

DENTAL HISTORIAN



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CONTENTS

Officials of the Lindsay Society, 1999-2000	2
Obituary: Christine Hillam	3
Origins of Orthognathic Surgery	5
<i>Kursheed F. Moos</i>	
The Decision to Fluoridate the Newcastle Water Supply from 7 October 1968	19
<i>C.L. Carmichael</i>	
The Earliest Licentiates in Dental Surgery	30
<i>E. Muriel Cohen</i>	
Book review	48
<i>Geoff Garnett</i>	
History of Dentistry at the World Dental Congress in Mexico	50
<i>Marguerite Zimmer</i>	
Letters to the Editor	52
<i>Juanita Burnby, Marguerite Zimmer</i>	
Dentistry 2000 - Birmingham, April	55
<i>Geoff Garnett</i>	
IAHD Meeting, Thursday, 30 November 2000, Paris	59

Cover illustration

From S.P.Hullihen, 'Case of elongation of the under jaw and distortion of the face and neck, caused by a burn successfully treated', *Am. J. Dent. Sci.* 1st Series, 9(1849), 157 (reprinted in *Dental Cosmos*, 1900).

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OBITUARY

Born in Doncaster, Christine Moore grew up in the provinces which figured so prominently in her later dental research. Her BA degree from the University of Newcastle in 1962 featured languages, ancient and modern, and was followed by a Dip Ed qualification in 1963. A year later, she married David Hillam, a recently qualified dentist from the same University. An early career teaching languages at schools on Tyneside and at Blaydon was followed by a move to Birmingham in 1970 where a clinical post in the Dental School for David enabled Christine to undertake a course in English as a Foreign Language and subsequently to work part-time as an EFL teacher. This provided Christine with the opportunity to develop her interests in genealogy, historical research and their application to the history of dentistry, thus bringing her to the attention of Ronald Cohen and the commencement of a career in which Christine's academic talents were to be developed to the full. An early assignment translating three Latin theses in 1973 led to her appointment as a part-time Research Associate with a grant from the Wellcome Trustees in 1974. By 1978, David and Christine had moved their respective talents from the University of Birmingham to the University of Liverpool. While this move was initially more to David's liking than to Christine's, she soon found work for her skills in the Language Export Centre of Liverpool University while continuing with research on the history of dentistry. Further development of her earlier enthusiasm for investigating the social histories of provincial dentists led to a most productive effort encompassing all aspects of dental practice in the provinces from 1755 to 1855, for which she was awarded a PhD by the University of Liverpool in 1986. This was published under the title of *Brass Plate and Brazen Impudence* by the University of Liverpool in 1991.

She became Honorary Treasurer of the Lindsay Society for the History of Dentistry and then the Editor of its Newsletter, where her efforts to improve the quality of refereeing of papers and adherence to correct listing of references were greatly appreciated. In 1998 she became the Society's Chairman. Her talents as a linguist prompted an extension of her interest in the development of dental practice in the 1790s to the European continent where she established a faithful network of correspondents on both sides of the 'Iron Curtain' long before the wall fell in 1989. Meetings of this group of experts were held in Berlin in 1992, in Liverpool in 1993 and in Paris in 1994.

She developed a most comprehensive database of dental practitioners and dental products for this country, and in the period before her death she made considerable efforts to compile a balanced picture of dental practice and education across Europe at the end of the eighteenth century. David is endeavouring to ensure that this important work is published posthumously.

Christine played an important part in the development of the Liverpool Medical History Society and served as Secretary, Treasurer, editor of its journal *Medical Historian* and eventually Chairman shortly before her death.

Such was Christine's infectious enthusiasm for her subject that students and contributors in this country and abroad rallied to support her in many collaborative efforts. She was a European before this term developed political implications and will be remembered with affection by all whom she befriended and inspired.

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ORIGINS OF ORTHOGNATHIC SURGERY

Khursheed F Moos*

Facial deformity has been with us since time immemorial, but its relative importance and significance in society has varied in different ages. Congenital anomalies have always caused parental anxiety and disappointment, and have frequently led to ostracism of the affected child. In the ancient world they often became omens and portents of disaster. In Sparta children with deformities were thrown from the mountain tops, in Ancient Rome they were often drowned, and in Ancient Greece to avoid such conditions women were encouraged to contemplate beautiful statues and paintings to produce healthy babies; it was thought that exposure to frogs, monkeys and other animals was responsible for producing children with craniofacial anomalies. In other parts of the world cleft deformity would seem to have been an acceptable anomaly, and the deformity we now know as Treacher Collins Syndrome has been identified in statues in Central and South America in such a way that it would appear that the unusual human child was given special status in their society, either as a king or god.¹ Whereas in Europe, in the first millennium AD, the face was portrayed in a stylised way which only later gave way to a recognisable and then idealized form. It was only when deformity occurred in members of upper classes, such as the Hapsburg emperors, that it was then acceptable to portray this in painting and sculpture.²

It was not until the fifteenth and sixteenth century that artists such as Raphaël,³ Dürer and Leonardo da Vinci started to define the normal balance of the various parts of the face and how to construct images of a beautiful form

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1 M.Orticochea, 'The harelipped king: a precolumbean ceramic statue over 2000 years old', *Brit. J. Plast. Surg.*, 36(1983), 392.

2 C.Gysel, *Histoire de l'Orthodontie* (Brugge: Catherine Press, 1997).

3 C.Gysel, 'Raphaël humaniste les structures de la face et leur appréciation esthétique', *Orthodontie Française*, 62(1991), 1043.

of the face. Leonardo da Vinci also illustrated the more grotesque forms of facial deformity sometimes associated with old age or various forms of discrepancy in jaw size, but in those days nothing could be done about it. For the male a beard might hide some of the problems, but loss of teeth in old age often accentuated the deformity. Perhaps one of the reasons for various forms of splinting of the teeth that were carried out from Etruscan times was not only to provide support for the dentition, but to maintain the appearance.

The history of orthognathic surgery, or the surgical correction of dento-facial deformity, is of relatively recent origin. Virtually nothing effectively could be done prior to the middle of the nineteenth century, and this was largely due to the lack of any form of satisfactory anaesthesia for surgical procedures. Horace Wells, in the middle of the century, used nitrous oxide for dental surgery, and this was later followed by William Morton with the use of ether in the USA and, at the turn of the nineteenth century, James Simpson in the UK who started to use chloroform. These three general anaesthetic agents were widely used for surgery in the New World and in Britain. At the turn of the nineteenth century local anaesthesia was discovered in Germany and this became a popular aid to surgery in central Europe, often instead of general anaesthesia.

The development of orthognathic surgery may be considered in three stages, the first stage started in the USA and Europe in the second half of the nineteenth century. At that time maxillofacial operations were carried out usually by general surgeons who used osteotomies to provide access to the face for the removal of pathology, especially tumours in the maxillofacial area. The early maxillofacial operations and resections were carried out by Dupuytren and Dufourmontel in France,^{4,5} by von Langenbeck in Germany,⁶ Cheever in the USA,⁷ and by a number of other innovative surgeons in both Europe and the New World. The second phase that can be identified is the first twenty years of the twentieth century, when various forms of mandibular surgery were being defined and some thought was being given to midface surgery. The third phase was a period of continuing progress from 1921 onwards which covered all aspects of deformity surgery in the face and included mandibular, midface and craniofacial deformity.

4 G. Dupuytren, 'Leçons orales de clinique chirurgicale,' Paris, 4(1834), 628.

5 L. Dufourmontel, 'Le traitement chirurgical du prognathisme', *Presse Méd.*, 29(1921), 235.

6 B. von Langenbeck, 'Beiträge zur Osteoplastik - Die osteoplastische Resektion des Oberkiefers', in *Deutsche Klinik*, ed. by A. Göschen (Berlin: Reimer, 1859).

7 D. W. Cheever, 'Displacement of the upper jaw', *Med. Surg. Rep. Boston City Hosp.*, 1(1870), 156.

In the first phase, in 1859 von Langenbeck carried out a unilateral osteoplastic resection of the maxilla, i.e. a horizontal osteotomy of the maxilla for access and tumour removal. Intraorally the osteoplastic flap was pedicled posteriorly and then firmly replaced. At that time the low-level fracture of the maxilla had not yet been described by Guérin,⁸ and this came in 1866. The detailed description of midface fractures had to wait until 1901, when René Le Fort published his experience of traumatising cadavers in Lille jail.⁹ This formed the basis of a classification of fractures and osteotomy surgery at three principal levels in the midface that still bears his name.

What is now called the Le Fort I maxillary down fracture osteotomy can be traced to David W. Cheever in 1867,^{7,10,11} an attending surgeon at Boston City Hospital, USA. He treated an eighteen-year-old male with a two-and-a-half year history of epistaxis and right nasal obstruction. A nasopharyngeal tumour had depressed the soft palate pushing it forward at right angles which totally occluded the right half of the nasal cavity and posteriorly the throat. At that time the approach was either to ligature the tumour through the nose, or to access it through a transpalatal approach, or to perform a complete maxillectomy. Cheever, wishing to preserve the teeth, was reluctant to do this, and he therefore suggested a horizontal section of the upper jaw. Under ether anaesthesia, skin incisions were made across the upper lip and towards the medial canthus of the eye. A narrow saw blade was used to section the right half of the maxilla and, after removing the upper right central incisor, the alveolus was divided. The soft palate was left intact but the hard palate had to be fractured. The tumour was removed from the right maxilla and nasal cavity and the lower half of the sectioned maxilla was re-positioned. The hemimaxilla was re-secured with a silver wire round the right lateral and left central incisors. The patient was maintained on a fluid diet. Additional maxillo-mandibular fixation was applied using a gutta percha mould, and a head bandage around the head and chin maintained the mandible and maxilla in a fixed position. By six weeks, union was solid and the patient could chew. A recurrence unfortunately occurred at eleven months and the whole procedure had to be repeated, apparently with success.

8 A. Guérin, *Arch. gén. de Méd.*, 6th Series, 8(1866), 1.

9 R. Le Fort, 'Étude expérimentale sur les fractures de la mâchoire supérieure', *Revue de Chirurgie, Paris*, 23(1901), 208.

10 R. B. Drommer, 'The history of the Le Fort I osteotomy', *J. Max. Fac. Surg.*, 14(1986), 119.

11 F. Moloney and P. Worthington, 'The origin of the Le Fort I osteotomy. Cheever's operation', *J. Oral Surg.*, 39(1981), 731.

Cheever extended the surgical procedure bilaterally for a tumour of the nose which was occluding both nostrils. In a similar way, the tumour was removed and the alveolar portions of the maxillae were repositioned and attached to the malar complexes with silver wires. Few details are available, but the patient was thought to have had an ether anaesthetic. There was only moderate blood loss – but the shock of the procedure was considerable, with a post-operative course accompanied by nausea and bloody diarrhoea. The exhausted patient died on the third post-operative day. At the time Cheever thought that he had carried out a novel procedure which, although technically successful, resulted almost certainly in a pneumonic death for the patient.

In 1893 Lanz,¹² following Kocher's description of the operation for midface osteotomy,¹³ split the upper lip in the midline to expose the maxillae, and then down fractured it and divided it sagittally for access to the pituitary fossa. Lanz quoted von Dieffenbach,

during the operation the patient presented a dreadful picture, the operation demands a cold-blooded surgeon and one skilful in the control of bleeding.

There were other varied descriptions of the so called "Le Fort I osteotomy" in the early part of the twentieth century.

As far as the mandible is concerned we turn to Simon P. Hüllihen,¹⁴ a remarkable general surgeon from Wheeling in Virginia who, in 1848, took pity on a twenty year old girl with gross facial deformity from burns sustained at five years of age. The scarring over the lower half of the face and neck pulled the head down and forward so that the chin was only one inch from the sternum. The lip was dragged down and the mucosal surface was lying below the chin, and she was unable to turn her head. The cheeks and upper lip were also pulled down, and there was drooling of saliva, poor speech and a history of two previous failed surgical procedures in New York. He decided to carry out surgery for her in three stages without any form of anaesthesia. The first part was to reduce the projection of the lower jaw and teeth. There was a gap for sectioning between the first and second premolars, which he used, but on the left side the first premolar had to be removed. Two v-shaped bone wedges were cut out, and then via a tunnelling approach and maintaining intact the

buccolingual mucoperiosteum, a horizontal section was carried out below the teeth with a saw. Bone was nibbled away, and the anterior segment was repositioned and inclined inwards and was secured to the teeth by ligatures. Cast silver cap splints were fitted. The operation allegedly caused little pain! But there was some swelling in the first three days. The soft and hard tissues healed, and the fixation was removed at six weeks, then the scarred skin and strictures of the neck were released with flaps developed from the shoulder to close the wound. After suturing with thread, a plaster was applied to the neck to support the flap. Allegedly, the patient bore this tedious and very painful operation with great fortitude and without uttering scarce a murmur. She was exhausted at the end of the procedure but there was little blood loss. A detailed description of the first few days was given, including problems with vomiting, dehydration and the necessity for bladder catheterisation, but by the tenth day she was sitting up and five days later she was walking. Over a period of weeks the shoulder wound granulated. There was pain and headaches, but healing occurred. Six weeks after the second episode of surgery a v-shaped excision of the lower lip was carried out, and this was closed with a combination of pins and sutures. At the end there were still burn scars, but she had good use of her jaws and lips and pictures dating from that time indicate a remarkable change in her appearance.

It was not until 1898 that the next significant mandibular procedure was carried out in the St Louis School under the direction of Edward Angle,^{15,16} the so-called father of orthodontics. He recognised the limitations of orthodontic treatment, and suggested surgical correction of mandibular prognathism with a double resection of the mandible, i.e. removal of a portion of the body of the mandible on each side with approximation of the fragments. He suggested their retention by dental splints and by fixation of the lower teeth to the upper teeth; now called inter-maxillary fixation. James Whipple,¹⁷ a St Louis dentist, referred a prognathic medical student to Angle. Previous orthodontic treatment had been unsuccessful, and an ugly appearance persisted. After much discussion and the passage of a few years, Edward Angle persuaded Dr

12 O.Lanz, 'Osteoplastische Resektion beider Oberkiefer nach Kocher', in *Deutsche Zeitschrift für Chirurgie* (Leipzig: Lücke Rose Vogel, 1893).

13 T.Kocher, 'Einfall von Hypophysis – tumor mit operativer Heilung', in *Deutsche Zeitschrift für Chirurgie* (Leipzig: Bier Garre Trendelenburg Wilms, 1909).

14 S.P.Hüllihen, 'Case of elongation of the under jaw and distortion of the face and neck, caused by a burn successfully treated', *Am. J. Dent. Sci.*, 1st Series, 9(1849), 157.

15 E.H.Angle, 'Double resection of the lower maxilla', *Dental Cosmos, Philadelphia*, 40 (1898), 635.

16 E.H.Angle, *Treatment of Malocclusion of the Teeth and Fractures of the Maxillae, Angle's System* (Philadelphia: S.S.White, 1898).

17 J.W.Whipple, 'Double resection of the inferior maxilla for protruding lower jaw', *Dental Cosmos, Philadelphia*, 40(1898), 552.

Vilray Blair,¹⁸ a talented local surgeon, to carry out the surgery via an external skin approach. The mandibular body was sectioned on each side, but no note was taken of the inferior dental nerve. Copper ligatures were applied at the lower border but apparently there were problems with the fixation. Whipple, who should have attended the operation, failed to supervise the fixation, and there were arguments over the surgical management during the post-operative period such that the intermaxillary fixation was lost and only a simple support head bandage was applied. There was ensuing infection, with a bloody purulent discharge intra-orally on the left side. Whipple, seeing the patient later, tried to rescue the situation with the insertion of bands on the teeth and traction across the osteotomy sites together with intermaxillary fixation. Remarkably, after five weeks union occurred, but because there was still some uncertainty about this a further chloroform anaesthetic was given which proved there was visible osseous union. The occlusion was not ideal, but quite correctable later with gold crowns.

Subsequent to that there was much argument over who was the true innovator of this surgical technique. Dr E.S. Talbot from Chicago asserted that this was entirely his idea.¹⁹ The details of the controversy were collected together by Biederman in 1956,²⁰ and after much argument it was agreed that Edward Angle had described the procedure some years earlier prior to the operation. A further, similar operation was carried out by a W.O. Talbot in New Orleans,²¹ but this was accompanied by bone necrosis and delayed recovery with a poor result. Some fourteen years later only two further successful cases allegedly had been carried out.

At the turn of the nineteenth century in Lyon, France, Berger was carrying out condylar osteotomies and condylectomies for the correction of mandibular prognathism,²² but there was little knowledge of these operative procedures in North America or the UK, nor were French surgeons familiar with the techniques being developed in the USA.

18 V.P.Blair, 'Report of a case of double resection for the correction of protrusion of the mandible', *Dental Cosmos, Philadelphia*, 48(1906), 817.

19 E.S.Talbot, 'Double resection of the lower maxilla', *Int. Dent. J.*, 19(1898), 640; *ibid*, 20(1899), 337.

20 W.Biederman, 'The strange story of the Angle operation', *Annals of Dentistry*, 15(1956), 1.

21 W.O.Talbot, 'A case of double resection of the mandible', *Dental Cosmos, Philadelphia*, 49(1907), 1002.

22 P.Berger, 'Du traitement chirurgical du prognathisme' (unpublished medical thesis, University of Lyon, 1897).

Vilray Blair, the talented St Louis surgeon with a particular interest in maxillofacial surgery, suggested various other corrective procedures for mandibular deformities in a paper of 1907,²³ and he was the first to publish a text book describing the correction of maxillofacial deformities in 1912 with a range of body, ramus and condylar procedures. He was also the first to recognise the importance of orthodontic involvement in the correction of skeletal deformity. During the First World War he was the senior maxillofacial consultant to the American Military Force, and it was during this period that he became associated with Robert Ivy, the first Professor of Plastic Surgery. The experiences of war surgery proved to be an invaluable training for surgeons managing elective surgery for deformity.

Early in the twentieth century, much discussion took place over the relative advantages of surgery in the ramus and body of the mandible. Wayne Babcock, in 1909, in the Philadelphia Dental College, advocated the treatment of anterior open bite with ramus surgery.²⁴ To maintain the occlusion he advised the insertion of a 'magnesium or ivory wedge' between the bone fragments of the ramus to reduce the risk of relapse. He also used an aluminium chin cup, intermaxillary fixation and a plaster bandage, all to maintain the mandible in its correct position. He also advocated a step osteotomy for the treatment of mandibular retrusion, thus maintaining bone contact. The advantage of ramus surgery was a reduced risk of infection, as there was no compound intra-oral wound, and in the absence of antibiotics every precaution had to be taken to avoid bone infection. He also advocated the regular use of study models, and he gave some consideration to preservation of the inferior dental bundle and mental nerve sensation.

P.H. Kazanjian,^{25,26} in the first quarter of the twentieth century, was an Armenian who started his working life in a US factory and then paid his way through medicine and dentistry over a number of years. He was a great innovator and a true maxillofacial surgeon, who developed his experience in the field of trauma during the First World War. He reported his experience of five mandibular body osteotomies in the London International Orthodontic Congress of 1931. To reduce the risks of infection, he advocated the initial removal of teeth followed by the healing of bone in the socket area. This was

23 V.P.Blair, *Surgery and Diseases of the Mouth and Jaws* (St Louis: Mosby, 1912).

24 W.H.Babcock, 'The surgical treatment of certain deformities of the jaw associated with malocclusion of the teeth', *JAMA*, 53(1909), 833.

25 V.H.Kazanjian, 'Surgical correction of mandibular prognathism', *Int. J. Orthodont.*, 18(1932), 1224.

26 V.H.Kazanjian, 'Jaw reconstruction', *Am. J. Surg.*, 3(1939), 249.

followed by an intraoral osteotomy of the alveolar portion of the mandible at six weeks, and some six weeks later, via a submandibular approach, the body osteotomy was completed. The occlusion was corrected and maintained with orthodontic fixation by attachments to the teeth and intermaxillary fixation. In some cases interosseous wiring and bone grafting were attempted; in most cases union occurred. However, no attempt was made to preserve the inferior dental nerve. In one case he quotes a complete return of sensation. Other comments were made to the effect that the patient accepted the alteration of sensation and that he could not remember any case which had developed permanent absence of sensation. There were no complaints! The treatment of mandibular retrusion was also developed, with lengthening procedures of the mandibular body. Anaesthesia was generally achieved by the rectal administration of ether.

In the German speaking area of Europe many developments were also occurring around this period, and Bruhn and Lindemann described similar mandibular procedures in 1921,^{27,28} as did Limberg,²⁹ a surgeon of high repute in Leningrad.

However the popularisation of orthognathic surgery was aided by the use of the Gigli saw, which was strongly advocated by Kostecka in Germany in a paper in 1931 for the treatment of mandibular prognathism.^{30,31} It should be said that Leonardo Gigli,³² born in 1863, was a gynaecologist who developed his wire saw for a symphysiotomy of the pelvis when the foetal head exceeded the diameter of the mother's pelvic canal. This was a means of dealing with disproportion by rapidly expanding the pelvic outlet. Gigli first described this in 1890, and some of his original work was carried out on the mandible. The versatility of the wire saw was soon recognised, and it was

- 27 C. Bruhn, 'Über die Beseitigung der Progenie durch Chirurgische und Zahnärztlich-Orthopädische Massnahmen', in *Deutsche Zahnheilk Forschung und Praxis* (Berlin: Sonderheit, 1920) p. 20.
- 28 A. Lindemann, 'Die Wehrchirurgie des Gesichtsschädels. Nachbehandlung und Nachoperation', *Deutsche Zahn Mund und Kieferheilkunde*, 3(1936), 105.
- 29 A.A. Limberg, 'Oblique osteotomy of the ramus for mandibular prognathism,' *J. Am. Dent. Assoc.*, 15(1928), 851.
- 30 F. Kostecka, 'Surgical correction of protrusion of the upper and lower jaws,' *J. Am. Dent. Assoc.*, 15(1928), 362.
- 31 F. Kostecka, 'Die chirurgische Therapie der Progenie,' *Zahnärztliche Rundschau*, 40(1931), 669.
- 32 J.J. Tarsitano and J.R. Gossman, 'Dr Gigli's saw and the closed mandibular osteotomy, an appraisal, a variation and a report of a case,' *J. Oral Surg.*, 29(1971), 409.

used not only for mandibular sections, but also for craniotomies, and it still remains in the repertoire for orthopaedic and neurosurgery. Kostecka used it for horizontally sectioning the ramus of the mandible above the lingula and inferior dental canal. It was generally considered a safe, closed method of sectioning the ramus. There were possible risks of damage to the facial nerve, parotid gland, inferior dental bundle and maxillary vessels, but all of these were rare. The procedure was modified for the closed subcondylar osteotomy using an oblique cut low in the condylar neck, however bone contact was not particularly good here and therefore there was a risk of non union and subsequent development of an anterior open bite. It was however a swift, and reasonably safe, development. The unpredictability of union, however, led to the method being largely abandoned by the end of the century, when it was effectively replaced by burs and saws.

The mandibular osteotomy was further refined with preservation of the inferior dental nerve by Reed O. Dingman in 1944 from Michigan,³³ a maxillofacial/plastic surgeon who improved techniques, fixation and the final occlusion and reduced the risk of complications. He did however report at least one death of respiratory origin in a narcotised patient, a persisting risk to this day. It was only the advent of antibiotics which converted the extra-oral procedure to an intra-oral one that could be safely carried out without infection.

Returning again to midface surgery, in Berlin in 1921 Günther Cohn-Stock developed the anterior maxillary osteotomy,^{34,35,36} and in many ways he can be considered the father of maxillary orthognathic surgery. He was born in 1889 in Witkovo, then part of Germany, and obtained his dental degree from Breslau in 1911. During the First World War he treated soldiers with lower facial injuries. He then returned to medical school and obtained his MD in 1923 in Berlin, where he worked with Professor Esser during the 1920s. Because of Cohn-Stock's Jewish background, he left Berlin in 1939 with the help of Prince Bernhard of the Netherlands who had been one of his patients. He immigrated to England, practising in St Johns Wood until 1965 before he

- 33 R.O. Dingman, 'Surgical correction of mandibular prognathism - an improved method,' *Am. J. Orthodont.*, 30(1944), 683.
- 34 G. Cohn-Stock, 'Die chirurgische Immediatregulierung der Kiefer, speziell die chirurgische Behandlung der Prognathie,' *Vjschr. Zahnheilk Berlin*, 37(1921), 320.
- 35 S.A. Wolfe, 'Günther Cohn-Stock, MS, DDS. Father of maxillary orthognathic surgery,' *J. Craniomax. Fac. Surg.*, 17(1989), 331.
- 36 S.A. Wolfe and S. Berkowitz, *Plastic Surgery of the Facial Skeleton* (Boston: Little, Brown & Co, 1989).

retired to California, dying at ninety-three years of age at the Marin General Hospital.

Martin Wassmund,³⁷ in Berlin, always acknowledged his debt to Günther Cohn-Stock, but he further developed the techniques of mandibular and maxillary surgery, carrying out the first total maxillary osteotomy for deformity in 1927, but he was afraid to mobilise it and therefore had to allow correction of the anterior open bite by traction with intermaxillary fixation over fourteen days. He also described and published many other procedures in relation to the mandible and maxilla, including his own maxillary segmental osteotomy.

The first full-blown maxillary osteotomy as we know it was carried out by Axhausen in 1934 for the correction of a post-traumatic deformity.^{38,39} This technique is elegantly described in papers written in 1934, 1936 and 1939. There were many who contributed to midface surgery, but Schuchardt,^{40,41} who was also from the Berlin school, was the first to carry out the difficult posterior maxillary osteotomy for the correction of anterior open bite. He was also the first to describe an extra-oral sagittal split osteotomy of the ramus of the mandible, which improved bone contact and provided a useful method both for the treatment of mandibular prognathism and retrusion.

The correction of the secondary cleft deformity was particularly difficult and the necessity for complete mobilisation of the maxilla was emphasised by Axhausen and Wassmund,^{38,36} but there was concern about the dangers of excessive advancement of the maxillae, leading to deterioration of speech. At that time compromise surgery was suggested by Wassmund, repositioning the mandible to accompany maxillary advancement.

At the same time, in the Austrian school at Vienna, Pichler developed and in 1928 suggested alternative methods for mandibular corrective sur-

- 37 M. Wassmund, *Lehrbuch der praktischen Chirurgie des Mundes und der Kiefer* (Leipzig: Meusser, 1935).
- 38 G. Axhausen, 'Die operative Orthopädie bei den Fehlbildungen der Kiefer,' *Deutsche Zahn; Mund und Kieferheilkunde*, 6(1939), 582.
- 39 G. Axhausen, 'Zur Behandlung veralteter disloziert verheilte Oberkieferbrüche,' *Deutsche Zahn; Mund und Kieferheilkunde*, 1(1934), 334.
- 40 K. Schuchardt, 'Die Chirurgie als Helferin der Kieferorthopädie,' *Fortschritte der Kieferorthopädie*, 15(1954), 1.
- 41 K. Schuchardt, 'Formen des offenen Bisses und ihre operativen Behandlungsmöglichkeiten,' *Deutsche Zahn; Mund und Kieferheilkunde*, 9(1942), 222.

gery.^{42,43} From his Unit some of the most famous twentieth century surgeons obtained their training, including Richard Trauner,^{44,45} who developed procedures for the correction of mandibular micrognathia with the ramus inverted L osteotomy and postcondylar grafts. He started a further centre in Graz, where Heinz Köle and Hugo Obwegeser were trained.^{46,47} Various orthognathic procedures carried their eponymous names, and from there the first significant text of orthognathic surgery originated, entitled *Chirurgische Kieferorthopädie*, which was produced by Reichenbach, Brückl and Köle.⁴⁸ The intra-oral sagittal split osteotomy, described by Obwegeser and Trauner,^{45,49} has been modified in many ways over the years, but this was a major innovation which became a standard technique in the 1960s. At the same time Obwegeser was carrying out midface surgery at all levels to correct deformity where it lay in the face.⁵⁰ His visits to the USA at that time popularised the sagittal split procedure for the treatment of mandibular retrusion and the Le Fort I osteotomy with bone grafting for secondary cleft deformity, and they led the way to the consideration of the relative advantages of modifications and different surgical procedures. The original sagittal split osteotomy was first modified by Dal Pont to give greater bone contact and to reduce complications;^{51,52}

- 42 H. Pichler and R. Trauner, *Mund und Kieferchirurgie für den Zahnarzt und Studenten* (Wien: Urban & Schwarzenburg, 1948), II, p. 600.
- 43 H. Pichler, 'Über Progenieoperationen,' *Wiener Klinische Wochenschrift*, 38(1928), 1333.
- 44 R. Trauner, 'Der retrokondyläre Implantation, eine Operationsmethode zum Vorbringen des Unterkiefers beim Distalbiß,' *Deutsche Zahn; Mund und Kieferheilkunde*, 20(1954), 391.
- 45 R. Trauner and H. Obwegeser, 'Zur Operationstechnik bei der Progenie und anderen Unterkieferanomalien,' *Deutsche Zahn; Mund und Kieferheilkunde*, 23(1955), 1.
- 46 H. Köle, 'Surgical operations on the alveolar ridge to correct occlusal abnormalities,' *Oral Surg. Oral Med. Oral Path.*, 12(1959), 277.
- 47 H. Köle, 'Die chirurgische Behandlung von Formveränderungen des Kinns,' *Wien. Med. Wschr.*, 118(1968), 331.
- 48 E. Reichenbach, H. Brückl and H. Köle, *Chirurgische Kieferorthopädie* (Leipzig: J.A. Barth, 1964).
- 49 H. Obwegeser, 'The indications for surgical correction of mandibular deformity by the sagittal splitting technique,' *Br. J. Oral Surg.*, 1(1963), 157.
- 50 H. Obwegeser, 'Surgical correction of small or retrodisplaced maxillae,' *J. Plast. & Reconst. Surg.*, 43(1969), 351.
- 51 G. Dal Pont, 'L'osteotomia retromolare per la correzione della progenia,' *Minerva Chir.*, 1958, 1.

Hunsuck shortened the posterior split,⁵³ and various other changes were suggested by Bell, Epker and Wolford in the USA.^{54,55,56} The scientific background to this came only with the work of Bill Bell in Dallas during this same period.⁵⁷

Even before the Second World War, the risks of sensory nerve damage and loss of lower lip sensation were thought worthy of consideration, and Robinson and Moose et al developed a reliable extra-oral procedure for prognathism – the vertical subsigmoid or vertical ramus osteotomy with a bone cut placed posterior to the inferior dental nerve.^{58,59,60} This procedure, although now rarely carried out extra-orally, was subsequently modified and replaced by the intra-oral approach. H. David Hall was able to show that with appropriate instrumentation and oscillating saws this could be done reliably, safely and without external scarring.⁶¹ This procedure remains today within the repertoire of every oral and maxillofacial surgeon for the correction of prognathism.

Continued ...

- 52 G.Dal Pont, 'Retromolar osteotomy for the correction of prognathism,' *J. Oral Surg. Anaesth.* 19(1961), 42.
- 53 E.E.Hunsuck, 'A modified intraoral sagittal splitting technique for correction of mandibular prognathism,' *J. Oral Surg.*, 26(1968), 249.
- 54 W.H.Bell, *Surgical Correction of Dentofacial Deformities* (Philadelphia: W.B.Saunders, 1985).
- 55 B.N.Epker and L.M.Wolford, *Dentofacial Deformities – Surgical Orthodontic Correction* (St Louis: Mosby, 1980).
- 56 B.N.Epker and L.M.Wolford, 'Middle third facial osteotomies. Their use in the correction of acquired and developmental dentofacial and craniofacial deformities,' *J. Oral Surg.*, 33(1975), 491.
- 57 W.H.Bell, 'Biologic basis for maxillary osteotomies,' *Am. J. Phys. Anthropol.*, 38.2(1973), 279.
- 58 M.Robinson, 'Prognathism corrected by open vertical condylotomy,' *J. Southern California State Dental Association*, 24(1956), 22.
- 59 S.M.Moose, 'Correction of abnormal mandibular protrusion by intraoral operation,' *J. Oral Surg.*, 3(1945), 304.
- 60 S.M.Moose, 'Surgical correction of mandibular prognathism by intraoral subcondylar osteotomy,' *Brit. J. Oral Surg.*, 1(1963), 172.
- 61 H.D.Hall, D.C.Chase and L.G.Payor, 'Evaluation and refinement of the intra-oral vertical subcondylar osteotomy,' *J. Oral Surg.*, 33(1975), 333.

During the Second World War some consideration started to be given to more complex craniofacial deformities in the UK, and Sir Harold Gillies and Harrison in 1942 carried out the first correction of a Crouzon's type deformity with a Le Fort III osteotomy.⁶² Harold Gillies and Norman Rowe in 1954 successfully repeated this surgery with a craniofacial dysjunction on a secondary cleft deformity case.^{63,64} The changes that were produced in the face were quite remarkable, not only correcting the midface deficiency but also gross orbital proptosis and skull deformity. Spectacular changes in the midface resulted from the treatment of craniofacial deformity and the orbital areas by Paul Tessier in France during the 1960s and 1970s.⁶⁵ Derek Henderson and Ian Jackson in Glasgow in 1973 were responsible for the development of the Le Fort II osteotomy for the correction of central midface deformity.⁶⁶ It was Derek Henderson who was also responsible for the development of appropriate planning techniques using a combination of photocephalometry and accurate model surgery. He also emphasized that the correction of jaw deformity with the aid of cephalograms was not simply the carrying out of bony surgery, as this failed to recognise the varying soft tissue changes occurring in the face. The soft tissues responded differently from the underlying bone structure, and this was to a large extent predictable and measurable (1975 Hunterian lecture). In the USA, Converse,⁶⁷ and others in Europe,⁶⁸ refined osteotomy techniques in the post war period, paying particular attention to changes in the overlying soft tissues.

Further improvements in technique occurred with the development of plating techniques and screws for the fixation of jaw fragments. This reduced

- 62 H.D.Gillies and S.H.Harrison, 'Operative correction by osteotomy of recessed malar maxillary compound in a case of oxycephaly,' *Br. J. Plast. Surg.*, 3(1950), 123.
- 63 H.D.Gillies and N.L.Rowe, 'L'ostéotomie des maxillaire supérieur envisagée essentiellement dans le cas de bec-de-lièvre total,' *Rev. de Stomatologie*, 55(1954), 545.
- 64 N.L.Rowe, 'The aetiology, clinical features and treatment of mandibular deformity,' *Brit. Dent. J.*, 108(1960), 45.
- 65 P.Tessier, 'Ostéotomies totales de la face syndrome de Crouzon, syndrome d'Apert Oxycéphalies, Scaphocéphalies, Turricéphalies,' *Ann. Chir. Plast.*, 12(1967), 273.
- 66 D.Henderson and I.T.Jackson, 'Nasomaxillary hypoplasia – the Le Fort II osteotomy,' *Br. J. Oral Surg.*, 11(1973), 77.
- 67 J.M.Converse and D.Wood Smith, 'An Atlas and classification of midfacial and craniofacial osteotomies,' in *Trans. of the 5th Int. Congress of Plastic Surgery* (Melbourne: Butterworth, 1971), p. 931.
- 68 S.Wunderer, 'Die Prognathieoperation mittels frontal gestieltem Maxillafragment,' *Österreichische Zeitschrift für Stomatologie*, 59(1962), 98.

the risk of relapse, and allowed intermaxillary fixation to be dispensed with in many cases. Spiessl in Switzerland,⁶⁹ and Luhr in Germany,⁷⁰ were perhaps the two most important innovators of plating techniques, and these were further developed by Steinhäuser in Erlangen.^{71,72} More recently, the use of resorbable bone plates in Helsinki and Groningen in Holland suggest a new way forward which avoids the risk of leaving plates permanently in situ, or the necessity for a second operation.

Although the history of orthognathic surgery is relatively short, it should be said that progress is still being made and the use of distraction osteogenesis, developed from limb lengthening procedures of Ilizaroff in Russia,^{73,74} is now being applied to the jaws allowing for the early correction of deformity in children which is both low risk and reliable. In many cases it also eliminates the need for autogenous bone grafts from the hip, ribs and cranium. The place for these new techniques is not yet defined but, increasingly, they are used for the more difficult high relapse cases seen in cleft deformity surgery. Continuing change is part and parcel of surgery, and we may well ask 'where will it all end?' The quest for aesthetic perfection will no doubt continue to intrigue the oral and maxillofacial surgeon.

69 B.Spiessl, 'Osteosynthese bei sagittaler Osteotomie nach Obwegeser - Dal Pont', in *Fortsch. Kiefer und Gesichtsch.* (Stuttgart: Thieme, 1974), 18, p. 145.

70 H.G.Luhr, 'Stabile Fixation von Oberkiefer-Mittelgesichtsfracturen durch Mini Kompressionsplatten,' *Deutsche Zahnärz.* 34(1979), 851.

71 E.W.Steinhäuser, 'Bone screws and plates in orthognathic surgery,' *Int. J. Oral Surg.*, 11(1982), 209.

72 E.W.Steinhäuser, 'Historical development of orthognathic surgery', *J. Cranio. Max. Fac. Surg.*, 24(1996), 195.

73 G.A.Ilizarov, 'The tension stress effect on the genesis and growth of tissues. Part I: The influence of stability of fixation and soft tissue preservation,' *Clin. Orthop.*, 238(1989), 249; G.A.Ilizarov, 'The tension stress effect on the genesis and growth of tissues. Part II: The influence of the rate and frequency of distraction,' *Clin. Orthop.*, 239(1989), 263.

74 J.G.McCarthy, J.Schreiber, N.Karp, C.H.Thorne and B.H.Grayson, 'Lengthening the human mandible by gradual distraction,' *Plast. Reconstr. Surg.*, 89(1992), 1.

THE DECISION TO FLOURIDATE THE NEWCASTLE WATER SUPPLY FROM 7 OCTOBER 1968

C.L. Carmichael*

The City and County of Newcastle upon Tyne Local Authority was first officially involved in fluoridation on 20 July 1962 when Kenton Ward councillor, Mr J. Cox, wrote to the Medical Officer of Health as follows:

Dear Sir,

I enclose a letter I have received from Mr Harold Dresner, LDS, which I should be very much obliged if you would pass to the Health Committee for their consideration.

Mr Dresner's letter, sent from his dental practice at 78 Kenton Lane, Kenton, is dated 13 July 1962 and states:

Dear Councillor Cox,

The adding of sodium fluoride to local water supplies has been proved conclusively by recent tests to improve the dental condition of our younger generation.

I would like to suggest that the Health Committee gives priority consideration to recommend to the Newcastle and Gateshead Water Board to add fluoride to its water supply.

Yours sincerely,

H. Dresner, LDS

The Newcastle Local Authority General Purposes Committee met on Wednesday, 19 September 1962 when Dr Pearson, the Newcastle Medical Officer, reported Councillor Cox and Mr Dresner's letters, and added in his report:

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I have no doubt that Dr (sic) Dresner's request is stimulated by the Ministry of Health's Scottish Office and Ministry of Housing and Local Government Report on *The Conduct of the Fluoridation Studies in the United Kingdom and the Results Achieved after Five Years*. This is a particularly interesting report arising out of the studies, which the Ministries initiated in Watford, part of Anglesey and Kilmarnock, comparable communities serving as controls. The water supplies in the study areas had one part per million of fluoride added to it in 1955 and the state of the teeth of children living in the area was measured after five years.

The results after the first five years show that in each area there has been a striking improvement in the dental condition of children aged three to seven years, the most marked improvement in children born after the onset of fluoridation. A reduction in dental caries in this group range from sixty-six percent in three-year-olds to fifty percent in five-year-olds.

These findings confirm the report of the United Kingdom Mission to the United States and Canada in 1952. The process of fluoridation in these countries was studied and the conclusions reached, that a marked reduction in dental caries among children could be brought about by this means.

The standing Dental and Medical Advisory Committee for England, Wales and Scotland endorsed the report on the fluoridation studies in the United Kingdom and had therefore advised the general adoption of fluoridation. The Committee is asked to consider the evidence and then, if satisfied that fluoridation by the addition of one part per million of fluoride to water supplies is sound, safe and an advantageous procedure, to approach surrounding authorities using the Newcastle and Gateshead Water Company supply. If general agreement is reached then a request will have to be submitted to the Ministry of Housing and Local Government to permit the fluoridation of the water supply, always assuming that the Water Company will be prepared to purchase the necessary apparatus and meet the costs.

The Newcastle Health and Social Services Sub-Committee, 19 September 1962 minutes state:

Submitted – Report of the Medical Officer of Health in connection with a letter from Mr H. Dresner, a General Dental Practitioner in the City on the subject of adding fluorine to water supplies. The report also contained a synopsis of a Ministry of Health, Scottish Office and Ministry of Housing and Local Government Report on *The Conduct of the Fluoridation Studies in the United Kingdom and the Results Achieved after Five Years* – a copy of report in official Minutes Book.

Agreed that the question of increased fluoridation in water supplies be deferred, and that the Medical Officer of Health report back to the Committee after the Ministry of Health has made an announcement on the subject.

It was further agreed that the Town Clerk be asked to write to the Ministry of Health stating that the Committee intend to give consideration to the increasing of fluoridation in water supplies and to ask the Ministry to look into the legal aspects of the question.

The Central Council for Health Education, Travistock House, North Tavistock Square, London, sent to the Newcastle Council in October 1962 the following:

ANNUAL CONFERENCE 1963

"Fluoridation"

I have pleasure in enclosing a copy of the Programme and Registration Form for the Annual Conference of this Council which will be held at the National Film Theatre, South Bank, London SE1, on Thursday, 24 January 1963, from 10.00 a.m., to 4.00 p.m.

This conference is intended for Chairman of Health, Education and Welfare Committees, Medical Officers of Health, Chief Dental Officers and their staffs, Directors of Education and all members of the dental, medical, nursing and teaching professions and representatives of voluntary bodies. Following the favourable report on *The Conduct of the Fluoridation Studies in the United Kingdom* published in July 1962, it seems clear that there will be increasing public demand for this preventative health measure. The report shows that dental decay in children in the experimental areas were reduced by fifty to sixty percent. It was impossible to find proof of any harmful side effects. The safety of controlled fluoridation has been endorsed by the World Health Organisation and the legal Dental and Medical associations throughout the world. Local authorities will need to have a clear assessment of the arguments for and against the fluoridation of water supplies. Those authorities which advocate fluoridation may anticipate some organised opposition but experience of fluoridation schemes so far indicate that a well informed public provides the best answer.

A document from the Newcastle files headed "Fluoridation Proposals invited – the Minister ready to give approval under Section 28" states:

Replying in 10 December, the House of Commons to a question by Sir Richard Pilton, who asked the Minister what action he was taking following his Department's report on fluoridation of water and what would be the dental effects, Mr Enoch Powell said, 'My Right Honorable friend, the Secretary of State for Scotland and I are ready to approve under Section 28 of the National Health Service Act, and the corresponding section of the Scottish Act, proposals from local health authorities to make arrangements with water undertakers for the addition of fluoride to water supplies which are deficient in it naturally. Where this is done, the incidence of dental decay in young children should be reduced by about half.'

Sir G. Nicholson: 'Why does he not take stronger steps? Surely my Right Honourable friend ought to be more vigorous?'

Mr Powell: 'I cannot do more, short of making it mandatory upon all local authorities to do this. I cannot pick one element out of a whole field of the responsibilities of the local health authorities and make that mandatory. I am sure that in this, as in other elements of preventative health, realising the value of this measure, local authorities will come forward steadily and actively to put it into effect.'

After giving this answer in the House, the Minister met the press whom he told how much he had been impressed by the benefits conferred by this simple measure in the study areas and by the evidence put before him about the ravages of dental caries among children and the reductions brought about by bringing the fluoride content of public water supplies to one part per million. Local health authorities and water undertakings, Mr Powell said, had legal powers to carry out this measure but would be indemnified by the Government as the study areas' local authorities had been against the outcome of any legal procedures taken against them in this respect. He pointed out that during the past five years, no action had been taken against the local authorities in whose areas the study had been conducted.

The Minister was asked by a press representative whether he would bring pressure to bear on local authorities that took no action in this matter to which he said no, but he expected that the laggards would be influenced by the evidenced benefits which would accrue to the dental health of children in the places where one part per million of fluoride was present in or was added to the water supply. Sixty-seven local authorities in England and Wales had already indicated support for fluoridation and, in addition to the Medical and Dental bodies which were in strong favour of it, the County Councils' Association, from which a deputation recently asked the Minister to take action, and the Association of Municipal Corporations had both advocated this public health measure. The first recorded letter received in opposition to fluoridation in Newcastle is dated 3 September 1962, and states:

Dear Sir,

You will no doubt have received for your Council an invitation from the Central Council for Health Education to send delegates to their Annual Conference to be held at the Film Theatre, South Bank, London, on 24 January 1963.

It appears a very wrong thing that a body such as the Central Council for Health Education, which is supported by local authority money and claims to be educational, should be intending at this Conference, to put only the proponent side of fluoridation to their audience and, from the printed Programme, give no indication at all that there is a strong case on ethical, scientific and medical grounds against fluoridation.

In the original report of this conference in the *Medical Officer* of 21 September 1962, it was stated that the arguments for and against fluoridation would be given, but on my Chairman having written to enquire who was to give the case against, he and several other enquirers all received the same circular letter as attached copy.

It would be appreciated, therefore if you would get your Council or your proposed delegates to write to the Medical Director of the Central Council for Health Education asking what arrangements have been made for both sides of the case to be presented at the Conference. Our Organisation would be happy to supply both Medical

and Dental and perhaps biochemical speakers to give the case against fluoridation provided we have sufficient pre-notice.

I should be grateful to you for a copy of any reply you may receive.

Yours truly,

C.P. Sykes
Hon. Secretary

In any account such as this, it is only possible to highlight some of the enormous national, as opposed to local, press opposition that was sent to local city councillors with whom the decision, to fluoridate or not, rested. The National Pure Water Association, with its imposing Committee - Chairman The Lord Douglas of Barlock, KCMG, Vice Presidents the Viscount Bledisloe, QC, The Lord Semple, Mrs Joyce Butle, MP, The Lord Methuen, RA, The Lord Glentener, KBE and Major The Lord Worlsey, DL - sent scores of documents over the years, many several pages long. It is only possible to highlight some of the pamphlets, articles, and debates in the Lords and Commons in their sustained national effort to prevent fluoridation, and to give some indication of the pressures put upon city councillors.

As an example, well over a hundred pages of national anti-fluoridation literature was widely distributed, particularly to local authority decision makers and those who could influence democratically elected representatives.

The British Dental Association, in 1963, distributed *Fluoridation and Public Health* as a guide for members of local Councils, including Newcastle, and emphasised the imbalance of publications for fluoridation compared to the overwhelming amount distributed by those against.

On 11 April 1963, Dr Pearson, Medical Officer of Health, wrote to the Honorary Secretary of the Newcastle Local Dental Committee, Mr T.W. Hogg, LDS, asking for the views of the Local Dental Committee regarding fluoridation. On 9 May, Mr Hogg replied to Dr Pearson as follows:

Dear Dr Pearson,

I refer to our previous correspondence in connection with the necessity for the fluoridation of the local water supply and to say that your letter of 11 April 1963 was considered by my Committee at their meeting held this week. The result is that they are strongly in favour of the idea of fluoridation and should any movement take place in this direction at any time I can add that the local Dental Committee would support it.

Yours sincerely,

T.W. Hogg

On 29 May 1963 the Medical Officer of Health for Newcastle wrote to the Ministry of Health:

Dear Sir,

I would be grateful if you could forward 1000 copies of the booklet *Fluoridation* and mark them for the attention of my principal assistant, Mr E.A. Moore.

I understand that this booklet is free but if there is any charge I would be grateful if you could forward your account in due course.

This letter follows Dr Pearson's letter to Mr H.E. Lightfoot, the Newcastle Director of Education, stating that the Minister of Health had issued the attached booklet and had instructed local health authorities to consider the addition of fluoride to the water supply in order to reduce the incidence of dental caries. He added:

The Medical and Dental Committees have been consulted and are in favour of this procedure but it is necessary to disseminate information so that members of the general public can obtain an unbiased view when the time comes for the Health and Social Services Committee and eventually the Council to consider this very delicate matter.

I am wondering whether you would permit me to send out a booklet to head teachers and the heads of technical and training colleges?

Do you think it would be wise to consult the school health and childcare sub-committee first? If so, it might be better to bring the matter as simultaneously as possible to the health and social services committee and the school health and childcare sub-committee.

On 5 June 1963 the Ministry of Health sent out the following letter to all County and County Borough Councils in England:

Dear Sir,

Fluoridation

- 1 In the course of a recent speech at Hitchin, Hertfordshire, the Minister referred to fluoridation and he thinks it might be helpful to local health authorities to have the full text of that part of the speech in which he did so. A copy is enclosed.

Extract from Minister of Health's speech at Hitchin on 17th May 1963

I want to refer specially to one preventive measure which I know is engaging the attention of the local authorities in this country. Among the services which will be provided at this clinic are dental services for children. Unhappily even at the age when children enter school, let alone by the time they leave it, much of the work of the dentists consists of repair and not

prevention: the mouths of all too many children will already have suffered irretrievable damage before they are dealt with here. Fortunately we know a way in which a great deal of this damage can be prevented safely, surely and simply, for we know that in areas where the drinking water is not deficient in fluoride, children's dental health is vastly better than elsewhere; we know that water with adequate fluoride has been used by millions of people and their ancestors from time immemorial without any ill effects; and we know that water with fluoride brought up to the requisite level artificially is indistinguishable in any respect from water containing it naturally.

I am aware that there are cranks who are trying to hold up fluoridation by scare-mongering and misrepresentation. It is hard to speak to these people in moderate language. They themselves drink water which contains numerous chemicals artificially added. They themselves drink water which already contains fluoride, sometimes at appreciable levels. Yet, for the sake of a private fad or personal quirk, they would be satisfied to see whole generations of children grow up suffering avoidable pain and ill-health.

This must not be allowed to happen. Indeed, I am sure it will not happen. I have already approved the fluoridation schemes for four counties or county boroughs; I am approving another scheme today – it is that of Monmouthshire – and I expect to be approving a further eight, if not more, in the next few weeks. At least thirty-four other health authorities have already passed resolutions in favour. Thus a big start had been made on something which before long will become general and I congratulate these authorities – I am sorry the roll of honour is too long to read it out here which have led the van. I am glad to know that in Hertfordshire no fewer than twenty-seven out of the twenty-nine county districts that have considered fluoridation want the county to go ahead with it, and I am sure that the Hertfordshire children benefits which children in some fortunate parts of the country have always enjoyed and which can now be available to all.

In June 1963 the Newcastle Council General Purposes Sub-Committee were sent the Ministry of Health pamphlet on fluoridation and were told that if the Committee was prepared to recommend to the City Council that fluoride should be added to the Newcastle and Gateshead Water Company supply, which is naturally deficient in fluoride, then it will be necessary to request the water undertaking to make suitable arrangements after consultation with the Minister of Housing and Local Government as set out in the Ministry of Housing and Local Government Circular 37/63.

The General Purposes Sub-Committee were told that the local health authority would be called upon to meet the full cost, which was estimated at 10p per head of population per annum, approximately £11,125. The Committee's instructions were requested.

On 17 June 1963, the National Pure Water Association for the Prevention of Water Pollution sent out a press release with the heading as follows:

LEGAL ACTION TAKEN FLUORIDATION

Poor British and American experience, compulsory mass medication unpopular, rejected by Cambridge, Oxford and many other local authorities - inefficient - hazardous - wasteful.

On 27 July 1963 the Health and Social Services Department in Newcastle received a guide for members of local councils issued by the British Dental Association headed *Fluoridation and Public Health*. The document presented the facts about fluoridation and went on to meet the propositions that the anti-fluoridation campaign put out.

Dr Pearson wrote to the City Librarian enclosing twelve copies of the Ministry of Health's publication on fluoridation of water supplies, which he suggested the librarian might find useful for distribution to various libraries. 'Further copies are available if you require them,' said Dr Pearson.

On 16 December 1963, the Health and Social Services Department received a document issued by the National Pure Water Association, headed *Why is Fluoridation so Unpopular?* and included Newcastle Upon Tyne as one of thirty-three county borough councils which had not accepted fluoridation.

On 30 January 1964, Dr R.C.M. Pearsons wrote to the Town Clerk suggesting that he circulate copies of the Ministry of Health pamphlet on fluoridation to all members of the Council. 'If you agree,' he wrote, 'I could let you have eighty or so copies for distribution.'

On 4 March 1964, the Newcastle City Council debated the report from the Health and Social Services Committee on fluoridation. Alderman Mrs Murray stated, 'the subject had excited more passions than many of the items that had been discussed for a long time in the Council Chamber'. Mr Grey said that,

on this occasion the Health and Social Services Committee decided that they would bring a Report before the Council without recommendation and so give the members of the Council the opportunity of making up their own minds. I entirely agree with the Committee's action, and it will be as each and every member pleases, conscientiously, to either say yeah or nay!

The motion stated:

That this Council, believing that the advantages of fluoridation of the water supplies outweighs any proven disadvantages, approves the principles of fluoridation and instructs the Health and Social services Committee to hold discussions with the Newcastle and Gateshead Water Company as well as other appropriate local authorities and to draft a scheme of implementation.

The motion was put to the Council, and on a show of hands there were twenty-eight votes for the motion and twenty-eight votes against. The Chair-

man intimated that he would not use his casting vote in this matter, and the motion was therefore declared as not carried. The Town Clerk stated that 'the motion had not been carried the matter, therefore if necessary, would have to come up at some future date'. So reported the Proceedings of Newcastle Council for 4 March 1964.

On 9 August 1965, the Medical Officer of Health wrote to Mr S.P. Barrett, General Manager, Newcastle and Gateshead Water Company, as follows:

Dear Mr Barrett,

I think that the statement by the Minister of Health and the request that local authorities should reconsider the fluoridation situation will result in a review of the previous decision which my Council made in relation to fluoridation. It would be very helpful if you could let me know what the approximate cost to the Council would be if all the authorities in your area invited your Water Company to fluoridate the water supply.

Mr Barrett wrote back on 13 August 1965 that the approximate capital cost of the instillation would be £6700 and the approximate running costs £2750 per annum.

On 13 September, the Health Committee was told that a circular had been received from the Ministry of Health dated 3 August 1965 recommending all councils to reconsider their previous decision on the fluoridation of water supplies.

The Minister trusts that Councils will recognise the undoubted safety of this measure and the benefits which it brings in the reduction of dental caries. The booklet *Fluoridation* has been brought up to date and has been circulated with the Committee reports in order that a full discussion may take place and a recommendation to the City Council would naturally follow.

On 30 October 1965 the Newcastle Medical Officer wrote:

My Council will be debating this matter again on Wednesday afternoon this week, finishing up with another free vote. So far Northumberland, Durham, Gateshead, South Shields and Tynemouth, have all agreed to fluoridation but nothing can happen until Newcastle upon Tyne agrees too as we have joint water supply. The score at the moment is two draws at the Health Committee, one draw at the City Council, with the Chairman and Lord Mayor respectively declining to give a casting vote.

Dr Pearson wrote to Professor Neil Jenkins, Professor of Oral Physiology, Newcastle Dental School.

I understand that the Committee Clerk has now been in touch with you about a meeting of the City Council on the above subject and we will be inviting you to speak at this meeting which I believe has been arranged for 3.00 p.m. on Monday,

15 November. In the meantime, I am enclosing copy of the proceedings of the Council dated 4 March 1964, when this matter was previously discussed for your information.

Professor Neil Jenkins, a strong scientific supporter of fluoridation, wrote to Dr Pearson on 12th November 1965 enclosing a summary of some disputed points of the fluoridation question which he proposed to distribute and discuss with members of the Council.

The proceedings of the Newcastle Council stated on 1 December 1965, in fifteen pages of report, that

following the motion of the 4 March 1964 not being carried, being twenty-four votes for and twenty-four votes against the motion, the Health and Social Services Committee reported that a further circular letter had since been received, again inviting local authorities to make arrangements for the fluoridation of the water supplies. If the health authorities in the supply area of the Newcastle and Gateshead Water Company all request the Company to add fluoride to the water supply, the Company tentatively estimate that the cost to the Authority will be £6700 in respect of the initial expenditure and £2750 per annum in respect of the annual running costs. The Health and Social Services Committee, without making any recommendations, therefore again submit the matter to the Council for decision.

There was a long discussion during which some ten Aldermen and Councillors spoke almost evenly for and against fluoridation. When the motion was put to the Council it was carried on a show of hands, there being thirty-five votes for the motion and twenty-three against.

A note to the Newcastle Health Committee on 13 May 1968 stated:

FLUORIDATION OF WATER SUPPLIES

The Engineer of the Newcastle and Gateshead Water Company informs me that the necessary equipment has arrived, the working arrangements are being checked and he hopes to be able to introduce fluoride into the water supply within the next few weeks. He will make a press announcement so that anyone at present taking tablets as a source of supply will know when the introduction takes place. The British Dental Association and the Local Dental Committee will be informed. Medical Officers of Health in the areas covered by the Newcastle and Gateshead Water Company supply are likewise receiving this information.

The following announcement was issued by the Newcastle and Gateshead Water Company in late September 1968:

NEWCASTLE AND GATESHEAD WATER COMPANY FLUORIDATION OF WATER SUPPLIES

The Newcastle and Gateshead Water Company will commence the addition of fluoride to the water supplies treated by the purification plants at Whittle Dene and Throckley on the 7 October 1968. The area to be supplied with water containing

fluoride covers: Newcastle upon Tyne, Gateshead, Newburn, Ryton, and parts of Prudhoe, Blaydon, Felling, Gosforth, Longbenton, Castle Ward, Seaton Valley, Whickham, Chester-le-Street, Hexham Rural District (Stocksfield area).

In respect of properties in the aforesaid part areas, the Water Company will be pleased to inform householders whether or not fluoridated water is supplied. The dose to be applied is one part of fluoride ion for each million parts of water and the chemical to be used will be sodium silico fluoride.

The Water Company being aware that the application of fluoride to water supplies does not meet with universal approval decided, after careful consideration, to follow the recommendations of the British Waterworks Association which are, in short, not to debate the merits or demerits of fluoridation as a health measure but, instead, to accept the decision of the local health authorities, viz, the County Councils of Northumberland and Durham and the County Borough Councils of Newcastle upon Tyne and Gateshead all of whom are in favour of the application of fluoride to the drinking water supply and all of whom have requested the Company to carry out the process.

The plant which has been installed operates on the 'fail to safety' principle so that if a fault occurs the equipment is automatically shut down and can only be restarted when the fault has been cleared. Samples of water will be examined to ascertain the fluoride content several times each day by the Water Company's Laboratory staff and, in addition, the local health authorities will take regular samples for analysis from the distribution system.

And so the 1960s passed. Fluoridation in Newcastle, in spite of intense national and local opposition, became a fact. The need to fight locally for fluoridated water supply had been accepted by medical and dental individuals and groups. Due to the democratic process, and including decisions of other adjacent local Councils, the Newcastle City Council's decision on the 4 March 1964 of twenty-eight votes for fluoridation and twenty-eight votes against was changed on 1 December 1965 to thirty-five to twenty-three votes in favour, and fluoridation started in Newcastle on 7 October 1968. It might have been assumed that the intense controversy would cease, or at least lose its capability of causing concern and bitterness between opposing views.

But it was not to be. The 1974 reorganisation of the NHS gave the opportunity once again to open up the whole question of fluoridation and to employ again the arguments and passions of the previous decade in an even more intense personal and closed way within Newcastle itself.

THE EARLIEST LICENTIATES IN DENTAL SURGERY

E. Muriel Cohen*

As early as 1843, when the Council of the Royal College of Surgeons was preparing a new Charter, a deputation of dental practitioners headed by John Tomes suggested that a dental qualification should be introduced by the College so that dentists should have legal recognition. No progress was made, nor did Samuel Lee Rymer succeed when in 1855 he suggested, in a letter to the *Lancet*, that a board of examiners be set up to grant diplomas in dentistry. This stimulated Tomes and his allies to repeat their request in a letter to the College, but again it was turned down. Tomes and his friends in 1856 founded the Odontological Society, which persisted in the request for the formation of a dental department within the College that would institute and hold examinations for those wishing to practise dentistry, and this was agreed and formed a clause in the 1858 Medical Act. Tomes promptly wrote to the College enclosing a suggested curriculum of dental studies. In October 1859 the College assented to the creation of a Licence in Dental Surgery and appointed examiners for the first examination to be held in March 1860.¹

One frequently reads in dental historical biography that the subject was 'one of the first to receive the LDS of the Royal College of Surgeons'. It seemed, therefore, that it would be helpful to future biographers if a list of these early Licentiates were published. Expecting that the lists of successful candidates would have appeared in the *British Journal of Dental Science*, a search was made and some names were found there, often reprinted from *The Times*, but it was apparent that these lists were both incomplete and inaccurate. An approach was therefore made to Mr Ian Lyle, Librarian of the College, who kindly provided photocopies of the relevant pages from the records, which had until then been under threat of destruction by the College.

It is interesting to find that the 296 successful candidates were equally divided between London and the provinces in the first seven years of the LDS

(1860-1866). There was considerable enthusiasm during the first four years for taking the qualification, with several examinations each year, but by 1864 only one annual examination was held.

The Examiners

The first examiners were Sir William Lawrence, FRS, FRCS, James Moncrieff Arnott, FRS, FRCS, Thomas Bell, FRS, FRCS, John Tomes, FRS, FRCS and Arnold Rogers, FRCS.

Sir William Lawrence (1783-1867) was a surgeon at St Bartholomew's Hospital for more than sixty years, and was appointed Surgeon Extraordinary to Queen Victoria. He was twice President of the Royal College of Surgeons, twice gave the Hunterian Oration and, since 1840, had been a member of the Board of Examiners for the MRCS and FRCS. He was created a baronet in 1867.

James Moncrieff Arnott (1794-1885) had also twice served as President of the College and was on its Board of Examiners. As early as 1857 he had proposed forming a dental department of the College. He was a surgeon at the Middlesex and University College Hospitals, Professor of Surgery at King's and University College, Surgeon in Ordinary to the Prince Consort and Surgeon Extraordinary to Queen Victoria.

Thomas Bell (1792-1880) was a dental surgeon practising in London, and for over sixty years dental surgeon at Guy's Hospital. He was a lecturer in comparative anatomy at King's College London and Professor of Zoology. He became Secretary of the Royal Society and President of the Linnean Society, and he published extensively on zoological subjects. He retired to The Wakes at Selborne, the home of Gilbert White the naturalist, and published a definitive edition of the latter's *Natural History of Selborne*.

John Tomes (1815-1895), known as the Father of British dentistry, practised in London and was dental surgeon at King's College and the Middlesex Hospitals. He was a founder member of the Odontological Society of which he was twice President. In 1886 he received a knighthood. His many studies on the histology of bone and dental tissues were published, the most important papers having been presented at the Royal Society.

Arnold Rogers (1798-1870) qualified as a surgeon but practised as a dentist in London. He was very active in the Dental Reform Movement and served the Odontological Society as President. He was a founder of the new Dental Hospital of London.

It is interesting that all three practising dentists appointed as examiners for the LDS actually sat for the initial examination.

* E. Muriel Cohen, MBE, BA, 8 Warwick New Road, Leamington Spa, CV32 5JF.

† Sir Zachary Cope, *The Royal College of Surgeons of England: A History* (London: Blond, 1959), pp. 100-105.

The Examination Lists

Written in copperplate, the lists for 1860-1866 were on twenty-seven pages of foolscap in a folio ledger with a separate page for each examination. The names and addresses of the candidates are given, those in London listed by streets only, the rest by town. The fee of ten guineas (£10.50) is given beside each name. Half of this fee was paid to the examiners, half to the College. Only twenty-five failed at the first attempt and were referred, of whom ten subsequently passed, two at the third attempt.

The heading on each page is "Board of Examiners in Dental Surgery", the date and the names of the five examiners are stated, and all the lists are signed by William Lawrence, except for 1864-1866 which are signed by John F. South who joined the examiners in 1864 (Figure 1).

ACKNOWLEDGEMENT

I should like to express my gratitude to Mr Ian Lyle for the trouble he took in locating and photocopying the lists.

Figure 1

Board of Examiners in Dental Surgery
13. March 1860
Present.

Mr Lawrence Mr Ansell
Mr Bell Mr Jones Mr Rogers

Thomas Bell	Dipn	New Broad St	10	10	1
John Jones	Dipn	Lawrence St	10	10	1
Arnold Rogers	Dipn	Lawrence St	10	10	1
John Keating, Portsmouth	Dipn	Lawrence St	10	10	1
Charles Cartwright, Jew	Dipn	Old Broad St	10	10	1
James Parkinson	Dipn	St. James St	10	10	1
Thomas Arnold Rogers	Dipn	Lawrence St	10	10	1
Wm Anthony, Worcester	Dipn	High St	10	10	1
Henry Rogers	Dipn	Lawrence St	10	10	1
Alfred George Carter	Dipn	St. Martin St	10	10	1
John Bowman, Blithen	Dipn	New Broad St	10	10	1
Edmund Bramble	Dipn	Broad St	10	10	1
John Piggan, Worcester	Dipn	Lawrence St	10	10	1
George Augustus Elliott	Dipn	Broad St	10	10	1
Mr Alfred Newman, Blithen	Dipn	High St	10	10	1
			157	10	
			48	15	
			48	15	

Wm Lawrence

BOARD OF EXAMINERS IN DENTAL SURGERY

13 March 1860

Thomas Bell	New Brook Street
John Tomes	Cavendish Square
Arnold Rogers	Hanover Square
John Herring Parkinson	Sackville Street
Samuel Cartwright, Jr	Old Burlington Street
James Parkinson	King Street, St James
Thomas Arnold Rogers	Hanover Square
William Anthony Harrison	Keppel Street
Henry Rogers	Hanover Square
Alfred George Canton	Great Marlborough Street
John Bowman Fletcher	New Burlington Street
Edwin Sercombe	Brook Street
John Rigden Mummery	Cavendish Square
George Augustus Ibbetson	Brook Street
William Alfred Newman Cattlin	Highbury Place

14 March 1860

Joseph Rogers	Hanover Square
George Thomas Parkinson	Bath
Thomas Gill Palmer	Cheltenham
Richard White	Norwich
Thomas Underwood	Gower Street
Samuel James Augustus Salter	New Broad Street
Albert Edward Ollive	Chelsea
Charles Spence Bate	Plymouth
Josiah Saunders	Albemarle Street
Alfred Hill	Euston Road
John Martin	Portsmouth
Charles Duncan Roberts	Ramsgate
John Shortt	Madras Army
Charles Dubb Rogers	Newbury

20 March 1860

Robert Brookhouse	Manchester
William Deacle Saunder	Lower Seymour Street
John David Charles Hampson	Dorset Square
Alfred James Woodhouse	Hanover Square
Joseph King	York
Edward Barton Bartlett	Cambridge Terrace
William Henry Scott	Wimpole Street
Charles James Fox	Mortimer Street
Frederick Normansell	Gloucester Street W.
Henry Woolfryes	Gloucester Street W.
William Henry Lintott	Wimpole Street
Robert Reid	Edinburgh

Charles Vasey
Robert Hepburn

Cavendish Place
Davies Street W.

2 April 1860

William Minshull Bigg	Stratford Place
Henry John Barrett	Finsbury Square
Charles Bromley	Southampton
Edward Pickering Parkinson	Brighton
Duncan Dewar Hepburn	Nottingham
Frederick James Clouston Scott	Swansea
David Hepburn	Edinburgh
William Crampton	Grosvenor Square
Peter Matthew	Lower Berkeley Street
Edward Pritchett Warren	Birmingham
Edwin John Winterbottom, Sr	Sloane Street
Thomas Henry Harding	Park Square W.
William Alfred Roberts	Edinburgh
William Cattlin	Highbury Place
James Henry Allingham	Finsbury Square
Edward Randell	Carshalton
Edwin John Winterbottom, Jr	Sloane Street
George Charles Kernot	Poplar
William Izod Doherty	Dublin

14 April 1860

Henry Andrew Dewar	Aberdeen
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2 May 1860

John Wilcox Elliott	Islington
George Owen	Islington
George Salusbury Williams	Clifton
Andrew Lows	Carlisle
George Ash	Great Marlborough Street
Sidney Longhurst	Southampton Row
John Littlewood	Lower Eaton Street
John Howard Kyan	Preston
Frederick William Rogers	Sackville Street
William George Bennett	Poland Street
Robert Parsons	York Place, Portman Square
Alfred Coleman	Finsbury Square
Charles Rogers	Burlington Gardens

13 June 1860

Edward Vizard	Scarborough
Daniel Corbett	Dublin
John Knox Chisholm	Edinburgh

Charles Grierson De Lessert	Wolverhampton
Robert Ransom	St Leonard's on Sea
George Stothert Penny	Cheltenham
John Burke Lindsey	Dover
Joseph Walker	Holles Street
Frederick Charles Allen	Gloucester Gardens
Edward Hope Tweed	Brook Street
William Henry Wonfor	Sackville Street
James Bell	Perth

11 July 1860

James Joseph Keene	Boulogne sur Mer
Joseph Snape	Chester
Robert Thomson	Denmark Hill
Henry John Perkins	City Road
Robert Campbell Pilling	Blackburn
William Burnley Macdowall Walkinshaw	Princes Street W.
John Lee Statham	Rome
James Olrock	Nottingham
Henry Bell Longhurst	Manchester
William Frederic Forsyth	Piccadilly
Gilbert Walker	Cumberland Street
Charles Allin Rodway	Torquay

23 October 1860

Samuel George Leigh	Leeds
George Fellows Harrington	Ryde
William Williamson	Elgin
Martin Magor	Penzance
St. George Freeman	Waterford
Joseph Lewthwaite Ritson	Carlisle
William Ryding	Limerick
John Spencer Fitkin	Fleet Street
Francis Hancock Balkwill	Islington
James Kempe Devonshire	Great Coram Street
John Evans	Albany Street

19 February 1861

William Fort	Preston
Thomas Magor	Cardell Truro
Samuel Adams Parker	Birmingham
Frederick Bullin	Chester
Frederick William Mitchell	Clapham Road
George Lyddon	Southsea
Charles Henry Bromley	Southampton
John Henry Charles Erridge King	Portsmouth
William Edward Jameson	Grosvenor Street

11 June 1861

William Hunt	Yeovil
William Heneely Bridgman	Norwich
Walter Campbell	Dundee
Octavius Annesley Fox	Brighton
George William Smith	Manchester
Adolphus Daniel Hart	Brook Street
Henry Howard Hayward	Queen Anne Street
John Thomas Cunningham	Edinburgh
John George Robinson	Carlisle
William Salisbury Clement	Bath
Henry Heygate Goddard	Nottingham

6 August 1861

Henry Budd	Turnham Green
John Swanston Cobb	Great Yarmouth
Edmund Durant	Winchester
Charles William Dunn	Florence
William Barker	Crescent New Broad Street

26 February 1862

Sills Clifford Gibbons	New Burlington Street
Samuel Key Watson	Jersey
William Croall	Davies Street
John Blencowe Simons	Queen Anne Street
William Tibbits	Uttoxeter
George Gregson	Harley Street
Joseph Steele	Plymouth

4 November 1862

James Clarke	Nottingham
Daniel Tayler	Cheltenham
Nathaniel Stevenson	Cleveland Square
Henry Thomas Kirby	Leicester
John Thomas Browne Mason	Exeter
Henry Charles Hervey Longhurst	Lutterworth
James Robertson	Rochester
James Joseph Simmons	Kennington
Thomas Morgan	Orchard Street
John Thomas Henry West	Old Broad Street
Murray Joel Davis	Norfolk Street
Morris De Courcy Dickinson	Euston Square
John Elwin	Southampton
Isaiah Alfred Mosely	Grosvenor Street
William Henderson Nicol	Leith

18 February 1863

William Vanderkemp Moore	Plymouth
John Hewitt Hatfield	Lloyd Square
George Frederic Fox	Gloucester
Edwin Cox	Preston
Samuel Amos Kirby	Huntingdon
James Gabriel Surene	Edinburgh
John Henry Brown	Brighton
Henry Robert Rowe	Preston
John James Holford	Princes Street W.
Edwin Holboro Green King	Portsmouth

10 June 1863

Rudolph Helfrich	Notting Hill
Henry Tattershall Knowles Kempton	Cavendish Square
George Ratcliffe Keeling	Epsom
Sylvanus Bevan Fox	Exeter
Henry Smith	Oakley Square
George Joseph Williams	Cavendish Square
Frederick Ryding	Limerick
Samuel Lee Rymer	Croydon
Da@Vid Cormack	Windmill Street
Reginald Forward	Southsea
Edward Llewellyn Davies	Islington
Thomas William Gascoigne Palmer	Cheltenham
Francis Petty	Southampton
William Perkins	Maida Hill

17 June 1863

Richard Duncan	Whitehaven
Daniel James Brenneis	Cavendish Square
John Charles Stevens	Chester
John Brock	Berners Street
Henry Charles Smale	Haverstock Hill
John Saxty Good	Sloane Street
Philip Cafferata	Sunderland
Robert Colville Dykes	Bedford Street
George Ross	South Street
William Grenfell Borlase	Barnstaple

27 July 1863

George Lindup	Kensington
William Margetson	Dewsbury
George Weaver	Upper Baker Street
John Fenn Cole	Ipswich
John Montague Didsbury	Paris

George Frederick Hare	Limerick
Henry John Ollive	Chelsea
John Alexander Smith	Chelsea
George Bonnalie	Chester
Francis George Bridgman	Norwich
William Goddard	Nottingham
Thomas Tanner	Manchester
George Wallis	Great Marlborough Street

3 August 1863

James Richardson	Duke Street
John Hastings Atkinson	Leeds
James Sutcliffe	Bradford
Seth Gill	Liverpool
William Taylor Holford	Half Moon Street
Simon Alfred Rogers	Manchester
Alfred Barron Jones	Brook Street W.
Thomas Charters White	Upper Eccleston Place
Gillam Moseley	Sheffield
James Bradford Hall	Margaret Street
James Smith Turner	Margaret Street
Thomas Hankins	Great Pulteney Street
James Edward Moseley Murphy	Derby
Louis Burgoyne Pillin	Notting Hill
Richard Harrisson	Camden Street North

28 October 1863

William Robert Wood	Brighton
William Fothergill	Darlington
Alexander Fothergill	Darlington
William John Parks	Princes Street N.
William Barkley	Surbiton
Stephen Hoole	Pimlico
George Augustus Slater	Burslem
Alexander Cormack	Edinburgh
William Linthall Leatherby	Great Portland Street
John Dennant	Brighton
Edwin Martin	Newman Street
John Frederick Stuck	Bayswater
Charles West	Hackney Road
James Sackville Grant	Armagh
Andrew Isles Swanson	Edinburgh

4 November 1863

Charles Gibbs Nightingale	Shrewsbury
Anthony Hockley	Great Marlborough Street
Samuel Sutton	Newcastle on Tyne

William James Gilbert
 Thomas Collins Vidler
 John Wyatt Scott
 Peter Wesley Samuel
 Henry Stephen Ryding
 Alfred Hallam Murphy
 Charles Jevons Fowler
 Charles Sims
 Charles Frederick Augustus Usher
 Aaron George Medwin

Old Quebec Street
 Eastbourne Terrace
 Edware Road
 Darlington
 Limerick
 Derby
 Gloucester
 Birmingham
 Bow
 Greenwich

11 November 1863

James Davis
 Alexander Marshall Duff
 William Richard Tuck
 John Caldcleugh
 Alfred Marston Matthews
 Felix Weiss
 George Edward Ash
 Richard Southam
 William Ash
 Charles Sibthorpe Bright
 George Henry
 George Stulz Wells
 William Tenney Bradley
 Augustus Lloyd

Old Cavendish Street
 Queen Anne Street
 Camborne
 Durham
 Bradford
 Great Russell Street
 Dover
 Pimlico
 Great Marlborough Street
 Gosport
 Old Kent Road
 Kensington Gardens
 Chichester
 Bristol

25 November 1863

James Scholefield
 Henry Morley
 William Robert Stuck
 Robert Edward Stewart
 John Nathaniel Manton
 Frederick William Zinkgraf
 Lancelot James Myers
 Edward Pounoll Bastard Bromley
 Gavin Young
 Andrew Aaronson
 Leopold Moore

Huddersfield
 Derby
 Bedford Street
 Liverpool
 Grosvenor Street
 Bavaria
 Charlotte Street
 Southampton
 Edinburgh
 Judd Street
 Grosvenor Street

8 December 1863

Samuel Leon Finzi
 Jacob Ayton
 William Buckell
 George Laurie
 Robert Ennson Harrison
 Joseph Nicholson
 William Henry Nolan

City Road
 Devizes
 Salisbury
 Mortimer Street
 Hull
 Durham
 Charles Street

1 August 1864

Henry James Virgin
 Anthony Percy Reboul
 Warwick Hele
 John Clough Clarke

Oxford
 Islington
 Cheltenham
 Nottingham

2 August 1865

Henry Ezekiel Sewill
 Robert John Bell

Clifton Gardens
 Cirencester Place

2 August 1866

Thomas Read
 William Penny Bartlett
 Edwin Frederick Lane
 William Caleb Williams
 Ebenezer Apperly
 John Cardell Oliver
 George Christopher McAdam
 Edward Byatt West
 Thomas Henry Gosling Harding
 Nathaniel Tracy

Holles Street
 Kensington Park Terrace
 Bedford Place
 Petherton
 Stroud
 Cardiff
 Hereford
 New Broad Street
 Park Square
 Ipswich

GEOGRAPHICAL DISTRIBUTION, PROVINCES AND OVERSEAS

Of the 296 early LDSs, 145 had London addresses, six were overseas and 145 in British provincial towns. Here are listed by towns the practitioners in the constituent parts of the United Kingdom (which in the nineteenth century included the whole of Ireland), and finally those practising overseas.

*United Kingdom*England

Barnstaple	W.G. Borlase
Bath	G.T. Parkinson, W.S. Clement
Birmingham	E.P. Warren, S.A. Parker, C. Sims
Blackburn	R.C. Pilling
Bradford	J. Sutcliffe, A.M. Matthews
Brighton	E.P. Parkinson, O.A. Fox, J.H. Brown, W.R. Wood, J. Dennant
Bristol	A. Lloyd
Burslem	G.A. Slater
Camborne	W.R. Tuck
Carlisle	A. Lows, J.L. Ritson, J.G. Robinson
Carshalton	E. Randell
Cheltenham	T.G. Palmer, G.S. Penny, D. Tayler, T.W.G. Palmer, W. Hele
Chester	J. Snape, F. Bullin, J.C. Stevens, G. Bonnalie
Chichester	W.T. Bradley
Cirencester	R.J. Bell
Clifton	G.S. Williams
Croydon	S.L. Rymer
Darlington	W. Fothergill, A. Fothergill, P.W. Samuel
Derby	J.E.M. Murphy, A.H. Murphy, H. Morley
Devizes	J. Ayton
Dewsbury	W. Margetson
Dover	J.B. Lindsey, G.E. Ash
Durham	J. Caldcleugh, J. Nicholson
Epsom	G.R. Keeling
Exeter	J.T.B. Mason, S.B. Fox
Gloucester	G.F. Fox, C.J. Fowler
Gosport	C.S. Bright
Great Yarmouth	J.S. Cobb
Hereford	G.C. McAdam
Huddersfield	J. Scholefield
Hull	R.E. Harrison
Huntingdon	S.A. Kirby
Ipswich	J.F. Cole, N. Tracy
Leeds	S.G. Leigh, J.H. Atkinson
Leicester	H.T. Kirby
Liverpool	S. Gill, R.E. Stewart
Lutterworth	H.C.H. Longhurst
Manchester	R. Brookhouse, H.B. Longhurst, G.W. Smith, T. Tanner, S.A. Rogers
Newbury	C.D. Rogers
Newcastle on Tyne	S. Sutton

Norwich	R. White, W.K. Bridgman, F.G. Bridgman
Nottingham	D.D. Hepburn, J. Olrock, H.H. Goddard, J. Clarke, W. Goddard, J.C. Clarke
Oxford	H.J. Virgin
Penzance	M. Magor
Petherton ²	W.C. Williams
Plymouth	C.S. Bate, J. Steele, W.V. Moore
Portsmouth	J. Martin, J.H.C.E. King, E.H.G. King
Preston	J.H. Kyan, W. Fort, E. Cox, H.R. Rowe
Ramsgate	C.D. Roberts
Rochester	J. Robertson
Ryde	G.F. Harrington
St Leonard's on Sea	R. Ransom
Salisbury	W. Buckell
Scarborough	E. Vizard
Sheffield	G. Moseley
Shrewsbury	C.G. Nightingale
Southampton	C. Bromley, C.H. Bromley, J. Elwin, F. Petty, E.P.B. Bromley
Southsea	G. Lyddon, R. Forward
Stroud	E. Apperly
Sunderland	P. Cafferata
Surbiton	W. Barkley
Torquay	C.A. Rodway
Truro	T.M. Cardell
Utttoxeter	W. Tibbits
Whitehaven	R. Duncan
Winchester	E. Durant
Wolverhampton	C.G. De Lessert
Yeovil	W. Hunt
York	T. King

Wales

Cardiff	J.C. Oliver
Swansea	F.J.C. Scott

Scotland

Aberdeen	H.A. Dewar
Dundee	W. Campbell
Edinburgh	R. Reid, D. Hepburn, W.A. Roberts, J.K. Chisholm, J.T. Cunningham, J.S. Surenne, A. Cormack
Elgin	W. Williamson
Leith	W.H. Nicol
Perth	J. Bell

2 This must be South Petherton.

Channel Islands

Jersey S.K. Watson

Ireland

Armagh J.S. Grant
Dublin W.I. Doherty, D. Corbett
Limerick W. Ryding, F. Ryding, G.F. Hare, H.S. Ryding
Waterford St.G. Freeman

Overseas

Bavaria F.W. Zinkgraf
Boulogne sur Mer J.J. Keene
Florence C.W. Dunn
Madras Army J. Shortt
Paris J.M. Didsbury
Rome J.L. Statham

ALPHABETICAL LIST, 1860-1866

Aaronson, A.	25.11.1863	Corbett, D.	13.6.1860
Allen, F.C.	13.6.1860	Cormack, A.	28.10.1863
Allingham, J.H.	2.4.1860	Cormack, D.	10.6.1863
Apperly, E.	2.8.1866	Cox, E.	18.2.1863
Ash, G.	2.5.1860	Crampton, W.	2.4.1860
Ash, G.E.	11.11.1863	Croall, W.	26.2.1862
Ash, W.	11.11.1863	Cunningham, J.T.	11.6.1861
Atkinson, J.H.	3.8.1863	Davies, E.L.	10.6.1863
Ayton, J.	8.12.1863	Davis, J.	11.11.1863
Balkwill, F.H.	23.10.1860	Davis, M.J.	4.11.1862
Barkley, W.	28.10.1863	De Lessert, C.G.	13.6.1860
Barrett, H.J.	2.4.1860	Dennant, J.	28.10.1863
Bartlett, E.B.	20.3.1860	Devonshire, J.K.	23.10.1860
Bartlett, W.P.	2.8.1866	Dewar, H.A.	11.4.1860
Bate, C.S.	14.3.1860	Dickinson, M. de C.	4.11.1862
Bell, J.	13.6.1860	Didsbury, J.M.	27.7.1863
Bell, J.B.	3.8.1863	Doherty, W.I.	2.4.1860
Bell, R.J.	2.8.1865	Duff, A.M.	11.11.1863
Bell, T.	13.3.1860	Duncan, R.	17.6.1863
Bennett, W.G.	2.5.1860	Dunn, C.W.	6.8.1861
Bigg, W.M.	2.4.1860	Durant, E.	6.8.1861
Bonnalie, G.	27.7.1863	Dykes, R.C.	17.6.1863
Borlase, W.G.	17.6.1863	Elliott, J.W.	2.5.1860
Bradley, W.T.	11.11.1863	Elwin, J.	4.11.1862
Brenneis, D.J.	17.6.1863	Evans, J.	23.10.1860
Bridgman, F.G.	27.6.1863	Finzi, S.L.	8.12.1863
Bridgman, W.K.	11.6.1861	Fitkin, J.S.	23.10.1860
Bright, C.S.	11.11.1863	Fletcher, J.B.	13.3.1860
Brock, J.	17.6.1863	Forsyth, W.F.	11.7.1860
Bromley, C.	2.4.1860	Fort, W.	19.2.1861
Bromley, C.H.	19.2.1861	Forward, R.	10.6.1863
Bromley, E.P.B.	25.11.1863	Fothergill, A.	28.10.1863
Brookhouse, R.	20.3.1860	Fothergill, W.	28.10.1863
Brown, J.H.	18.2.1863	Fowler, C.J.	4.11.1863
Buckell, W.	8.12.1863	Fox, C.J.	20.3.1860
Budd, H.	6.8.1861	Fox, G.F.	18.2.1863
Bullin, F.	19.2.1861	Fox, O.A.	11.6.1861
Cafferata, P.	17.6.1863	Fox, S.B.	10.6.1863
Caldcleugh, J.	11.11.1863	Freeman, St G.	23.10.1860
Campbell, W.	11.6.1861	Gibbons, S.C.	26.2.1862
Canton, A.G.	13.3.1860	Gilbert, W.J.	4.11.1863
Cardell, T.M.	19.2.1861	Gill, S.	3.8.1863
Cartwright, S., Jr	13.3.1860	Goddard, H.H.	11.6.1861
Cattlin, W.	2.4.1860	Goddard, W.	27.7.1863
Cattlin, W.A.N.	13.3.1860	Good, J.S.	17.6.1863
Chisholm, J.K.	13.6.1860	Grant, J.S.	28.10.1863
Clarke, J.	4.11.1862	Gregson, G.	26.2.1862
Clarke, J.C.	1.8.1864	Hampson, J.D.C.	20.3.1860
Clement, W.S.	11.6.1861	Hankins, T.	3.8.1863
Cobb, J.S.	6.8.1861	Harding, T.H.	2.4.1860
Cole, J.F.	27.7.1863	Harding, T.H.G.	2.8.1866
Coleman, A.	2.5.1860	Hare, G.F.	27.7.1863

Harrington, G.F. 23.10.1860
 Harrison, R. 3.8.1863
 Harrison, R.E. 8.12.1863
 Harrison, W.A. 13.3.1860
 Hart, A.D. 11.6.1861
 Hatfield, J.H. 18.2.1863
 Hayward, H.H. 11.6.1861
 Hele, W. 1.8.1864
 Helfrich, R. 10.6.1863
 Henry, G. 11.11.1863
 Hepburn, D.D. 2.4.1860
 Hepburn, R. 20.3.1860
 Hepburn, D. 2.4.1860
 Hill, A. 14.3.1860
 Hockley, A. 4.11.1863
 Holford, J.J. 18.2.1863
 Holford, W.T. 3.8.1863
 Hoole, S. 28.10.1863
 Hunt, W. 11.6.1861
 Ibbetson, G.A. 13.3.1860
 Jamieson, W.E. 19.2.1861
 Jones, A.B. 3.8.1863
 Keeling, G.R. 10.6.1863
 Keene, J.J. 11.7.1860
 Kempton, H.T.K. 10.6.1863
 Kernot, G.C. 2.4.1860
 King, E.H.G. 18.2.1863
 King, J. 20.3.1860
 King, J.H.C.E. 19.2.1861
 Kirby, H.T. 4.11.1862
 Kirby, S.A. 18.2.1863
 Kyan, J.H. 2.5.1860
 Lane, E.F. 2.8.1866
 Laurie, G. 8.12.1863
 Leatherby, W.L. 28.10.1863
 Leigh, S.G. 23.10.1860
 Lindsey, J.B. 13.6.1860
 Lindup, G. 27.7.1863
 Lintott, W.H. 20.3.1860
 Littlewood, J. 2.5.1860
 Lloyd, A. 11.11.1863
 Longhurst, H.B. 11.7.1860
 Longhurst, H.C.H. 4.11.1862
 Longhurst, S. 2.5.1860
 Lows, A. 2.5.1860
 Lyddon, G. 19.2.1861
 Magor, M. 23.10.1860
 Manton, J.N. 25.11.1863
 Margetson, W. 27.7.1863
 Martin, E. 28.10.1863
 Martin, J. 14.3.1860
 Mason, J.T.B. 4.11.1862
 Matthews, A.M. 11.11.1863
 Matthews, P. 2.4.1860

McAdam, G.C. 2.8.1866
 Medwin, A.G. 4.11.1863
 Mitchell, F.W. 19.2.1861
 Moore, L. 25.11.1863
 Moore, W.V. 18.2.1863
 Morgan, T. 4.11.1862
 Morley, H. 25.11.1863
 Moseley, G. 3.8.1863
 Mosely, I.A. 4.11.1862
 Mummery, J.R. 13.3.1860
 Murphy, A.H. 4.11.1863
 Murphy, J.E.M. 3.8.1863
 Myers, L.J. 25.11.1863
 Nicholson, J. 8.12.1863
 Nicol, W.H. 4.11.1862
 Nightingale, C.G. 4.11.1863
 Nolan, W.H. 8.12.1863
 Normansell, F. 20.3.1860
 Oliver, J.C. 2.8.1866
 Ollive, A.E. 14.3.1860
 Ollive, H.J. 27.7.1863
 Olrock, J. 11.7.1860
 Owen, G. 2.5.1860
 Palmer, T.G. 14.3.1860
 Palmer, T.W.G. 10.6.1863
 Parker, S.A. 19.2.1861
 Parker, W. 6.8.1861
 Parkinson, E.P. 2.4.1860
 Parkinson, G.T. 14.3.1860
 Parkinson, J. 13.3.1860
 Parkinson, J.H. 13.3.1860
 Parks, W.J. 28.10.1863
 Parsons, R. 2.5.1860
 Penny, G.S. 13.6.1860
 Perkins, H.J. 11.7.1860
 Perkins, W. 10.6.1863
 Petty, F. 10.6.1863
 Pillin, L.B. 3.8.1863
 Pilling, R.C. 11.7.1860
 Randell, E. 2.4.1860
 Ransom, R. 13.6.1860
 Read, T. 2.8.1866
 Reboul, A.P. 1.8.1864
 Reid, R. 20.3.1860
 Richardson, J. 3.8.1863
 Ritson, J.L. 23.10.1860
 Roberts, C.D. 13.3.1860
 Roberts, W.A. 2.4.1860
 Robertson, J. 4.11.1862
 Robinson, J.G. 11.6.1861
 Rodway, C.A. 11.7.1860
 Rogers, H. 13.3.1860
 Rogers, J. 14.3.1860
 Rogers, S.A. 3.8.1863

Rogers, T.A. 13.3.1860
 Rogers, A. 13.3.1860
 Rogers, C. 2.5.1860
 Rogers, C.D. 14.3.1860
 Rogers, F.W. 2.5.1860
 Ross, G. 17.6.1863
 Rowe, H.R. 18.2.1863
 Ryding, F. 10.6.1863
 Ryding, H.S. 4.11.1863
 Ryding, W. 23.10.1860
 Rymer, S.L. 10.6.1863
 Salter, S.J.A. 14.3.1860
 Samuel, P.W. 4.11.1863
 Saunder, W.D. 20.3.1860
 Saunders, J. 14.3.1860
 Scholefield, J. 25.11.1863
 Scott, F.J.C. 2.4.1860
 Scott, J.W. 2.11.1863
 Scott, W.H. 20.3.1860
 Sercombe, E. 13.3.1860
 Sewill, H.E. 2.8.1865
 Shortt, J. 14.3.1860
 Simmons, J.J. 4.11.1862
 Simons, J.B. 26.2.1862
 Sims, C. 4.11.1863
 Slater, G.A. 28.10.1863
 Smale, H.C. 17.6.1863
 Smith, G.W. 11.6.1861
 Smith, H. 10.6.1863
 Smith, J.A. 27.7.1863
 Snape, J. 11.7.1860
 Southam, R. 11.11.1863
 Statham, J.L. 11.7.1860
 Steele, J. 26.2.1862
 Stevens, J.C. 17.6.1863
 Stevenson, N. 4.11.1862
 Stewart, R.E. 25.11.1863
 Stuck, J.F. 28.10.1863
 Stuck, W.R. 25.11.1863
 Surene, J.G. 18.2.1863
 Sutcliffe, J. 3.8.1863
 Sutton, S. 4.11.1863

Swanson, A.I. 28.10.1863
 Tanner, T. 27.7.1863
 Tayler, D. 4.11.1862
 Thomson, R. 11.7.1860
 Tibbits, W. 26.2.1862
 Tomes, J. 13.3.1860
 Tracy, N. 2.8.1866
 Tuck, W.R. 11.11.1863
 Turner, J.S. 3.8.1863
 Tweed, E.H. 13.6.1860
 Underwood, T. 14.3.1860
 Usher, C.F.A. 4.11.1863
 Vasey, C. 20.3.1860
 Vidler, T.C. 4.11.1863
 Virgin, H.J. 1.8.1864
 Vizard, E. 13.6.1860
 Walker, G. 11.7.1860
 Walker, J. 13.6.1860
 Walkinshaw, W.B. 11.7.1860
 Wallis, G. 27.7.1863
 Warren, E.P. 2.4.1860
 Watson, S.K. 26.2.1862
 Weaver, G. 27.7.1863
 Weiss, F. 11.11.1863
 Wells, G.S. 11.11.1863
 West, C. 28.10.1863
 West, E.B. 2.8.1866
 West, J.T.H. 4.11.1862
 White, R. 14.3.1860
 White, T.C. 3.8.1863
 Williams, G.J. 10.6.1863
 Williams, G.S. 2.5.1860
 Williams, W.C. 2.8.1866
 Williamson, W. 23.10.1860
 Winterbottom, E.J. 2.4.1860
 Winterbottom, E.J., Jr. 2.4.1860
 Wonfor, W.H. 13.6.1860
 Wood, W.R. 28.10.1863
 Woodhouse, A.J. 20.3.1860
 Woolfryes, H. 20.3.1860
 Young, G. 25.11.1863
 Zinkgraf, F.W. 25.11.1863

HISTORY OF DENTISTRY AT THE WORLD DENTAL CONGRESS IN MEXICO

Marguerite Zimmer*

There was no better way to finish the millennium than with the jointly held FDI World Dental Congress and XXVth Congress of the Mexican Dental Association.

Mexico, throughout history, has always drawn inspiration from the past and a wealth of tradition. It was a pleasure for the FDI's Section of the History of Dentistry to meet with colleagues of this part of the world on Sunday, 31 October at the World Trade Center, Mexico City. Since the session was announced in the mail program of the Congress, more than one hundred persons attended the meeting, with several sitting on the floor or standing up against the wall.

People attending the conference had many opportunities to hear about the various aspects of the history of dentistry of the American continent.

Five papers were given by local speakers: Dr Vicente Cuairan's presentation, entitled 'Medicine and dentistry among ancient Mexicans: a trip to their Sources', referred to for example Juanus Badianus, Francisco Hernandez and Hernando Ruiz de Alarcon. The second speaker, Dr Martha Díaz Kuri, focused on 'The birth of the dental profession in Mexico'. Then, Dr Aureo Garcia presented a retrospect of 'Mexico and its amazing pre-Columbian dentistry' and an attractive video. Dr Nicanor Gorraez discussed the 'Birth of science in Mexico'. He mentioned three important periods in its scientific development: the seventeenth century, with the mathematician Diego Rodriguez's applications to astronomy, the eighteenth century, with the contribution of Francisco Hernandez to botany and, finally, the nineteenth century, with Francisco Diaz Covarrubias's work on the estimation of the distance between Earth and the sun.

After lunch, Dr Rosa Maria Gonzalez spoke on the 'Female role in Mexican dentistry'. Then, Mrs Marianna Cooley, from the Industry World, presented the Copalite inventor's family and its industrial development.

Dr Marguerite Zimmer gave a historical approach on the desperate 'Fight against pain' before the discovery of anaesthesia, and analysed the efficiency of the different methods of anaesthesia in use in the second part of the nineteenth century. As Dr Walter Siutti was not able to attend the meeting, Dr Hannelore Loevy read his paper. It highlighted the 'Evolution of the legal professional exercise in Argentina from the Protomedicaio to the founding of the dental school'.

The session was followed by the Annual General Meeting. Dr Marguerite Zimmer, in the Chair, reported on the constitutional amendment voted by the FDI General Assembly. She announced that the History of Dentistry Section was discontinued. Since the International Association of the History of Dentistry (IAHD) was established in 1994 in Vancouver, members will continue to study the history of dentistry as members of the IAHD and meet at the time of the FDI Congress.

* Dr Marguerite Zimmer, Dental Surgeon, Strasbourg, D.E.A. Ecole Pratique des Hautes Etudes, Paris.

LETTERS TO THE EDITOR

Dear Sir,

Full of New Year good intentions, I have at last got around to writing to you! First of all let me say how much I enjoyed the *Dental Historian* no. 35 of May 1999. I had no idea that Francis Hancock Balkwill had been a dentist, nor one of such eminence. I am enclosing a few notes on the Cookworthy and Balkwill families, mostly gleaned from Douglas Selleck's excellent *Cookworthy - A Man of no Common Clay* (Plymouth: Baron Jay Ltd., 1978), which I think you might find of interest. [Appended below, Ed.]

I also found Dr Marguerite Zimmer's paper, 'Dental surgeons in the early days of anaesthesia', of particular interest as I too have written on the subject from the pharmaceutical point of view. I would be grateful if you would send the enclosed copy of the *Pharmaceutical Historian* to her. You will see in the article that Peter Squire was rather quicker off the mark than Dr Zimmer suggests.

As a matter of passing interest, both my father and grandfather (to say nothing of others further back) were pharmacists, and both extracted teeth - in my father's case his own! My father was in the RAMC during the First World War and was attached to what he called the "Dental Corps", though I have no idea if that was its correct title. He claimed it proved to be very lucrative as they made dentures as a side-line. Probably should have been in the 'glass-house' three times over.

Yours Sincerely,

Dr Juanita Burnby
Editor, *Pharmaceutical Historian*

THE WORLD OF FRANCIS BALKWILL

The South Sea Bubble burst in 1720, leaving the widow of William Cookworthy Snr of Kingsbridge, and her seven children, in dire straits. The Quaker and apothecary, Sylvanus Bevan (1691-1765), was travelling in Devonshire when he heard of the family's plight. Attracted by the eldest

child, young William's (1705-1780) ability and competence, Bevan offered the fifteen-year-old an informal pupillage in his London pharmacy at Plough Court, off Lombard Street. Lack of money forced William to walk the two hundred miles or so to take up this opportunity.

Six years later, Cookworthy became the manager and a partner of Sylvanus and Timothy Bevan (his brother having recently joined Sylvanus) in a branch chemist and druggists business in Plymouth. William worked hard, travelling through the counties of Devonshire and Cornwall seeking business. It was during his travels that he first came across the two essential ingredients of true porcelain, kaolin and petuntse, first of all near Helston at Tregonning and, years later, between St Columb and St Austell. Business and family problems initially prevented him carrying out all the trials and experiments he would have liked, but in the end he was able, in 1768, to take out Letters Patent for 'a kind of Porcelain Newly Invented by me...'

The Bevans had already withdrawn from the partnership in 1746, and in their place had come William's younger brother Philip (1716-1776) who had been the mate of an East Indiaman. Despite their differing backgrounds, the two brothers worked together harmoniously. After their deaths, William's favourite grandson, Francis Fox (1765-1812), ran the firm until 1795 when he took in a cousin's husband, Benjamin Balkwill of Calstock (1772-1847), as a partner - the first of the Balkwills.

He was joined by his son, Joseph Hancock Balkwill (1805-1844), for a period, but unhappily he predeceased his father. Nothing dismayed Joseph's widow Ann (nee Payne) ran the firm until her two sons, Frederic Pryor Balkwill (1832-1909) and Alfred Payne Balkwill (1834-1913), the brothers of Francis Hancock Balkwill (1837-1921), were old enough to take over.

Frederic's daughter, Alice, married a pharmacist John Henry Pumphrey of Evesham (1855-1895); they had two sons, Theodore (born 1890) and Oliver (born 193), both of whom trained at Balkwills and became pharmaceutical chemists.

Many tales are told of William Cookworthy's absent-mindedness. One that is not generally known was related by Theodore to Leslie Matthews, renowned as a pharmaceutical historian who died two or three years ago.

William Cookworthy was often the guest of the Earl of Mount Edgcumbe at Mount Edgcumbe House, where a special bedroom was reserved for him. One night, on retiring to his usual room, William was startled to hear a shrill female voice protesting from his bed, 'Oh! Mr Cookworthy! Mr Cookworthy!!' Perplexed, he withdrew to spend the night in less congenial quarters. Next evening, having a vague recollection that the previous night something had gone wrong, he retired to bed early and was soon asleep. However, before long he was aroused by someone entering his room. Starting up, night cap on head, he met the horrified gaze of the lady of the night before. 'Ah Ha!' he chortled, 'beaten you to it this time.'

This story was told to Theo Pumphrey by his Great Uncle, Alfred Balkwill, the last Balkwill successor to the Cookworthy business, as they walked home one Sunday morning after attending the Plymouth Quaker Meeting.

Dear Sir,

Thank you for the copy of the *Pharmaceutical Historian*, which you forwarded to me along with a copy of the letter from Dr Juanita Burnby. I found Dr Burnby's paper very interesting, especially for the information concerning Boott's family.

Unfortunately, I have to disagree with her comment about Peter Squire. His trial of ether inhalation did not precede that of Boott and Robinson. According to F.W. Cock,¹ Mrs Lonsdale's tooth was extracted in the morning of Saturday, 19 December 1846, and Robert Liston came into contact with Peter Squire after midday on Saturday 19th. I did not refer to that in my paper because this account has been referred to quite frequently. I have focused in my paper on the work of dental surgeons in England and America.

In June, I shall be giving a presentation in Paris to the History of Medicine Society on the work of French dental surgeons and several American doctors in the early days of anaesthesia to be published later in the year.

With kindest regards,

Dr Marguerite Zimmer

1 F.William Cock, 'The first major operation under ether in England', *American Journal of Surgery (Anaesthesia Supplement)*, 29(1915), 98-106. [This paper also gives a portrait of Jones Robinson. MZ]

DENTISTRY 2000 – BIRMINGHAM, APRIL

Geoff Garnett

The Lindsay Society were kindly granted facilities at the above conference and exhibition on Thursday and Friday, 6 and 7 April 2000. This opportunity enabled members to view three obsolescent techniques, demonstrated on a video prepared by Geoffrey Barnes.

Jack Messing, from UCH, demonstrated gold foil restorations, the late Nick Inman extolled the virtues of "standing" at the chair-side and the Bristol Dental School explored the historical use of springs and swivels in denture construction. Their use was then demonstrated on a patient with a neurological hand and facial disorder. After watching each section of the video, a general discussion took place on the relative merits of the technique under discussion.

Cohesive gold foil restorations

After observing Jack Messing on the video, the group present were privileged to hear Henry Noble give a critique of the technique shown and then explain in more detail some of the intricacies of the procedure.

Rubber dam was mandatory for the cavity isolation, and then a tooth separator was applied if there was any hint of an inter-proximal aspect to the restoration. Over-filling before polishing was usually necessary, and hence the separator was essential. This painful-looking instrument could not be used on children's teeth because of risks to the periodontia. Again, persistent trauma from the mallet ruled out use of the restoration on anyone under eighteen years of age.

A ninety-degree cavo-surface angle was used, and Jack Messing favoured the use of under-cuts. Henry, however, pointed out that a starting pit made with a number three rose-head bur was essential in order to prevent the foil sliding out of the cavity and in order to allow the cold welding process to begin.

Linings were placed with a zinc phosphate cement (eugenol products forbidden!) Henry Noble again suggested that, after lining, an interval of a day or two was helpful with a gutta percha temporary filling. However, this may be a reflection on the time that students at Glasgow were taking with this

type of restoration. Henry did favour the mechanical pluggers used to condense the gold, whereas Jack relied entirely on hand instruments. Another useful tip from Henry was to build the restoration up from one side of the cavity and move across, rather than to work from the whole of the base and move outwards.

We were grateful for the loan of instruments for the session from the Glasgow Dental School, and were well impressed when Henry related how he had actually constructed a Class IV incisal restoration in the 1947 Glasgow Prize Competition.

Standing at the chair-side

Nick Inman, as all his friends and acquaintances knew, bore a striking resemblance to George V. It was uncanny, then, to see him on video showing us around his 1954 vintage surgery and telling us of his favourite operating position at the chair-side. Geoff Garnett, the presenter, then confessed to having the same habit of standing and that, after thirty-seven years, could observe no ill effects.

The low-seated dentist with patient supine had become the accepted paradigm for the treatment position. However there were undoubted problems with patient vulnerability, eye safety and airway/throat aspiration.

Stanley Gelbier explained that, as a left hander, he had found problems with both positions until the "cart" instrumentation was introduced. An American colleague joined in at this point and explained his reasons for going low-seated in 1965. He firmly rejected any merits in the "standing" habit.

Low-seated dentistry was introduced with evangelical zeal. It carried the day, but now, in retrospect, the subject does not raise the same passions. Comfort for all concerned is paramount.

Springs and swivels

Geoffrey Barnes introduced this topic on video with colleagues from the Bristol Dental School. Most of it was a scripted discussion on the history of denture wearing and the devices used to aid stability. It was apparent that we take our impression techniques for granted, and that without accurate working models life is difficult for dentist and patient alike.

Malcolm Heath was the only person present with any practical experience of constructing a denture with retention springs. As it was a single case only, his memory had dimmed somewhat and the only current demonstration was on the video at Bristol. The patient had a distressing neurological condition and springs and swivels were indeed a great benefit to her. An interesting feature of the case was a hand-held device for inserting the dentures simultaneously. This had been invented by the patient's father in order to overcome her manual disabilities.

Our meeting at Birmingham had been a great success, and it was resolved to try and arrange similar sessions at Harrogate in 2001.