

Dental Historian

Volume **59** (1)
January 2014

1972 1878 2014
1962 1099 1957
1530 1540 1543
1655 1685 1857
1768 1771 1778
1783 1808 1976
1840 1844 1846
1851 1870 1872
1893 1894 1895
1855 1949 1946
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Journal Received: 12 April, 2016

Shelf 136

DENTAL HISTORIAN

NUMBER 59

January 2014

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The History of Dentistry

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Dental Historian

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

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EDITORIAL

This is the first edition of the *Dental Historian* in the new format. I hope to continue the fine tradition set up by former editor Professor Stanley Gelbier, who has served the journal and the Lindsay Society with immense dedication for many years. The *Dental Historian* will continue to publish papers, not only from the UK but also to include the international aspect of dental history. The current issue covers a wide variety of topics. There are two biographies: of Professor Hitchin from Dundee and Harold Watkin a pioneer orthodontist. There is a further insight into the achievements of Lilian Lindsay and the early history of the Royal Society of Medicine. Those of us who remember learning about Moons' molars at dental school will be intrigued by the life history of Henry Moon.

Remembering those student years and the technical exercises to equip the young dentists with the skills for later life; we have a paper which describes the technical exercises which were introduced early on in the course.

Superb technical skills and an extraordinary appreciation of dental anatomy are also the theme of a paper describing a denture made for the Great Exhibition. Remaining with the subject of dental anatomy, a review is presented of the development and orthodontic assessment of the facial skeleton from early man to present day.

Some of the greatest changes in dentistry have occurred over the last 30 years, in terms of new materials, techniques and also changes in employment. It is vitally important that we record these events and their impact on our practicing lives and not leave it only for future generations to interpret. Papers describing the impact of these changes will be most welcome.

It is important to record history past and recent to provide insight into the "how" and "when" of the development of contemporary dentistry.

Editorial Board

It is intended to recruit an editorial board to support the further development of the *Dental Historian*. Expressions of interest for membership of the proposed board should be sent to the editor together with brief curriculum vitae. Prior experience of editorial board membership and editorial processes is not essential.

Corrections

The biography of Aylwin Drakeford Hitchin has been reprinted due to some unforeseen omissions and errors introduced in the previous edition of the journal.

Professor Aylwin Drakeford Hitchin (1907 – 1996)

Gordon Smith

Abstract Professor A D Hitchin's personal history, war time experience and academic achievements, Dundee are described.

Key Words: AD Hitchin, University of St Andrews, Dundee Dental School



Early years

Aylwin Drakeford Hitchin was born on 31 December 1907, to Leonard and Ruth Hitchin (née Drakeford) in Gosforth, a suburb of Newcastle upon Tyne. During the Boer war, his father had served in Imperial Warwick Yeomanry as a photographer in a hydrogen-filled balloon to locate enemy positions. Leonard was a process engraver by trade and a director of a photography company. He was also well known commercial and amateur photographer. Aylwin grew up with his elder sister, Olive, or as she was known in the family, Ownie, and at the outbreak of the First World War in 1914, his father joined the Royal Flying Corps and became an aerial photographer using stereoscopic photography to create accurate maps to aid the war effort. Aylwin said that he could remember the German airships coming over to bomb the Tyne shipyards.¹ His mother, Ruth was a strict Baptist and she clearly instilled in Aylwin, a

deep religious belief which moulded and sustained him throughout his long life. He attended the local Royal Grammar School and won a scholarship to Rutherford College in Newcastle, where he was an all-rounder both academically and also on the sports fields, and not surprisingly, he became Victor Ludorum in 1925.

Both his parents had been keen woodcarvers and they passed this on as another interest and skill to the young Aylwin. He further developed his keen interest in photography and learned avidly under the watchful eye of his father, Leonard. Both of these interests were to remain with Aylwin throughout his long and illustrious life. Indeed, Aylwin very nearly followed his father as a process engraver and photographer, but this was not to be. Rather than follow in his father's career, he decided to study dentistry and threw himself into this with his usual enthusiasm.

Personal History

He became an undergraduate at Newcastle Dental Hospital and School. His love of sports saw him playing both rugby and hockey at University. Given his father's military record, it was not surprising that Aylwin was also an active member of the Officer Training Corps and was attached to the Royal Army Medical Corps. While at an OTC camp in North Wales, while he was playing rugby, his right leg collapsed under him. He was stretchered off the

¹ Personal Communication with Mr David Hitchin

field and was later examined by the Army Medical Officer who immediately referred Aylwin to see a specialist. It was later found that he had suffered a pathological fracture following the development of an osteogenic sarcoma and the whole of his right leg was amputated. This radical surgery was followed by radiotherapy, a treatment which at that time was in its early stage of development. Such a disaster would have made most men give up, but not Aylwin Hitchin. Having been fitted with a prosthetic leg, he returned to his studies having been absent for little more than a year, and in spite of what appeared to be an insurmountable disability, not only did he complete his dental course, but characteristically, he gained first class certificates in every dental subject, with medals in Dental Surgery and Pathology, Operative Dental Surgery, Orthodontics, Dental Anatomy, Dental Histology, Dental Materia Medica and Dental Metallurgy – a quite outstanding achievement. He was also awarded many of the Special Hospital Prizes.² In those days, the dental engine was foot-operated by a treadle. Somehow Aylwin coped with this, but he soon became one of the first to acquire an engine powered by a German-designed multi-voltage electric motor which made life a little easier for him. This he used for many years and during WW2, it ran off his car battery when he was performing operations in temporary surgeries.³

Early employment

After qualifying as LDS in 1931, he became a House Surgeon at Newcastle Dental Hospital. He graduated BDS a year later and he established a general dental practice in Harley House, Gosforth, in Newcastle. The majority of dental students often assume that their professors and teachers know nothing of general dental practice and that they live in ivory towers! This was certainly not the case with Aylwin Hitchin.

He became a part-time Assistant Honorary Dental Surgeon and Demonstrator in Dental Surgery and Conservation at his Alma Mater, from 1932 until 1936 where he gained much additional surgical experience. During this time, Mr Harold Round, an Oral Surgeon from Birmingham, was invited to deliver a series of lectures and demonstrations at the Dental Hospital and School in Newcastle, and the young Aylwin Hitchin was instructed to help with the organisation and to provide suitable patients for the demonstrations.

These courses clearly had a marked effect on him as he later wrote:

"This course was run three times and changed my whole orientation in Dentistry. A very deep friendship developed between us and I used to go and stay with Mr & Mrs Round, often assisting him at operations both private and Hospital, and also his partner Ralph Broderick who later became my Brigadier as Consultant Dental Surgeon to the Army."

"These courses were not only important steps in Postgraduate Education, but also in the reference by Registered Dentists to the Dental Hospital of cases beyond them."

A D Hitchin August 1994.⁴

His interest in dental education and research resulted in a period of study of the conservative treatment of the dental pulp, which led to Hitchin being awarded the Degree of MDS in 1935 and he became the first recipient of a higher dental degree to be awarded by the University of Newcastle Dental School.^{5 6}

Figure 2 Practice Business card



² Copy of Curriculum Vitae written by ADH and supplied by his son, Mr David Hitchin

³ Personal Communication with Mr David Hitchin

⁴ Newcastle Dental Hospital and School – An Illustrated History by J J Murray, I D Murray and B Hill
Published by Medical Faculty University upon Tyne p136

⁵ Newcastle Dental Hospital and School – An Illustrated History by J J Murray, I D Murray and B Hill
Published by Medical Faculty University upon Tyne p158

The war years

Hitchin maintained his contacts with the army and with the outbreak of the Second World War; he fully expected to be called up for national service. Not surprisingly, this did not happen due to his disability, and he was graded 'Medically Unfit.' He refused to accept this grading but he pleaded and pestered the military authorities and after much argument and pressure, they eventually agreed that he could be accepted into the army as long as his duties were restricted to the UK.⁷

His first deployment was to provide dental and oral surgical care for searchlight crews in London. He had to set up a dental unit at the searchlight station since the men could not be spared from duty to travel for surgery.

His interest in wood carving continued - indeed during the terrible bombing in London, his bedroom at the hospital in Millbank in London was made into a carving workshop as his bed was in the air-raid shelter!

Figure 3 World War II, Captain in the Royal Army Dental Corp



During the Blitz, Aylwin was to meet Stella Michie, who was a nurse based in UCH in London. She was also a Territorial Army Nurse and her unit was about to be sent for duty in Northern France shortly before the evacuation at Dunkirk. They became engaged and Stella was not sent abroad, and although his mother's approval was not readily forthcoming, they married in 1942.

He was soon promoted to the rank of Captain in the Royal Army Dental Corps and was transferred to Shenley Hospital, in North London, where he looked after the dental and oral surgical needs of Special Operations Executive (SOE) and other army personnel.

His final army posting was to Drymen, to the north of Glasgow, on the shore of Loch Lomond, with the rank of Major, in charge of the Army Scottish Dental Services. Stella became Assistant Matron in the POW hospital at Drymen.

Their children, Susan and David were

born in Ipswich and looked after by Stella's family until she was demobbed. Aylwin was discharged from the Army in 1946 and the family returned to Newcastle where he resumed his dental practice.

University Career

It became clear that his time in the army had fired his enthusiasm and Aylwin wanted more from his dental career than his practice alone could offer. In 1947, a University position became available in Dundee. This was the Boyd Chair of Dental Surgery, Dean of the Dental

⁶ Personal Communication with Professor Sir David Mason

⁷ Surgeon's Lives, Edited by Iain Macintyre and Iain MacLaren, Royal College of Surgeons of Edinburgh, p286

School, and Director and Adviser in Dental Studies at St Andrews University in the Conjoint University School of Medicine which was in Dundee.

Professor Hitchin took up his appointment in October 1947.⁸ In 1951, he was elected to the Fellowship in Dental Surgery of the Royal College of Surgeons of Edinburgh, which the College had established in 1949.⁹

The whole nature of dentistry was to change with the establishment of the National Health Service in 1947. In 1948, the running of the treatment service was taken over by the NHS, while the University of St. Andrews, through Queens College, Dundee, concentrated on developing the teaching facility. At that time the School offered a Diploma and Licence in Dental Surgery from the University of St Andrews. Hitchin undertook the task of bringing the Dental School and Hospital in Dundee into the vanguard of both clinical and academic excellence. His task was immense. The dental equipment in the hospital was long past its best and the clinical staff consisted mainly of part-time general dental practitioners. Hitchin made a point of visiting many other dental schools both in the UK and also further abroad including Scandinavia and North America. As a result, his dream of building a School and Hospital in Dundee which would be a major centre of both clinical and academic excellence was born.

A new building was being planned to replace the old Dental Hospital. During the construction of this, Hitchin worked closely with the architect and kept a very close eye on the proceedings. He could be seen, often on Saturdays and Sundays, in the absence of the contactors, walking along planks and even climbing ladders while carrying out his military type inspections of the work! This new Dental Hospital building was opened in 1954 with several old houses still remaining between the old and new buildings. The Dental School formally became part of the University (then Queen's College, Dundee, University of St Andrews).

The authorities wished to move the Dental Hospital and School to the new Ninewells site on the southern outskirts of Dundee where a large hospital complex was to be built, but Professor Hitchin was determined to keep the facility as part of the University campus and nearer to the centre of the city. His persistence paid off and finally an ambitious plan was drawn up to add a multi-storey building in place of the remaining old houses which were eventually demolished, and in 1968 the combined Dental Hospital and School emerged in Park Place when the Dental School Tower which joined the two Dental buildings was formally opened by Her Majesty the Queen Mother. This saw Hitchin's dream become reality. However, not all traces of the old houses have disappeared, as Hitchin had characteristically salvaged some of the old oak stair treads, which he subsequently carved into a series of University shields, and some of these still hang today in the Dean's office in the Dental School at Dundee.

His research interests included the development of teeth and acquired dental anomalies. He tended to study animals and his two best known models were sheep and dogs. His studies on sheep saw him visiting the island of Soay off the south-west coast of Skye. Being part Geordie and part adopted Scot; he was always canny with the funds which were much more difficult to come by in those days. It is reported that his studies on 'broken mouth' in Soay

⁸ University of Dundee Archives

⁹ Surgeon's Lives, Edited by Iain Macintyre and Iain MacLaren, Royal College of Surgeons of Edinburgh, p286

sheep and the development of ovine dentine, meant his using a portable X-ray machine powered from the mains at Elgol School on the island, and for stability, this was bolted to the rear wheel of his car. Somehow Hitchin persuaded the owner of the sheep not only to transport them to Elgol by boat, but also to hold them still during the radiography!¹⁰

One of his most well known studies in tooth development was on the incidence of connate incisors in Lakeland terriers being bred for show purposes – compulsory reading for dental students at Dundee. He carried out extensive work on these dogs and their genetically based dental conditions.

His published work on impacted canines led to the award of DDSc from the University of Newcastle in 1957.¹¹

His interests in Dentistry were not restricted to the Dental School in Dundee. He was a member of a select group of powerful and influential Dental Deans who moulded the development of dental teaching and education in the whole of the UK.

He was elected Senior President of British Dental Students Association 1953-56, and was President of North of Scotland Branch of British Dental Association 1956-57. He was President of the historic Dundee Dental Club in 1955-56.¹²

He was appointed Convener of Dental Council of the Royal College of Surgeons of Edinburgh 1971-74, and was awarded Honorary Dental Fellowships from the Royal Colleges of both Glasgow and Ireland¹³.

He was a Member of General Dental Council from 1956 until 1974 and served as Chairman of the Dental Committee for Scottish Postgraduate Medical Education.

He was a member of the Dental Committee of the Medical Research Council from 1960 until 1973. He served as President of the Royal Odont-chirurgical Society of Scotland from 1969 until 1970. He became President of the Oral Surgery Club, the British Society of Dental Radiology, and was a founder member of the British Association of Oral Surgeons.

During his teaching career he had acted as External Examiner to most Dental Schools in Britain. He was Consultant Dental Surgeon to the Royal Navy from 1957 and remained so until he retired.

He was a member of the Senate of the University of St Andrews, and as such played an important part in the formation of the University of Dundee which was awarded its Royal Charter in 1971. He gained particular satisfaction when he was awarded a CBE in the Honours List in 1970, for Services to Dentistry.

Personal Memory

I had the privilege of being an undergraduate student from 1962-1967 and thereafter a House Surgeon, SHO and Registrar in Professor Hitchin's department, which at that time embraced Conservative Dentistry. He was a hard task master but he only ever expected from his staff, the same demanding standards that he asked from himself. We had to be able to take all our own radiographs, including those for maxillofacial fracture cases. My first scientific paper was co-written with Hitchin, and he insisted that the histological sections were prepared with me being present and involved in the preparation of the slides. We sat together at a microscope studying the sections, before the text was produced. This was a great preparation for scientific research and many others before and after me, were to benefit from this experience. His artificial leg also caused incidents. It soon became evident to junior staff that if you were looking over Professor Hitchin's shoulder during an operation, it was best to look

¹⁰ Personal Communication with Mr David Hitchin

¹¹ Newcastle Dental Hospital and School – An Illustrated History by J J Murray, I D Murray and B Hill
Published by Medical Faculty University upon Tyne p157

¹² Copy of Curriculum Vitae written by ADH and supplied by his son, Mr David Hitchin

¹³ Ibid

over his left shoulder, otherwise as he moved, he might stand on your foot with his prosthetic limb and he was quite unaware of the now trapped foot! I can also remember during a lengthy operation in theatre, asking him if he wanted a stool to sit on. I was told quite firmly, that he did not, as he was sitting already, given that his prosthetic leg was bearing most of his weight! In the old Dental School, there was (and still is) a lift, but Professor Hitchin stubbornly avoided using this, preferring to walk upstairs to the Dean's Office.

Staff and students were invited on several occasions to his home for dinner where we met his wife Stella. She was an extremely accomplished cook, and she thoughtfully and quietly helped nervous junior staff relax in what she realised was a daunting experience for us. Hitchin was a keen collector of antique furniture and there were items on show which he had carved. The author has recently become the proud owner of a wooden head carved by Professor Hitchin when he was a Captain in the Army during his time at Shenley Hospital.

We were also shown his extensive garden, which was his pride and joy and which provided much of the fruit and vegetables for the family, and which was, of course, immaculately kept. He was also a keen bee-keeper and he tended them meticulously.

Not surprisingly, following the skills learned from his father, Leonard, Aylwin Hitchin was a keen and accomplished photographer. I can still hear him saying to me between patients during a theatre list, *"If you are looking into a fine sunrise or sunset, turn around and look at the scene behind you. There will be a dramatic lighting effect which will be equally as interesting."*

This is something that I do to this day and Hitchin invariably comes into my mind.

Figure 4 Oil painting by J McIntosh Patrick 1978



He had his portrait painted by the celebrated Dundee artist, James McIntosh Patrick in 1978. At least two paintings were produced. One hangs in the Board Room in the Dental School in Dundee, and another is hanging outside the Sub-Faculty room in the Newcastle Dental School.

As in many artists' portraits, there is a 'great deal of symbolism in McIntosh Patrick's work. The oriental screen behind him was bought by Hitchin in

Dundee and was always behind his chair. The scarlet academic robes and splendid hat were from an Honorary Degree (D Odont) awarded to him by the University of Lund in Sweden in 1977. The vase of flowers contains dog violets, the bulbs of which are shaped like an incisor tooth. This is a clear reference to his research into the dental anomalies in Lakeland terriers. There is a painting of the new tower building at Dundee on the wall beneath a wood carving of a University shield – one of a series made by Hitchin, from the oak stair treads from the

old houses which occupied the site of the present tower block. He is wearing his CBE medal (1970) with pride.¹⁴

All through his long career, Hitchin was a devout Christian and his faith moulded and guided him both in his work, and his day to day life. Although brought up as a Baptist following his mother Ruth's example, he became a member of the Presbyterian Church in Newcastle and later joined the Church of Scotland. He served this in many ways. He was an elder at St James' Church, in his beloved Broughty Ferry. He was a long-standing Commissioner of the Presbytery of Dundee and a member of the Synod of Angus and Mearns. He also became Commissioner of the General Assembly of the Church of Scotland. He served as President of both the Christian Dental Fellowship and Inter-Varsity Fellowship.

Retirement

Hitchin retired from his post at Dundee on 31 December 1977. Even in his retirement he was still active in Dental Education. He was instrumental in the establishment of a Dental School in Benghazi, Libya. He helped with the choice of suitable accommodation, equipment and arranged for experienced visiting teaching staff.¹⁵

As he grew older, the large house with its extensive gardens was becoming too much for him, and they moved to Bridge of Weir in Renfrewshire to be with their family and could see their grandchildren growing up. He still loved to work in the garden, but with the passage of time, he slowly and reluctantly relinquished this task to the younger generation.¹⁶ After his beloved Stella died, life started becoming a strain for Aylwin and after a period of illness, he passed away on 1 October 1996 aged 88.

Professor Hitchin was a meticulous clinician who had the highest regard for the well-being of patients under his care. He could be a rather intimidating and authoritarian individual with exacting standards, but he could also be a very supportive and inspiring figure to junior staff and colleagues, and was fiercely loyal to his beloved Dundee Dental Hospital and School. He was a man of vision who guided and developed postgraduate dental education in the whole of the UK, and especially in Dundee.

Epitaph

In St Paul's Cathedral, in a corner of the crypt is a Latin inscription on a monument to the great architect, Sir Christopher Wren. It reads:

"Lector, si monumentum requiris, circumspice"

In our class year book, next to their photographs, we had various quotations about staff and students. We used the translation of the above for Professor Aylwin Drakeford Hitchin, and which perhaps should be read by all visitors to the Dental Hospital and School in Dundee:

"Reader, if you seek his monument, look around you."

Author Biography:

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¹⁴ Personal Communication with Mr David Hitchin

¹⁵ Ibid

¹⁶ Ibid

Convicted by a bite mark, Ted Bundy (1946-1989)

Xavier Riaud

Abstract

The identification of a murderer and the eventual conviction was largely due to forensic dentistry and in particular the use of bite marks on the victim compared with casts of the teeth of the accused. The Bundy case has become notorious in American legal circles.

Keywords: Forensic dentistry, bite marks

The crimes

At first glance Ted Bundy seemed to be the picture of the perfect well educated "all American" son-in-law, handsome, charismatic and intelligent. By day, he acted like any ordinary person, by night, his character changed, turning him into a sadistic serial killer who preyed on vulnerable young women. During his nocturnal activities, that charismatic young man would pretend to be injured or handicapped in order to obtain sympathy, and accept help from young women. He would then assault, rape and murder these women, returning to the murder scene a few hours later to further sexually molest the decomposing corpses until putrefaction. He decapitated at least 12 of his victims and kept some of the severed heads in his apartment for a period of time as mementos (<http://fr.wikipedia.org>, 2012). Anne Rule (1989), his biographer, referred to him as "*a sadistic sociopath who took pleasure from another human's pain and from the control he had over his victims until they died and even afterwards.*" After he had escaped custody on two occasions, Ted Bundy was finally arrested in Pensacola, on February 15th 1978. Bundy was suspected of causing the killings committed in the Chi Omega sorority house which took place overnight between January 14th and January 15th in 1978. A man with a truncheon had entered several bedrooms and murdered two young girls, Lisa Levy and Margaret Bowman. Two other students were also bludgeoned but remained alive and one other woman, Cheryl Thomas, was also seriously assaulted but also survived the attack (Aynesworth & Michaud, 1989).

At the crime scenes detectives found numerous blood stains, specimens of semen, hair and a hood. In addition, a bite mark was noticed on the dead body of Lisa Levy, and this evidence was recorded and photographed. This bite mark was going to provide invaluable and significant evidence for the eventual conviction of the murderer.

In order to charge Ted Bundy with the murders it would be necessary to relate Bundy's teeth with the bite mark on the body. For this comparison to take place photographs were taken of Bundy's teeth but a dental cast was also needed. An impression of his teeth was required in order to make a dental cast. Bundy did not cooperate with any attempts of taking an impression of his teeth and eventually he had to be pinned down by six men before an impression could be achieved.

The trial

On June 25th 1979 Bundy stood trial in a Miami courtroom. Right from the beginning of the trial, the description of the violence of the murders moved the jury members. The jury was shown photographs of the crime scene, the beds, the piles of blood-drenched clothes; Margaret Bowman's smashed-up head and even the hair spray bottle which was used to sodomize Lisa Levy. Then, two of the survivors, Karen Chandler and Kathy Klein, testified and described to the court the shocking details of how they had been assaulted and beaten. This testimony was then followed by that of Cheryl Thomas who described her injuries: "*I had five skull fractures and many contusions in my head, a nerve was damaged and I lost the hearing in my left ear as well as my balance. I had a broken jaw and a dislocated shoulder.*"

Unfortunately none of the women could positively identify Bundy as the person who had assaulted them. However, another student, Nita Neary, stated under oath that she definitely recognized Ted Bundy as the man seen leaving the Chi Omega sorority house on that January night.

After those damning testimonies, it was the turn of the forensic odontologist to give their evidence against the accused (Porte, 2011; Polly, 1994).

Forensic evidence

The most difficult pieces of evidence were the bite marks on Lisa Levy. The forensic odontologists, who were called upon as expert witnesses, confirmed that human teeth had their own unique features. When a bite is definite and properly measured, a dentist can be almost certain whether an individual's teeth were responsible or not for the observed bite mark. The potential error in this case was the result of the time delay from the initial bite. The bite mark had undergone post mortem changes from the time of the assault to the time of the trial. As a result the dentists had to rely on the photographs taken by detectives at the crime scene. The first quoted specialist was Dr Richard Souviron, a dentist in Miami, (Fig 1), (Porte, 2011; Dekle, 2011; Polly, 1994). He immediately testified that Lisa Levy had been bitten twice. Fortunately in the case of Lisa Levy, a high definition photograph had been taken with a ruler in the background so that the size and scale of the bite marks could be measured and compared to casts of teeth (Fig 2).

The culprit was said to have taken an initial bite of the young girl. Then, this was followed by a lateral rotation with his lower teeth on his upper jaw, with the upper teeth remaining fixed in her flesh. Afterwards, he was said to have bitten the victim a second time. Thus, the practitioner specified that the maxillary teeth left only one mark and that the mandibular teeth left two marks. These marks were said to have been extremely useful for the demonstration of Bundy's guilt at his trial according to the forensic odontologist (Porte, 2011; Dekle, 2011; Polly, 1994).

"For his demonstration, the specialist used two photo enlargements of the colour of the bite mark and of Bundy's teeth arrangement. On the photograph of the bite mark, the doctor showed the structure, the alignment, the size and the shape of the premolars and of the incisors. Three stripes could be seen at the top of the bite mark and Dr Souviron explained that these stripes matched Bundy's teeth on the lower jaw which were said to have slid along the skin. Then, as for the marks made by the teeth on the lower jaw, the dentists added that a person having perfect teeth arrangement would have left four similar rectangular marks, all on the same half-circle. The bite on Lisa Levy proved that the teeth were not in good condition, that there was a gap between the four lower incisors and that the two external canine teeth were worn and greatly tilted, which exactly described the features of Bundy's teeth arrangement (Porte, 2011)."

A second forensic odontologist was subpoenaed: Dr Lowell Levine, the head of the Odonto-Stomatology Department of the Medical Centre in New York. He maintained in front of the jury members that unequivocally, according to the bite marks, the victim was dead or dying when the bite was inflicted: *"It is almost impossible to find similar teeth arrangements causing such marks* (Porte, 2011; Dekle, 2011; Polly, 1994)." Both specialists had studied the dental casts of Bundy's teeth and confirmed that they matched the bite marks on the body. In addition, during the trial, wax impressions were taken from Bundy's dental casts to compare them with the marks which had been noticed on Lisa Levy's skin. Both forensic odontologists agreed on the undisputable similarities between the bite mark and the teeth. When the prosecutor asked them if they were able to definitely identify the person responsible for these bites, the two men maintained without hesitation that the culprit was in front of them, in the dock (Porte, 2011; Dekle, 2011; Polly, 1994). The defence lawyer tried to contest the evidence by any means possible with the aim of bringing the expert witness testimony into disrepute. He asserted that the expert witness had used an "unusual technique" in order to raise doubts in the minds of the members of the jury. Souviron was questioned once again and was asked how it was possible that so much value could be attributed to such a subjective odontological analysis. Then, Souviron confirmed without doubt "having carried out many

examinations with dental casts he had been able to standardize his analysis.” The defence lawyers attempted to retaliate by introducing their own forensic specialist, Dr Dwayne Devore. The latter argued that, according to him, teeth arrangements like Bundy’s could not be considered as unique (Porte, 2011; Dekle, 2011; Polly, 1994). (Fig 3).



Richard Souviron au procès du Chi Omega

Fig 1. Richard Souviron at the Chi Omega murder trial



Trace de morsures avec annotations des experts

Fig 2. Bite marks with the forensic comparisons



Ted Bundy observant le moulage de ses dents
procès du Chi Omega (1979)

Fig 3. Ted Bundy observing the casts of his teeth during the Chi Omega murder trial (1979)

Other pieces of evidence were found on the crime scenes: semen and hair. Unfortunately the analysis of these specimens was considered to be “inconclusive”. The defence team argued that these helped prove their client’s innocence. As for the prosecution, they maintained that on the contrary, these elements did not exclude Bundy’s guilt.

The court verdict and sentence

On July 24th 1979, the jury found Bundy guilty on two counts of first degree murder (those of Lisa Levy and Margaret Bowman) and of three counts of attempted first degree murder and assault on Kathy Klein, Karen Chandler and Cheryl Thomas (Porte, 2011; Dekle, 2011; Polly, 1994). He confessed before his execution to 30 homicides committed between 1974 and 1978 but the true total number of his victims will never be known and potentially could be higher. On July 31st 1979, Judge Cowart imposed death sentences by electrocution on Ted Bundy. He died in the electric chair on January 24th, 1989 at Raiford Prison in Starke, Florida.

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The William Parks Exhibition Denture- a hidden gem.

Peter Jordan

Abstract

This paper describes a previously unknown denture constructed from hippopotamus ivory. The denture is unusual in that it is anatomically correct in terms of tooth morphology. It is believed that it was a demonstration item for the Great Exhibition of 1851.

Keywords

Hippopotamus ivory, full upper denture, Great Exhibition of 1851

Background information.

What can be interesting about an old denture? But please read on because the denture described in this paper is something quite out of the ordinary.

As a new volunteer, my first job from the Curator of the Museum in the Royal College of Surgeons England was to photograph the entire College's collection of historical dental instruments. The collection consists of a very great number of instruments and artefacts and the Curator was pleased to have a dentist on hand to first identify the instruments then photograph them so that the images could be included in the Royal College of Surgeons on-line catalogue, Surgicat. This was a one-day-a-week job and it lasted two or three years before being completed. During this cataloguing exercise, a small cardboard box was found containing perhaps about fifty 18th and 19th century dentures manufactured from ivory, bone and porcelain. These had all been constructed for patients to wear and most could only be described as of poor quality and not really fit to be part of the College's collection. But because they had all been previously catalogued and numbered, they could not be ignored and were duly photographed.

The majority of these dentures had been catalogued and photographed before reaching the last few dentures, fully expecting it to be of similar poor quality. Much to my surprise, it was something completely different. Most of the prostheses in the box had been partial dentures, there were only two full upper dentures, made out of ivory or bone and hewn from one piece of the material. They were mostly of dubious quality with an appearance suggesting the maker may well not have been too skilled. These dentures must have been extremely difficult for a patient to wear as they were, hand carved on a very inaccurate model of the mouth, which could in no way have been described as precise.

The exhibition denture

The denture at the bottom of the box was unusual in that it was a full upper denture made of hippopotamus ivory. It had full palatal coverage rather than the horse shoe or "C"-shaped denture which was the most common presentation of other hand carved dentures. Each quadrant contained eight teeth giving a full arch of 16 teeth. This was uncommon in itself because it is more usual to have 14 teeth in any one arch of a full denture. "Wisdom" teeth or third molars are rarely put on a denture. On further inspection the denture started to reveal its secrets. Firstly, the workmanship was of the very highest quality with accurate reproduction of all anatomical detail. The soft tissues and gingival tissues had been fully contoured. Palatal rugae had been carved

and accurately represented on the artificial palate and the teeth were set up on the alveolar bone ridges conforming exactly to the curves of Monson and Spey.

The Teeth

Left quadrant

The eight teeth on the left side were natural, human teeth. The roots of these teeth had been sectioned and set into the ivory denture base on gold pegs. The cut root ends, which were only visible on the fitting surface of the denture, had been inserted with such superb skill that the junction between the teeth and the carved ivory gum margins could be seen at any point around each tooth. All the natural human teeth were perfect without any sign of wear, abrasion, attrition or dental caries and it was quite obvious that they were a set taken from the mouth of a single person. One immediately wonders how these perfect teeth were obtained from what had to be a young person, perhaps 18 or 20 years old, bearing in mind that at the time, the dental health of the general population was poor. Did he or she die as a result of disease, accident or battlefield injury or were the teeth extracted and sold to raise some cash? If the latter, one has to remember that no anaesthetic would have been available at the time. Regrettably, there is no record of the provenance of the teeth in the denture.

Right quadrant

These teeth had been carved with exquisite skill from the solid ivory of the denture base. Each tooth was an absolutely perfect reproduction of the natural contra-lateral tooth. The exact carving reproduced not only the individual tooth morphology, but also the spacial arrangement of the teeth within the arch.

The exhibition denture



The Skilled Carver

This denture was made at a time before the advent of electric rotary tools and so must have been carved with hand instruments with perhaps the aid of some form of foot or clockwork engine.

The question that now has to be asked is why so much incredible skill was expended on making a denture that was quite obviously not made to be worn by any individual patient. It is known that this denture was made in 1851 for the sole purpose of being exhibited at the Great Exhibition in Hyde Park as a demonstration of the skill of the maker. It is listed as an exhibit in the Catalogue of the 1851 Exhibition, most curiously, not on a page of related items, but on a page headed "Musical, Horological & Philosophical."

The denture was made by a man called William Parks, who was 26 years old at the time. We do not know if he was then practicing as a dentist, or just as a maker of false teeth, but he did qualify LDS RCS in 1863. When the Dental Register was first published, his name appeared in it and did so every year until 1905. He practiced all his life at 27 Newington Crescent, Kennington Park Road, London, a road which no longer exists. In 1901, the census tells us that he lived in Wandsworth with his wife, two sons and two servants. One of his sons was called Norris and in 1901 he was a medical student and it was he who presented the denture to the Museum.

This denture has never been exhibited in the Hunterian Museum. If it were to be placed in a showcase with a label saying "Denture shown in the Great Exhibition, 1851" a cursory glance would barely attract any attention. It is only when one seen close up that it reveals its secrets and history.

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Peter Jordan, LDS, RCS, Eng. was in general practice for 37 years and has been working as a volunteer in the Hunterian Museum at the Royal College of Surgeons, England.

Henry Moon and his Molars

Tony Waldron

Abstract

Henry Moon qualified in London in medicine and dentistry, emigrated to New Zealand, eventually returning to London. He is known for his observations of the malformation of tooth cusps in children with congenital syphilis

Keywords: Congenital Syphilis, Moon's Molars, Mulberry Molars

Henry Moon lived in the latter half of the nineteenth century at a time that might be called "the golden age of syphilis". Between 1860 and 1880 approximately two thousand deaths from syphilis were recorded each year in England and Wales. The true number must have been considerably greater since syphilis was often left off the death certificate to protect the susceptibilities of the remaining relatives. Also, many of the deaths recorded from cardiovascular and neurological disease were actually the result of tertiary syphilis¹. It has also been estimated that there might have been at least 10 – 12 thousand children alive with congenital syphilis at any one time. The prevalence of congenital syphilis meant that Henry had ample opportunity to observe the effects of the disease on the teeth, in particular the effects on the first permanent molar with which his name became synonymous.

Life and Death

Henry was born on the 23rd of May 1843 (*not* 1845 as stated by all the published sources), the third child and second son of William and Elizabeth Moon. William (1803 – 1867) was born in Barnstable, Devon, the son of a wealthy silk manufacturer. Elizabeth (1803 – 1881) came from the small village of Grafton Regis in Northamptonshire, the eldest daughter of the Rev John Bright and his wife Susanna (née Battams). It is not clear how Henry's parents met but they were married in 1840 at Tonbridge Wells when they were both 34 years. Many of William's family entered the medical profession and he followed suit. He trained at Guy's Hospital and qualified LSA in 1824 and MRCS the following year. He entered general practice in Tottenham in North London where Henry grew up. His father's first surgery was at 169 Tottenham Lane but the family later moved to 157 White Hart Lane in Tottenham where they were able to keep a cook and a housekeeper, reflecting his father's increasing income from practice. Henry was a delicate child and it is recorded at the age of seven to have fallen downstairs almost biting through his tongue. Fortunately, John Braxton Hicks (1823 – 1897), who was William's partner in practice at the time² was to hand and sutured the tongue which 'healed up rapidly, healing in a short time with scarcely a mark'³. At Braxton Hicks' instigation Henry entered Guy's as a medical student with the advice that, should he find general practice too arduous, he could turn to dentistry. In the event this is what he did for, having completed his examinations at Guy's in 1866 and qualified MRCS he then entered the Dental Hospital of London to study dentistry, qualifying LDS in 1867 the year that his father died from 'natural causes'. He then set up in practice at 26 Finsbury Square and was sufficiently in funds to donate a guinea to the Statham Defence Fund the year after he qualified⁴. In December 1870 he wrote to the Treasurer of Guy's Hospital accepting the post of Assistant Dental Surgeon to James Salter (1825 – 1897), taking up his post at the start of the coming year. He remained at Guy's for several years giving the annual series of summer lectures on dental surgery. He was a member of the Odontological Society of Great

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Britain, having been elected to the membership in January 1870. He served as a councillor, as a member of the Committee, and as Vice President in the 1880s. He published little, his few contributions appearing in the Society's *Transactions*, the *Journal of the British Dental Association*, and the *Guy's Hospital Reports*⁵. In 1880, on Salter's retirement he was appointed Dental Surgeon at Guy's and four years later, he was elected to the Dental Board of the Royal College of Surgeons. His final career move came in 1885 when he took up the post of Dental Surgeon at the London Dental Hospital, a post that he seems to have held in addition to that at Guy's.

All this time Henry kept his practice at 26 Finsbury Square, but in 1882 he formed a partnership with Underwood Arthur Carpenter Harris (d 1940) and together they took rooms at 112 Harley Street. Henry was the senior partner, owning three quarters of the partnership and he spent a good deal of money on alterations and on refurbishing the rooms. The partnership proved to be very profitable showing net profits in the years 1884/5 and 1885/6 of £2,495 and £3,382, respectively. Henry was certainly sufficiently in funds to contribute fifteen guineas to the Mahomed Memorial Fund in February, 1885⁶.

Henry never married but he kept in close touch with a wide range of relatives both close and distant. After his father's death he cared for his mother and his sister Mary Goodman who had been widowed in 1872 aged 31 years. They all lived in 120 Hornsey Lane, in north London where they also had a housekeeper, Barbara Brazier and some other servants. His mother had a stroke nine months before her death in 1881. In 1886 Henry and his assistant Frederick Newland-Pedley (1856 – 1944) were praised by the *British Medical Journal* for the energy that they had shown in contributing towards the enlargement of the dental department at Guy's⁷. Henry's health had begun to fail and he had delegated much of his work to Newland-Pedley⁸.

The move to New Zealand

On account of ill health, Henry was advised by Walter Moxon (1836 – 1886), a physician colleague at Guy's to join his older brother William in Cambridge, New Zealand. He resigned his posts, receiving a letter of thanks and regret from the Dental Hospital in April 1886 and sailed for New Zealand. His leaving was abrupt, and he did not have time to wind up his dental practice, leaving these arrangements to his sister Mary who was then living in the Harley Street premises. In September of 1886 he gave power of attorney jointly to Mary and his London solicitor, Edgar Harvie so that they could deal with the partnership. In December he wrote a letter to Mary in which he listed all the improvements that he had made to the property (amounting to some £2,860) and a detailed list of all the articles that he wished to be kept rather than sold. The sale of the practice proved to be something of a disaster. Harris, as sitting tenant struck a hard bargain and Henry had to settle for well below the market price. He received only £3,500 for the lease, to be paid in annual instalments over seven years, and £300 for all the fixtures and fittings, including the dental equipment. He also had to agree to a clause in the agreement that, should he return to England, he would not practice again as a dentist. The partnership was finally dissolved in September 1887.

When Henry arrived in New Zealand he found his brother William was well known, if not somewhat notorious in the small town in which he lived. William had emigrated to New Zealand in the 1860s and settled in the town of Cambridge. He became successively: native agent, land agent, exporter of frozen lamb, tour guide, and bankrupt. He married twice, to Maori women, and had two children by each wife. His money-making schemes generally failed and he was bailed out by Henry (whom he referred to as Harry) on numerous occasions. William invariably referred to these payments as loans but there is no evidence that any was ever repaid. In 1884, Robert Skaife, a young cousin of the Moons was planning

to emigrate to New Zealand to take up farming and Henry agreed to finance him. Henry bought a farm at Matanuku from William which Skaife subsequently worked.

Henry's first act on arriving in Cambridge was to give William £200 to buy a wagon and horses, together with other animals and farm equipment. He settled down in the town and his health seems to have improved sufficiently to take up work as an assistant to Dr Edward Waddington (1819 – 1903), the elderly local physician who was a veteran of the Crimean War. Henry was apprehensive about carrying out medical duties but he evidently began to enjoy the work, writing to Edgar Harvie, in February 1887, 'If I return to England, I should propose to something of the same sort.'

Return to England

Henry returned to England in February 1890 leaving New Zealand as abruptly as his arrival, suggesting that his health had suffered a relapse. He was accompanied by his niece Mary, William's daughter by his first marriage, perhaps to care for him until his health improved. During his time in Cambridge he had come to be held in some esteem. Noticing his departure the *Waikato Times* wrote on 30 January 1890

Dr Moon has, in his quiet unobtrusive way, done more good in Cambridge than many outsiders would believe. The interest he has shown in anything conducive to the good of the town, the influence he has tried to gain over his young friends, and his, quiet, pleasant and gentlemanly way on all occasions of "making rough places smooth" have gained him the respect and warm esteem of all with whom he has come in contact. We are quite sure that had times been better, or had there not been so many absentees from Cambridge, Dr Moon would have received far more public and tangible acknowledgement of what he has done ..

Henry and Mary went to live with his sister at Melford Lodge in Muswell Hill, London to which address she had moved after disposing of the Harley Street practice. Henry continued to send money both to William and to Robert Skaife but, despite this, in December 1890 William was declared bankrupt with debts of about £5,500. He died in 1924 of heart failure, secondary to mitral regurgitation.

In 1891 Henry's sister Mary died and Henry took on the task of caring for her son Harry who was mentally defective and in need of constant care. Henry and niece Mary moved to Pine Lodge in Byfleet, Surrey. Mary returned to New Zealand in February the following year to discover that Henry had deposited £300 in her bank in Cambridge. Henry was by now having money worries of his own. The clause that he had agreed to when settling the lease on the Harley Street practice meant that he could not resume practising dentistry. In 1892 he moved to a small house in Runnymede Street, Egham with another cousin, Selena Smith, the daughter of his maternal aunt Catherine. It is clear that Henry had been suffering intermittently from depression and at 2 o'clock in the morning of the 14th of November 1892, he was found wandering about in Chertsey, about four and a half miles from Egham and questioned by the police. He was allowed to continue on his way and went on about another five miles to Virginia Water where he drowned himself. His watch and chain and some other possessions were found on the shore of the lake. The lake was dragged but his body was not discovered until the 16th. His death and inquest were reported in a number of local papers including *Reynolds's Newspaper* (20 November 1892), the *Reading Mercury* (26 November 1892) and *The Worcestershire Chronicle* (26 November 1892). At the inquest, the jury were told that Henry had been forced to leave his post as dental surgeon at Guy's Hospital due to 'mental derangement' and they duly returned a verdict that he had committed suicide while he was temporarily insane.

In his will he left land in Matanuku, to Robert Skaife. The leases on the land that he had around Cambridge he left to William although William declined to accept them since they

were about to expire and would simply entail him in expense which he could not afford⁹. Bequests were made to his cousin, Mary Lamb, with the proviso that she provided for the care of his nephew Henry Goodman who was then in a sanatorium¹⁰. His whole estate was valued at only £613 4s 1d and most of his effects had to be sold off to settle legal fees and to pay for his funeral. He was buried on the 21st of November 1892, at the age of 49 in Highgate Cemetery, in the same grave as his mother.

The Molars ...

On the seventh of May 1877 Henry read a paper entitled *On Irregular and Defective Tooth Development* before the Odontological Society to an audience that included Jonathan Hutchinson (1828 – 1913) the great authority on syphilis and the describer of the changes to the upper permanent incisors that accompanied congenital syphilis. Henry divided irregular and defective teeth into two types; firstly those due to abnormalities of development that resulted in the formation of supernumerary teeth or odontomes. His second type of defective teeth included those that were either diminished in size or of defective structure due to developmental abnormalities. In this second category, he included the dental abnormalities that accompanied congenital syphilis. Henry stated that he had seen some hundred such cases in his twelve years of practice and went on to describe the case of a 16 year old boy with one normal central upper incisor and one that was 'a typical syphilitic tooth'; the lower incisors were narrowed with evidence of obliterated notching. That is to say, the boy had what came to be known as Hutchinson's teeth. He then said that the first molars were 'characteristically affected'. A little later in his presentation he noted the form of these characteristically affected molars: 'when the upper incisors are of typical form', he said, 'the first molars are exceedingly prone to be smaller and more dome-shaped than usual'. He illustrated his brief description of the syphilitic molars with an illustration of an upper first molar from the mesial surface (figure 1; Plate iv, figure 12c in the original). The caption admits that the figure is somewhat diagrammatic and it shows relatively little that would aid in its diagnosis except that it does seem to be somewhat smaller than usual, the cusps also seem smaller than usual while the crown appears to be smooth. What he did not say, but which is evident from the illustration is that the diameter of the tooth was greater at the base than at the crown, the reverse of what is normal. Moon's molars can be distinguished from the alteration in the molars described by Fournier père (1832 – 1914) in which three-quarters of the tooth appears normal, the abnormal quarter being separated from the normal part by an encircling groove¹¹, since there is clearly no groove present.

A lengthy discussion followed the reading of the paper, so long in fact that it had to be continued during the meeting the following month. Hutchinson was one of the contributors to the discussion, noting that the observations on the shape of the molars had 'interested him much,' although 'he had not himself noticed it.' Hutchinson, who could never quite bring himself to acknowledge that abnormalities in teeth other than the incisors could be diagnostic of congenital syphilis, did admit that they might help in the corroboration of the diagnosis. But 'in the absence of the peculiarity described in the upper central incisors they are not to be trusted' he said, for example, at the International Medical Congress held in London in 1881¹².



Figure 1

Illustration from Moon's *Transactions* paper showing a) notched upper incisors, b) a normal first lower molar, and c) affected first upper molar viewed from the mesial aspect

13.

Henry's paper was published in the Society's *Transactions*¹³ and also – but without the illustrations – in the *Monthly Review of Dental Surgery*¹⁴. And there the matter seemed to rest until 1884 when Henry contributed the chapter on Dental Surgery to the fourth and last edition of Thomas Bryant's (1828 – 1914) *Practice of Surgery*¹⁵. In this chapter he alluded to the changes of the teeth in congenital syphilis in a short paragraph, noting the changes in the incisors and the fact that 'The 1st molars are reduced in size and *dome* (sic) shaped, through the dwarfing of the central tubercles of each cusp.' The illustration that accompanies the text (figure 2) shows the typical notching of the upper central incisors and the lower first molars do appear somewhat smaller than normal and are clearly dome shaped due to the inward bending of the cusps. It is important to note that the cusps themselves are otherwise normal in number.

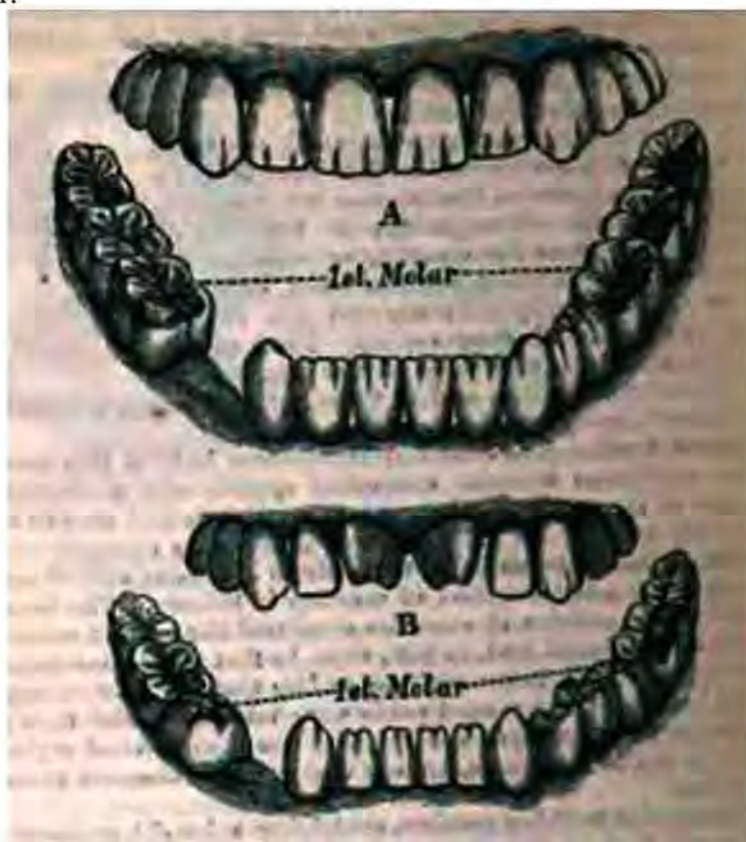


Figure 2

Part of illustration from Moon's chapter in Bryant's *Surgery* showing A) normal teeth and B) teeth affected by congenital syphilis. The upper incisors are notched and the lower first molars show the typical dome shape

. In a contemporaneous and extremely detailed account of the effects of syphilis on the dentition, Cavallaro¹⁶ referred to many changes in the first molars one of which – cuspal erosion – he considered as pathognomonic of congenital syphilis as the notched incisors of Hutchinson; nowhere did the changes described by Henry get a mention, indeed the only reference to him was in support of the fact that a normal upper incisor might accompany a contralateral one that was notched. (It is of interest that Cavallaro referred to the paper in the *Monthly Review of Dental Surgery*, rather than the one in the *Transactions*, the one that had the illustration of the defective molar, so he would not have seen Henry's depiction of the abnormal tooth.) In an earlier comprehensive list of the literature on syphilis from the 15th to the end of the 19th centuries, Hutchinson has several entries, but Henry none¹⁷, and this was also the case in Jeans' later extensive literature review of congenital syphilis¹⁸. In 1914, Still noted that the molars in congenital syphilis were 'dome-shaped' owing to the poor development of their cusps and the rounding off of their angles but did not attribute this observation to Henry¹⁹ while the mention he did get in Thom's book on syphilis was simply to corroborate the fact that a normal incisor might co-exist with a Hutchinsonian one, just as Cavallaro had done several years previously.²⁰ Pflüger in papers published in 1924 and 1925 described what he called a 'budform' (Knospenform) molar. The first paper is illustrated with a photograph of such a tooth in the mouth and the second is illustrated with casts showing the bud-shaped molar all of which conform closely to Henry's dome shaped molar. In both papers Pflüger included a line drawing of a normal first molar and a Knospenform that perfectly illustrates the narrowing of the crown of the latter tooth towards its occlusal surface. Henry was not referred to in the first paper but by the time he published the second Pflüger had read Lucas's *Lancet* paper and realised that he had been pre-empted by Henry. It is likely, he wrote, that Moon made the same observation as me forty years ago but his description is completely forgotten (Es ist anzunehmen, dass Moon bereits 40 Jahren die gleiche Beobachten gemacht hat wie ich, dass seine Beschreibung aber vollständig in Vergessenheit geraten ist)²¹. It is evident that Pflüger had not come across Pitts' paper of 1921 – admittedly in a less accessible journal – in which he refers to the 'type of molar described by Moon, which so frequently accompanies the Hutchinsonian incisors and is almost as typical as those teeth'²²

Confusion Following this, confusion set in with descriptions of what were first called the mulberry molars of Moon, and then the raspberry molars of Moon. The first eponym was due to Louis Karnosh who, in an influential paper, referred to the mulberry molars of Henri (sic) Moon or Fournier²³. He describes the teeth as being hypoplastic with the 'whole occlusal surface [being] rough, pigmented and pinched' with several nodules standing proud of the hypoplastic occlusal surface. Hillson and his colleagues have suggested that the accentuation of the cusps in figure 13b of the *Transactions* paper may have been the origin of some of the confusion between the mulberry and Moon's molars, since they do look somewhat reminiscent of the nodules of Karnosh's molars²⁴. Whether other authors were so influenced is not certain, but it should certainly not have confused Karnosh since his reference is to the chapter in Bryant's *Surgery* where the cusps are by no means similar to those described or illustrated by Karnosh in his own paper.

The second incorrect eponym is due to Charles Dennie who wrote that the tooth consisted of 'an imperfectly enamelled molar with numerous projections, wrongly called cusps; these may number from five to sixteen, and give the impression of a raspberry which has undergone petrification'²⁵. Almost nothing could be further from Henry's original description.

A number of authors have referred to the bud-shaped or dome-shaped molars. Pincherle, for example, referred to 'dente ridotto nel suo volume e foggato a cupola per un arresto di

sviluppo delle sue cuspidi' (a tooth reduced in volume and fashioned into a dome by an arrest in the development of its cusps)²⁶ and later Sarnat *et al.* showed radiographs of molars with typical changes in the crown of the first molar;²⁷ Putkonen emphasised that the most important feature of Moon's molar was a reduction in the size of the crown towards the occlusal surface, especially in the mesio-distal diameter²⁸. Mulberry, or honeycomb molars featured in an earlier paper by Morton Smith in which he described a conical narrowing of the teeth from neck to crown, illustrating his comments with a photograph of a cast in which the molars like similar to those that Henry had described²⁹.

The confusion about the relationship between Moon's molars and the mulberry molars was clarified in a paper by Hillson and his colleagues from their examination of specimens in the Royal College of Surgeons of England. In Moon's molars the cusps were abnormally closely spaced producing a narrowed occlusal surface relative to the bulge of the sides of the crown. The mulberry (or Fournier's) molars on the other hand, showed a marked hypoplastic defect that cut sharply into the bases of all the cusps. The abnormalities in the mulberry molars were considered to overlap with the wide range of other defects of enamel hypoplasia and might have been caused by any of the other growth-disturbing conditions that affect the teeth. In the opinion of these authors, the mulberry molars could not be considered as pathognomonic of congenital syphilis. The defects in the Moon's molars – and in Hutchinson's incisors which were also examined – were considered to be unlike any other defect and thus *were* pathognomonic of congenital syphilis.

Hillson's paper should really have made the distinction between Moon's molars and mulberry molars beyond question and have ended the practice of using the terms as synonyms. Henry would have been gratified to know that his teeth were on a par with Jonathan Hutchinson's but regrettably the message has still not penetrated into many corners of the medical world. All the on-line medical dictionaries that I have been able to access still use the terms interchangeably and the error is perpetrated in recent text-books of oral pathology, paediatrics, and cutaneous medicine³⁰. That the error continues reminds one of the Bellman in *The Hunting of the Snark* who said that 'what I tell you three times is true'; errors constantly repeated assume the status of fact, both in syphilology and elsewhere.

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5. A full bibliography is available from the author, on request.
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8. Newland-Pedley went on to found the Guy's Hospital Dental School and become the most famous dentist in London.
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**Odontology and the History of Medicine at the Royal Society of Medicine 1907-1960
and the Contributions of Lilian Lindsay- Part One the early years of the Royal Society
of Medicine and the Section of Odontology**

Julie Papworth

Abstract This paper examines the foundation of the Royal Society of Medicine and the Sections of Odontology. It considers the remarkable achievements of Lilian Lindsay which were made at a time when the medical world was almost entirely dominated by men.

Key words: Royal Society of Medicine, Odontology Society, Lilian Lindsay.

Lilian and Robert Lindsay gave up their practice in Edinburgh and moved to London in 1920 when Robert took up the newly established post of paid Secretary to the British Dental Association. This marked the start of Lilian's many years of dedicated service to the BDA. She founded the library donating her own artefacts to start the museum. She also began to write what was to become a large output of carefully researched historical and academic books and papers. In addition to her involvement with the BDA she entered fully into the wider dental life of London and this included joining the Royal Society of Medicine.

The Royal Society of Medicine

By the time of Lilian and Robert's move to London the Royal Society of Medicine was well established. Founded in 1907 it had amalgamated fourteen separate Medical Societies from all the divisions of medicine, providing each with a home within one central organisation in which each former Society became a Specialist Section. The *Lancet* correctly recognised the benefits of enhanced communication gained by drawing together 'branches of medicine that tend each year to become so specialized as to lose touch with medicine as a whole.'ⁱ The new institution also 'offered financial savings for those who had previously subscribed to more than one Society; economies of time management and staff were equally apparent.'ⁱⁱ

Membership difficulties

Despite the advantages of the union there were several difficulties to overcome and it was the admission of women that presented the greatest problem. Several Medical Societies already welcomed women into full membership and were adamant that their lady members must also join the new RSM. However, this was resisted by many others. Eventually an agreement was reached whereby women would be allowed to join immediately as Members of their specialist Sections, leaving the question of admitting them to full Fellowship to be decided at a later date. Among the first Council lists of all the founding Sections in 1907ⁱⁱⁱ there appeared the name of only one woman, that of Mary Ann Dacomb Scharlieb M.D. of the Obstetrical and Gynaecological Section. It was not until 1910, following an alteration to a bye-law, that the RSM finally allowed the admittance of the first female Fellows. The RSM rapidly developed into a prestigious and popular organisation. Other medical organisations soon joined and, within a short space of time, the new Society was forced to seek larger premises. A site was purchased in Wimpole Street, at the heart of the medical world, and plans were drawn up to erect a suitable building. It was felt that the 'house of the Society which represents British Medicine throughout the Empire should be of a character consistent with the importance of its objects'^{iv} and donations to the building fund were sought, not only from Fellows and Members, but also from external organisations and the general public. The appeal was successful and the new home of the RSM, at No.1 Wimpole Street, was officially opened on 21st May 1912 by King George V, accompanied by Queen Mary. The building contained three meeting rooms, the largest capable of seating 400 hundred people with 'annexes for examining male and female patients; a library with private rooms for study, a laboratory and a number of rooms for the Councils and Committees of the Society and its

Sections. For the convenience of Fellows rooms were also provided for conferences, as well as Tea, Smoking and Dressing Rooms.^v The new building included facilities for lady members following the express direction of the Secretary John MacAlister to the architect John Belcher during the planning stages; 'one of the Sections already has lady members', he wrote 'and the chances are that it is only a question of time before the ladies capture the Fellowship also – and it would be fatal if they also captured our lavatory.'^{vi}

The RSM became phenomenally successful; one correspondent to the BMJ wrote of 'the buoyancy and exuberant vitality which it infused into the medical life of the Metropolis'^{vii}, its building was admired and, in particular, its valuable educative influence greatly appreciated. It attracted numerous endowments and gifts and began to establish a whole series of awards and prizes. Prominent among these was the Gold Medal of the RSM which was to be awarded 'triennially and presented on St Luke's Day'^{viii} to a scientist, man or woman, who has made valuable contributions to the science and art of Medicine^{ix}. The first medallist was Sir Almroth Wright F.R.S. in 1920. In 1919 the William Gibson Research Scholarship for Medical Women was endowed which awarded 'approximately £300 for a period of two years to a qualified medical woman.'^x The first scholar appointed was Mary Esther Harding. Many Sections awarded their own prizes and examples were the Hickman Medal awarded by the Anaesthesia Section and the Jenner Medal awarded for outstanding work in the prevention and control of epidemic disease awarded by the Section of Epidemiology and State Medicine.

Facilities in the RSM

A major attraction for Fellows was the excellent library. The original collection of the Royal Medical and Chirurgical Society had been enriched by the libraries of the other Societies that joined the new RSM, particularly those of the Obstetrical Society and of the Odontological Society. By 1917 it had grown to over 100,000 volumes and was recognised as 'the most comprehensive medical library in the British Empire.'^{xi} Although no precise details remain of the books that the Odontological Society brought with it, a catalogue of its possessions dated 1905 reveals an impressive list of titles^{xii} and it was estimated that in 1907 it contributed 'approximately 5,000 volumes on teeth, dentistry and odontology in many languages.'^{xiii} In 1921 the widow of Dr Chalmers of Khartoum presented his 'large and valuable collection of very rare books including a first edition of Celsus' together with a cheque 'for the appropriation and fitting up of the Chalmers Room as a reference library for the use of Fellows.'^{xiv} By 1923 the library had received a gift to provide a library room 'in memory of Marshall Hall', a legacy from Mr F. J. Gant for the purchase of books to 'be labelled and known as forming the Gant Library', and a gift to cover the cost of a library room to 'be inscribed and known as the Sir William Allchin room.'^{xv} In addition, the library received numerous smaller donations of books and papers, from Britain and abroad.

The young RSM could also boast its own laboratory facilities. In 1912 a gift of £500 received from Mr Roger Beck had been used to fit out the Marcus Beck Laboratory in memory of his brother. This was originally 'available for the use of Fellows for the purposes of research and experiment'^{xvi} but during the First World War it was 'fully occupied by special staff engaged in research for the War Office',^{xvii} and shortly afterwards the space was converted to further enhance the library facilities by creating a special room to house the rarer books possessed by the Society, the star of which was a copy of William Harvey's book on the circulation, *Exercitatio anatomica de motu cordis et sanguinis in animalibus* (1628) which was presented by Sir William Osler in 1917. There was a busy programme of meetings. Each Section met at times 'fixed by its own Council for the reading of papers, the demonstration of cases and specimens and the discussion of scientific subjects', in addition there were occasional joint meetings between Sections and, the Society as a whole met 'from time to time to discuss important questions of general interest.'^{xviii} By 1913 the Society possessed two Epidiascopes for use at meetings. These were used to project images of opaque objects onto a screen.

Diagrams could be projected in the act of being drawn thus greatly facilitating demonstrations and removing the need to provide lantern slides or large drawings.^{xxix} In 1914 the latest Kinematograph manufactured by Messrs Pathe Frères was also installed.^{xxx} Details of all the papers read to the Society were published in the *'Proceedings'* and each Fellow was entitled to receive, carriage free, the complete monthly volume.

The Section of Odontology

The dental profession in Britain has its origins in the Odontological Society of London and the College of Dentists of England, both founded in 1856. Early rivalry between the two associations was resolved by amalgamation into the Odontological Society of Great Britain in 1863. This had become well established and successful by 1907 and many members expressed initial reservations about joining the proposed RSM. Their objections were overcome by the persuasion of Harold Mummery, a former President of the Odontological Society, who strongly promoted the union, feeling that 'much benefit will accrue to all'^{xxxi} from the interchange of thought and opinion that would accompany the closer co-operation of the various branches of medicine. The amalgamation went ahead and Mummery was elected as the first President of the new Section. He saw the amalgamation not as a termination of the Odontological Society but as a re-incarnation and ensured that the former Society would be commemorated by a special lecture every five years. In addition to its valuable library, the Odontological Society brought to the RSM a museum of some 2,900 items under the curatorship of Frank Colyer, approximately £5,000 of investments and 370 Fellows and Members. The new Section quickly began discussing the main dental concerns of the day. There was no perceived conflict with the more political activities of the BDA for, as Bacon said in his Presidential address in 1910,^{xxii} 'one of the best traditions of our Section has been the avoidance of the political discussion of public or legal questions.' Sidney Spokes, in his Presidential address of 1912,^{xxiii} confirmed this view, saying 'What may be called the "politics" of our profession are better dealt with by another body. Here in the serener atmosphere of the Odontological Section of the RSM, more interesting (shall we say more useful?) problems confront us'.

Topics for early meetings

As far as dental disease was concerned pyorrhoea was the main topic of many early meetings, with papers by Sturridge^{xxiv} and Turner^{xxv} within the very first year. Lively discussions followed subsequent papers on vaccine therapy, ionic therapy and the role of malocclusion in relation to the disease. Caries too was a major concern and Hern gave a carefully considered talk in 1909^{xxvi} in which he perceptively remarked that 'the suppression of dental caries by the elimination of its causes would effect more for the general well-being of the nation than the aggregate brilliant surgical work that is being carried on in our general hospital wards and theatres devoted to operative surgery.' Although the precise aetiology of caries was still hotly debated, Lloyd Williams in 1911^{xxvii} paid tribute to all those whose work had increased the knowledge of the disease, mentioning in particular the late Professor Miller 'who artificially produced dental caries which was in no way distinguishable from the lesion that occurs in the mouth'. He also praised the 'very valuable work on the bacteriology of caries that has since been carried out in this country and chiefly by members of this Section' and was pleased that the increase in knowledge of the aetiological factors now allowed for more attention to be focused on methods of prevention. The mood was optimistic and, during a meeting in January 1912, Colyer said "I already regard caries to all intents and purposes a preventable disease and I am disposed to place periodontal disease in the same category" and "dental disease will, I feel confident, rapidly disappear from our midst until perhaps in less than half a century, from being a universal scourge it will have shrunk to insignificant proportions".^{xxviii} The Chairman responded by saying that perhaps the most discouraging part to dentists was the conclusion where Mr Colyer held out the promise to the public that very soon dentists would

not be wanted and perhaps later on the only place where a dentist might be found would be as a curiosity in a museum! Restorative materials were also discussed and the optimistic mood continued. In 1913 Rilot welcomed the introduction of cast gold inlays 'which reduced to a minimum the pain and weariness formerly entailed on our patients by the long and tedious operations of gold filling'. He was pleased to note the availability of tooth coloured porcelain and silicate and was 'very hopeful that we are appreciably nearer the ideal filling material that shall be easy and practically painless to insert, shall be stable and permanent in its character, and when finished shall resemble as nearly as possible the tissue that has been removed'.^{xxxix} Practical advice was offered on numerous topics including denture design, splints and amalgamators. Clinical cases were presented on subjects as varied as methods of extractions, the use of radiographs, and the treatment of orthodontic problems.

Social Responsibility

A strong sense of social responsibility was apparent when members discussed the special rules in force in match factories,^{xxx} or the bearing that dentistry had on the public health.^{xxxi} There was a universal desire to alleviate unnecessary suffering during treatment and the ideal anaesthetic was keenly sought. The intensity of this desire is perhaps understood after reading the recollection by Professor Humphreys of a story told to him by Charles Edward Wallis of his early days in dentistry. At that time, Wallis had said, the bilateral extraction of molar teeth in children was about the commonest operation he was called on to perform. The injection of local anaesthetics had not then been introduced into dentistry and general anaesthetics were not normally available in schools, so he trained himself to extract two molars simultaneously, one with each hand, while an assistant held the patients head. This hurt the child only once instead of twice.^{xxxii} Equally disturbing were J.A.S. Wright's recollections of his own early years of training^{xxxiii} when he worked at a free dispensary in Waterloo Road in the evenings. He was permitted to do free extractions without any anaesthetic and often removed 70 or 80 teeth in an evening using only three types of forceps – straights and bayonets for the uppers and a pair of lower root forceps.

Infection Control

By this time, the work of Lord Lister had revolutionised the world of medicine and considerable attention was paid by everyone to maintaining clean working conditions. A sterilizable film holder was proposed as early as 1910^{xxxiv} and in 1911 Mr Lloyd Williams made cleanliness one of the topics of his Presidential Address.^{xxxv} He remembered when he was a student that 'no antiseptics were used in the ordinary extraction room at Leicester Square but that he had been taught the free use of water in the washing of the instruments'. 'After some time an open dish containing carbolic lotion heated over a spirit lamp had been allotted to each chair.' Instruments could be dipped into this solution and the constant evaporation of carbolic lotion made the room a much safer environment. 'Boiling the instruments was at first a complete failure because almost everyone was against it, and the house surgeons would not under the circumstances become enthusiasts: the instruments got into a dreadful state. The idea then was to boil all the instruments before the day's work began, and as they were used to ensure a degree of disinfection from the hot carbolic lotion, and again to boil them at the end of the day's work. Following this closed sterilizers were obtained, heated by spirit lamps; the water in these was, as a rule, hot. In the course of time all the sterilizers came to fulfil their purpose and their meaning'. He was pleased that aseptic dental surgery had now grown to its present strong position.

Papers on ancient skulls and teeth were popular and several were presented which examined specimens ranging from Prehistoric Man through to those of Ancient Egypt. One early speaker used dental radiographs to question the veracity of the claims made for Piltdown Man.^{xxxvi} No session was complete without a report from the Honorary Curator of the museum, Mr (later Sir) Frank Colyer. He described numerous specimens ranging from lions

and dogs to the more unusual capybara and koodoo and he used his Presidential address in 1919^{xxxvii} to pay tribute to the greatest comparative anatomist of them all, John Hunter, noting the contributions that Hunter had made to the development of the dental profession. The tragedies of the First World War brought sadness to the RSM. Mr (later Sir) Harry Baldwin noted in his Presidential address^{xxxviii} that 'at the present time it is difficult to think very seriously of anything except in its relation to the War.' Attendance at meetings dropped and the range of topics diminished. Discussions on war injuries of the jaw and face dominated the agenda, along with practical suggestions as to how treatment could best be provided for the army. Many deplored the lack of organization existing at the outbreak of the War and the slow response of the Government to the calls for expert dental provision. Eventually the Dental Corps was formed and Specialist Treatment Centres established. The Profession was united in its desire to make things better in the future. Despite the appalling cost, the 'mass of clinical material garnered by the cruel hand of war afforded an unequalled opportunity for the study and advancement of science'^{xxxix} and numerous changes were made to clinical practice. The value of properly cleansing wounds, stabilising the shattered fragments, maintaining the health and nourishment of the patient and the need for close teamwork with other scientific disciplines all became appreciated.^{xl} Finally the War was over and the country returned to a more normal existence. Frank Colyer received a knighthood for his service during the War resuming his position as Honorary Curator of the Odontological Museum, a position he held for over fifty years and one which is still remembered by the Section with the award of the Colyer Prize every three years for original work in dental science.

The hopes of Mummery that the formation of the RSM would bring closer co-operation between the various branches of medicine were realised when joint meetings were held with other Sections.^{xli xlii xliii xliiv xlv xlvi xlvii} In recognition of all his achievements Harold Mummery was made an Honorary Fellow of the RSM in 1921.

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Constructing a ROYAL DENTAL HOSPITAL SHIELD-a student technical exercise in the 1960s

Peter M Frost

In the early 1960s most UK dental teaching hospitals had large departments of prosthetic dentistry. These departments developed in response to the large numbers of patients who were partially or completely edentulous. It is estimated that at least half the population were edentate or had lost a significant number of teeth. It was therefore important that dental students were trained not only in the clinical skills of providing dentures, but also in the technical skills to make, adjust or repair the dentures. Consequently a large part of the undergraduate curriculum was devoted to prosthetics and attaining the required technical skills

The Exercise: In 1959, at the Royal Dental Hospital (RDH), an innovative technical exercise was brought into the curriculum. This involved the construction of a replica of the RDH crest. The instigators were Professor Arthur Chick, head of department, William (Willie) Welton head of the laboratory and Ken Bungard, one of the senior teaching technicians. Ken was very inventive and constructed a simplified version of the "Enigma" machine which was also planned to be used as a teaching exercise, but which never went beyond the prototype stage. Another of Ken's inventions was a wax rim heater containing a light bulb as a heating source. Those now on the market are based on this system. Ken also devised an acrylic template for making the various elements of the RDH crest.

Fig.1 Royal Dental Hospital Shield



In Figure 1, the RDH shield is shown with a black border with quarters of royal purple and vert or emerald green. The "charges" or other metallic elements represent the royal crown, the Aesculapius serpent and staff, denoting the healing of the sick. The book is thought to denote learning. The elements

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were: a cobalt chrome cross, the book, two crowns and two serpents entwined on the staff. These were carved in wax and set face down on a flat surface surrounded by about ¼ inch raised up border. Self cured tooth coloured acrylic was poured in and allowed to set. A separating medium of light oil was wiped in the mould areas and blue inlay wax flowed into the moulds. For the cross, pink toughened wax was used. These were sprued and invested using the lost wax process and cast in "students alloy" (copper/brass alloy). For the cross, a special refractory investment able to withstand high heat was used. Traditional oxygen/coal gas with the foot bellows and the centrifugal or Solbrig casting machines were used for casting the students alloy. The cobalt/chrome was melted using oxyacetylene heating and the invested casting ring was heated in a high heat oven and cast using the centrifugal casting machine. The cast items were trimmed using rotary mandrels and small hand files. The cobalt chrome cross was finished and polished. The crowns, serpents and book were gold plated to prevent later tarnishing. The book was soldered, using silver solder to the cobalt chrome cross. The back of the shield had a "German silver" (G/S) 1.5mm wire bent into a stand which engaged a G/S piece of sheet metal about 0.5mm thick 1 inch x 3/4 inch. This piece of metal was bent into a hinge housing which received the G/S stand. All the metal components were ready for enclosing into the specially prepared Perspex sheet pieces. A black sheet of Perspex, 2mm thick formed the back of the shield. The black outside rim was cut, filed and sandpapered to fit to the back plate. Within this shield cavity the purple and green Perspex were cut out and trimmed and polished in the same manner. The components were stuck on to the inside of the shield with "Durofix" the adhesive used all the time in the laboratory. The black surround was also stuck to the back plate. These were placed in a metal template so that they didn't move and a printing type press was lowered on to the assemblage. A previously cut and trimmed clear Perspex window which fitted into the rebated space was lowered onto the assemblage; heat was used to soften this window so that the clear Perspex deformed to produce an internal contact with the metal components. After final trimming, sand papering and polishing the hinge was stuck on using the ubiquitous Durofix. As one of the technical instructors I had previously made my own shield. The second year students had about a month to complete this exercise which brought in all the skills required during their year in the laboratory. The first few dentures produced by the dental students' required substantial support from instructor technicians. The really big challenge facing students in prosthetic dentistry was encountered when sitting part four BDS, where construction of a complete set of full dentures without guidance was a requirement of passing this examination. Today, as the dental health of the nation has improved and the incidence of edentulous patients has fallen, the current U/Gs have far less exposure to edentulous patients. The curriculum has changed in response to these demographic changes so that there is now much less emphasis placed on the technical aspects of denture construction.

Acknowledgement I would like to thank Professor Stanley Gelbier for suggesting and assisting with parts of this paper and Marilyn Gelbier who produced the shield in Figure 1.

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IN SEARCH OF OUR DIRECT ANCESTOR AN ANTHROPOLOGICAL AND ORTHODONTIC SUMMARY

John Mew

Abstract

This paper reviews the development of human facial anatomy in H Erectus, Neanderthal and modern man. Modern orthodontic measurements are used to compare different jaw size and relationships.

Keywords: Skull and facial malformation, Neanderthal, facial anatomy, malocclusion

Introduction

This is an assessment of research over the last 30 years. It was originally inspired by Richard Leakey, the well-known anthropologist who gave me some of his photographic records of early *Hominids*, from his research in the Olduvai Gorge in Kenya.

To start, I quote from my book, *Biobloc Therapy*¹ where, following a dissertation on the pre-human Australopithecines of Africa, I wrote: "It is the author's opinion that one of these Australopithecine sub-groups left Africa to reach a secluded area such as Indonesia, in the Pliocene period some three to four million years ago. Here, over this relatively long period in the history of humanoid development, could have been the ideal evolutionary situation, with temperate waterside conditions where the population was large enough to be viable, but not so large that developmental changes were washed out by genes from neighbouring stock.

H. Erectus

Many Erectus remains have been found in these areas and the existing Aborigines of neighbouring Australia show several Erectus characteristics. Despite these humble waterside origins, Erectus subsequently developed into an organised pack hunter, living in larger groups, using primitive stone tools and consuming food cooked over, or more probably in, a fire. His brain size was larger, about 1,100 cc² and in many respects could be considered human. He was physically stronger than Australopithecus although the need for a massive dentition was lessened by changes in diet.

If this were the case, Erectus may have then returned to Africa as a waterside, hairless ape where he appears quite suddenly about one and a half million years ago. Leakey showed that at that time Erectus was living contemporaneously with Australopithecus and it is likely that he displaced, or more probably eliminated, what must have been his nearest rival.

Following this, Lieberman³ suggested that two groups of Erectus developed, one of which again left Africa and possibly gave rise to more advanced sub-species while, "*The other Homo Sapiens evolved in Africa between 2 and 300,000 years ago. They dispersed into the Middle East starting about 100,000 and then into Europe and Asia about 40 to 60,000 years ago. These modern humans displaced all other species of Homo*".

I personally do not think Erectus or his subsequent progeny evolved further in mainland Africa as it is too vast and any genetic variations would have been diluted by reverse inbreeding. I also do not accept the suggestion that there might have been parallel evolution of Homo Sapiens. To me it is more likely that groups of Erectus remained in Southern Asia where the 25 to 30 metre

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rise and fall of sea levels during the various ice ages⁴ isolated small groups of these human ancestors. As Darwin hypothesised⁵ this was an ideal environment for the development of new species and they could have provided the true 'missing link' and also, perhaps at a later time, Homo Sapiens himself.

Neanderthal

By 600,000 years ago, this sequence had thrown up a distinctly improved version of man with a cranial capacity of over 1,500 cc. He was given the name Neanderthal and he differed in one interesting way from his predecessors and successors: his anterior teeth were about 30 per cent larger than modern averages and they were described as 'shovel shaped'⁶.

In 1998 I had the opportunity to help with excavations at Branscombe in Sussex where we found part of a femur from a Neanderthal man which was dated about 500,000 years old. I was amazed to see the quality of the flint tools they manufactured all those years ago.

Between 500,000 and 40,000 years ago Neanderthals flourished in Europe, but subsequently their survival became threatened by the sequence of Ice Ages when conditions became exceedingly harsh. Street et al⁷ reported that between 30,000 and 20,000 years ago "anatomically modern humans are rare anywhere in Europe".

Modern Man Emerges

There is considerable evidence to suggest that around 20,000 years ago a new version, 'Modern Homo Sapiens', was pushing across Northern Europe. He was fair skinned with blond hair and taller than previous humans. He was clearly successful in that he was able to thrive in the harsh climatic conditions of the various ice ages, probably retreating South during their peaks and returning North during the milder intervals.

While of similar brain capacity his facial anatomy was distinctly different from Neanderthal and related subspecies such as Cro-Magnon, with a narrower zygomatic arch, no shovel shaped incisors, less pronounced brow ridges and a more prominent mental process. At 1,500cc his brain size was slightly smaller than Neanderthal which was nearly 1,600cc although his forebrain was enlarged at the expense of a slightly reduced cerebellum. Indeed in many ways he was indistinguishable from us.

There certainly would have been conflict between these different versions of man and it would seem that modern man progressively replaced or eliminated his predecessors who over this long period of time had developed a wide range of genetic variations. Indeed Frayer⁸ found that in Europe before about 18,000: "Early Upper Palaeolithic groups are consistently more variable for nearly every dimension than either the Late Upper Palaeolithic or Mesolithic sample", confirming the takeover of the former by the latter although a small proportion of Neanderthal genes remain in most Europeans and, interestingly, North Africans.

Sykes⁹ suggested that the genes of this modern sub-group, then and now (a mere 750 generations later), were very uniform. Street et al⁷ proposed that their offspring, "the Creswellian and Hamburgian groups, had occupied the North European Plain by 12,500" and from this time onwards, skeletal remains have been so similar that primitive groups have been classified more by their culture than their anatomy.

Cooking of food and farming

There have been several estimates suggesting different dates for the early use of fire to soften food. Wrangham¹⁰ theorises 1,800,000 years ago but direct evidence suggests anywhere between 600,000 and 60,000 years ago. However organised cooking does not seem to have become wide spread until mankind adopted a more sedentary lifestyle during the Mesolithic period. Certainly tooth wear does not seem to have reduced much until after this.

It was not until about 10,000 years ago that farming began in South Eastern Europe and spread fairly quickly east and west from there. It would seem that these ancestors and their descendants in Northern Europe are one of the most recent and genetically compact human groups in existence. Prescott & Glørstad¹¹ on the basis of genetic analysis, suggest that advances in Northern Europe after 5,000 years ago may have come from more southern areas of Europe but that the cultural life style changes could have come more from ideas introduced by small numbers rather than mass immigration and certainly the gene pool changes were small.

Sykes⁹ suggests all of them (us) are descended from just seven families. Their progeny went on to populate the United Kingdom and much of its empire which at that time included North America. Unfortunately despite all this information, we cannot be sure how they looked, because of a lack of well-preserved crania. Despite the uniformity of their genes, changes in their life-style began to influence their facial development. Irregular teeth hardly existed until 2,000 or 3,000 years ago¹² and misshapen jaws were very rare, and usually only found in privileged burial sites. Of note these features were not associated with any change in their genetic make-up. In fact similar malocclusions have appeared all over the world wherever and whenever life-styles have risen above a certain level.

Jaw Discrepancies

We have to be aware that by 12,000 years ago civilisation was already spreading across Europe and a well preserved skull found recently at Oberkassel in Germany looks typically modern with his maxilla set back and an incipient malocclusion. In this case, to judge from his burial, he was a privileged man (Fig 1) probably sampling the advantages of an easy life in advance of his compatriots. Mesolithic Man circa 12,000 (photo by St Taubmann and published with the permission of Landschafts Verband Rheinland, Rheinisches Landesmuseum Bonn).

Figure 1. Mesolithic Man circa 12,000 (photo by St Taubmann and published with the permission of Landschafts Verband Rheinland, Rheinisches Landesmuseum Bonn).

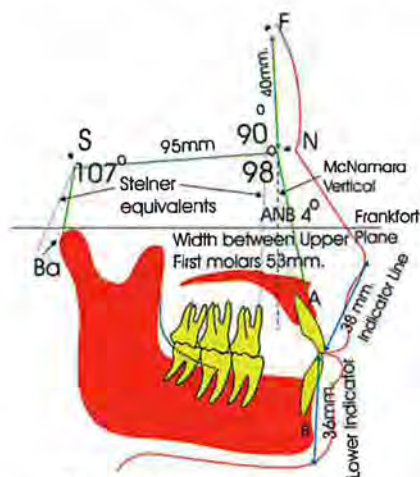


One of the best examples of this genetically compact group of *Mesolithic Man*, before the influence of civilisation, can be taken from Gough's cave, a male skull about 11,000 years old, from Somerset UK (Fig 2).



Figure 2. Mesolithic Man from Gough's cave, showing Orthodontic landmarks 'Ba', 'S', 'N' and 'A' (By kind permission of the British Natural History Museum).

The most obvious feature of this skull when compared to those from our current age is the wide and forward placed maxilla. Unfortunately the condyles are missing but there is no suggestion of dental crowding and plenty of space for 32 teeth. Interestingly there is a markedly different lay out of the internal cranial structures, despite the fact that his genes must have been almost identical to ours, with a much reduced 'saddle' angle and an 'SN' plane almost parallel to the mandibular plane.



**Mew's Mesolithic Profile
of 18 year old male.**

With Guidance from British Natural History Museum.
(NB Line 'SN' was shorter on Steiner's profile).
Point 'F' is placed on the cranial surface exactly
40 mm above 'N' so that angle 'FNA' demonstrates
movement of the Sphenoid within the cranium..

June 2013 Fig 3.

Figure 3 demonstrates how much further forward the maxilla was placed in this Mesolithic skull than his modern descendants and the green lines have been transferred from the skull, showing an SNA angle of 98° which is in marked contrast with the 82° recommended by Steiner¹³ who based his standards on modern averages (1953).

Steiner used to say "I am interested in but not greatly concerned about the angle SNA, because it merely shows whether the face protrudes or retrudes below the skull". The Mesolithic skull was also nearly ten degrees further forward than the 90° 'Nasion Vertical' recommended by McNamara¹⁴. The Mesolithic SNB was around 94° and the NSBa near 107° . In addition point 'F' has been added exactly 40mm above point 'N' on the soft or hard tissue surface and the SNF

angle is about 90^0 . This angle can be used to demonstrate how the sphenoid sometimes tilts within the cranium during growth and sometimes treatment.

Also shown in the outline of this human prototype are the Indicator Line¹² (the distance from the tip of the nose to the upper incisal edge) and the Lower Indicator Line (the distance from the lower incisal edge to the soft tissue surface below it). These values are for good-looking, average size 'norms' and although only approximate can provide a helpful guide during epidemiological studies when it is necessary to establish maxillary position and x-rays are contraindicated or impractical.

We do not know how far forward the maxilla should be but oral surgeons are well aware of the benefits of forward repositioning (Fig 4). This illustrates the aesthetic benefit of surgical forward movement of the Maxilla. James and Brook, European Journal of Orthodontics, 1985;7:231-47. By kind permission of the publishers.

Fig 4



James and Brook 1985 European Journal of Orthodontics, 7:231-247, 1985.
By kind permission of the publishers.

New techniques exist that can encourage forward growth over time (Fig 5). An eight year old boy treated by Orthotropics.

Active treatment took one year but postural training continued at night until he stopped growing. This is intended to encourage the natural forward growth of the maxilla and mandible seen in our direct ancestors. No fixed appliances are used because of the perceived risk of encouraging vertical growth.

How should these observations affect the current diagnosis and treatment of over-crowded teeth? Many of the diseases since Mesolithic

TREATED BY ORTHOTROPICS



Showing the advantage of continuing Stage 3 wear.



Thomas age 8 Six mo later Age 9 desc exts Age 11 Age 15

man, including malocclusion are seen as genetic but there has been little indication of genetic change. Perhaps the cause is environmental and the genes merely determine the pattern. Ought we to accept the relatively retruded maxilla seen in modern norms as normal or should we agree that buried within us there are the precise genes for a 'forward placed maxilla' that have been lost in the mists of time? We do not know, but the logic would suggest that we should look more closely at this ancient ancestor at least on paper, and see if we can stimulate our dormant genes to match his forward growing profile (Figure 5), possibly by emulating early life-styles and especially oral posture.

Acknowledgements

I would like to express my thanks to Prof Stanley Gelbier, Professor of Dental History of KCL Dental Institute and Robert Kruszynski of the British Natural History Museum for their advice and guidance.

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HAROLD GLADSTONE WATKIN 1882-1965 Part 1: Clinician

Winston Senior

Abstract A biography account of H G Watkin and early development of orthodontic training and treatment. A description of the first successful orthognathic jaw surgery is given.

Key Words: H D Watkin, Orthodontist, orthognathic jaw surgery

The Early Years.

Harold Watkin was educated in the High School in Hanley, Staffordshire where he excelled, especially in physics. Despite this educational ability he was obliged to leave school at aged 14 years without matriculating. His interest in science led him to take up a job in the equipment department of the National Telephone Company where he worked on the first fully automatic telephone exchange in the Potteries that opened in 1904.



Through his studies at the Wedgwood Memorial Institute he gained electrical engineer qualifications, passing City and Guilds London Institute Certificates in telephony, telegraphy and electrical lighting and power. During this time he also befriended a local dentist and used to assist him in his laboratory. Rontgen had already discovered x-rays in 1895, and at that time tubes could be bought by anyone; the

risks involved with handling X-rays were not well known. Always interested in cutting edge technology, Watkin built his own X-ray machine powered by a Wimshurst machine. Using this apparatus he took the earliest known radiograph in Stoke-on-Trent for Mr. King Alcock, F.R.C.S., a local surgeon, who had a female patient who worked in a textile factory. The radiograph was used to locate the end of a machine needle which had snapped off in her finger. His associations with Mr. Alcock and a dentist, Mr. J Shields, gave him the confidence to follow an old wish to study dentistry. At the age of thirty he left the telephone industry and embarked on a two year apprenticeship with Mr. J. Shields in the Potteries. In those days one could practice dentistry without a formal qualification and because of the shortage of qualified dentists he was exempt from compulsory military service in the First World War and was able to treat patients. He later studied at the Liverpool School of Dental Surgery and qualified with an LDS Liverpool at age 36 years in 1918.

Orthodontic practice 1930-1965

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In 1930 Watkin decided to concentrate on Orthodontics and set up a specialist Orthodontic practice at 84 Rodney Street, Liverpool. The building in which he worked is now named Watkin House. Coincidentally, number 62 was the birthplace of Watkin's namesake, William Ewart Gladstone, the Victorian three times Prime Minister.

In 1930 there were only two other Orthodontic Specialist Practices, George Northcroft, OBE, London, and, Professor Sheldon Friel, Dublin. Ever interested in educating others about Orthodontics, in 1930, he presented a paper to the Liverpool and District Odontological Society discussing the various forms of dental malocclusion, borrowing freely from the writings of the American Orthodontic pioneer, Edward Angle. With a growing reputation as an outstanding clinician, in 1933, the British Society for the Study of Orthodontics (BSSO) honoured him for his Study of Orthodontics by electing him their President.

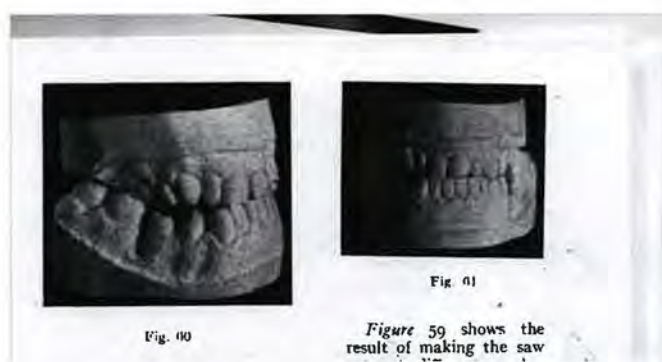
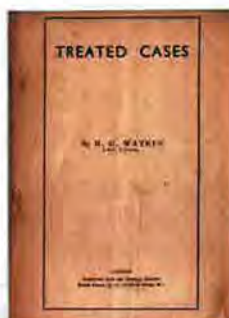
The First Successful Jaw Resection

Watkin performed the first successful jaw resection operation in the UK in 1928 with Mr. G.C.E. Simpson. FRCS. Together they published a paper 'The Surgical Correction of an Exaggerated Case of Inferior Protrusion'¹. The following pictures, (Figs 3, 4), are taken from his pre and post treatment photos of the case Watkin's Presidential address to the BSSO, 1933². The patient presented a marked protrusion of the mandible which Watkin referred to as a 'bull dog jaw'. The patient had been offered a high profile job on board a cruise ship. He would be expected to take up a position at the Captain's table and dine with the passengers. However his extremely prominent lower jaw with his lower incisors being 17mm in front of his uppers resulted in him being ashamed to eat in public. Only two of his teeth met to chew his food and as his lips did not seal whilst eating, food tended to spray out of his mouth. He also had problems with enunciation. The operation was therefore considered necessary for his quality of life.

Watkin did not lack in confidence and Simpson was an experienced surgeon, but the pair did plenty of research and mental preparation before beginning this daring operation.

The operation Watkin described in his 1933 address was performed as follows:

- Preparation was made by fixing metal bands with buccal hooks to the back molars that should occlude after mandibular surgery had been performed.
- A small incision, about half an inch long, was made on the outside of the jaw, the correct position being ascertained by palpitation and x-ray examination. A blunt instrument sought a path circumnavigating the ascending mandibular rami and a flexible Gigli saw was to cut from within outwards through the bone. Great care had to be taken to avoid damaging the facial nerve and the parotid gland. The final break was made using a very carefully angled fine chisel. Mallet and chisel work was Watkin's forte.
- The disengaged horizontal rami were drawn back and the teeth wired together interdentally. After 6 weeks, and being fed through a glass straw, the jaws were left permanently set in a normal position. The patient made a full recovery, with no complications and after some minor adjustments of the posterior teeth to compensate for the lack of normal wear, the patient had 16 teeth in good occlusion and was able to eat and enunciate well. He continued to work as a ship's captain for many years.



Presidential Address

The early 1930s saw the introduction of high tensile stainless steel. In his 1933 BSSO presidential address, Watkin discussed the use of stainless steel and the difficulties of welding steel wire. His previous knowledge and experience of metallurgy and electrical principles enabled him to take advantage of these novel materials. The use of stainless steel contributed to his future successes and changed orthodontic practice in the UK. In addition he also stressed the importance of soft tissue i.e. tongue and cheeks, in

achieving stability at the end of orthodontic treatment.

In a paper of 1939 he outlined the different devices available for maintaining the position of corrected teeth and discussed the theory that the bone supporting teeth acts in a similar way to a very viscous liquid. His hypothesis was that if there was no stable force keeping the teeth in a corrected position, they would eventually float back to the pre-treated position. He described several devices ranging from a small metal disc, with a raised section in the middle that could be bitten when relaxing to hold the corrected teeth in place, to a metal pole that protruded out of the mouth which could be weighted for strengthening the lips. He describes the use of this as being not unpleasant, rather like sucking on a cigarette.

These observations were very advanced at the time. Today, alas, the importance of creating biological stability following orthodontic treatment seems to have largely been abandoned in favour of permanent mechanical retention - the consequences of which will no doubt be revealed in years to come (*author's comment*)

Watkin's Role in Orthodontic Education

Even very early in his dental career Watkin showed an active interest in Orthodontic education as is illustrated in his copy of the BSSO's Education Committee's Report of December 1922 where he has highlighted the section which starts: 'The student qualifies, knowing less of Orthodontics than of any other branch of dentistry' The highlighted section then goes on to discuss the advantages and disadvantages of having a specialist lecturer for this subject. So, in 1935 he became a Lecturer in Orthodontics at the Turner Dental School in Manchester and in 1937 in the Liverpool Dental Hospital.

His enthusiasm for orthodontics was contagious and he loved demonstrating principles. He would begin his lectures giving out reproductions of hand drawn diagrams on pieces of card produced on the photographic equipment he had built. He would introduce a general theme but would very quickly become engrossed in the fine mechanical details of a specific point. He was not above making a fool of himself in order to prove a scientific principle. Hans Eirew, an ex-pupil, relates one such incident:

"It was the vogue at the time to say that gravity played a major role in ensuring stability of the full lower denture and added weights were often incorporated resulting in very heavy lower denture. Watkin by this time was a denture wearer and to disprove this theory, stood on his head and ate a cake. That was a lecture that no one forgot".

He continued this work until the late 1940s and a university record of 1 October 1947 states: This board wishes to place on record its appreciation of the many years of skilful and valuable service that have been given by Mr. HG Watkin, to express its gratitude for his help in continuing after the retirement age, pending the reorganization of the Orthodontic Department, and to wish him prolonged health in the future.

Watkin the latter years

Having more people in the practice gave him time to lecture and travel to the EOS and BSSO meetings he so enjoyed. He never refused a request to address colleagues or to demonstrate to overseas congresses in America and Europe. Although not extravagant with his wealth, he did prefer to travel by plane before air transport became a popular and generally affordable choice.

After the war his daughter Joyce became a Doctor of Medicine, qualifying from

Liverpool University and Phyllis followed in her father's footsteps and qualified as a Dental Surgeon and Orthodontist at Manchester.

His work was recognised and honoured in the UK when the Royal College of Surgeons of England awarded Watkin an F.D.S. without examination in 1947 and the Diploma in Orthodontics in 1954. His contribution to the advancement of dental science was also recognized in Scotland when the Faculty of Dental Surgery of the Royal College of Physicians and Surgeons of Glasgow bestowed on him the Diploma of Dental Orthopaedics, for which examination he was, for a time, on the board

As he approached his eighties he no longer lectured, but he stopped even mentioning retirement from work and just reduced to three days a week. His brain never faltered although he did become slower with his hands. He continued to attend BSSO monthly meeting in London and a former pupil, Hans Eirew, would catch the late train back so as to spend time in Watkins's company. Watkin always had a waistcoat with pockets full of bits of paper with diagrams, some spare pliers and wire and would produce a stub pencil and sketch amendments to the most recent lecturer's ideas. At the conference there would always be a cluster of people round him as he demonstrated some new idea. He was realistic about his abilities, not boastful, but not overly modest. For example, when exhibiting some of his work to a group of specialists in Glasgow and one said to him, 'Well Mr. Watkin, what products of your ingenuity have you brought to show us today?' He replied, indicating a specific model, 'This one is the most ingenious!'

On 11 November 1965, he died at the age of 83 years, the day after seeing a full list of patients. Sue Cork, Practice Assistant recalls: 'We were all so sad when he passed away, it was like losing a member of the family and all the staff attended his funeral, and went back to the family home in Aigburth Road.'

He was buried in Burslem Cemetery but, thanks to John Clifford, his memory lives on in both Liverpool and Manchester. 84 Rodney Street was renamed Watkin House about ten years after his death and a padded upholstered seat in lecture theatre was named after him when Manchester Dental Hospital refurbished the post-graduate room around 1980. As a teacher his enthusiasm, technical competence and approachability inspired many students to follow his steps and many are now leaders in the field of Orthodontics.

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Reports from Societies

THE LINDSAY SOCIETY ANNUAL CONFERENCE October 2013

Brian Williams: Honorary Secretary

This year the Annual Conference took place in Maidstone, Kent. Forty delegates attended; starting with a pub supper on the Friday night at the King's Arms in the picturesque village of Boxley.

The serious work of the Conference started the next morning with papers presented by Dr Xavier Riaud, 'Dentistry during the Napoleonic Dynasty'; Dr Barry Berkovitz, 'Nothing but the Tooth – what you don't know about them' and Ms Laura Hatton completing the morning session with her paper on 'The Life of Sir Harry Baldwin'.

The Saturday afternoon was given over to a visit to Leeds Castle. Then back to the Hotel to recover before the Conference Dinner in the evening. The Hotel did us proud with excellent food and attentive service; an evening of companionship and laughter.

Sunday morning started with papers from Prof Stanley Gelbier, 'Leslie Howe – Three times a Dean'; Ms Melanie Parker, 'Jane Austin and Dentistry' and Dr John Beal, 'Master John Schorn – Medieval Rector who cured Toothache'.

The last speaker was Peter Batty, a Maidstone guide, who gave a very amusing talk about the area which proved to be a great end to a very enjoyable weekend.

If you have never been to the Lindsay Society's Annual Conference why not come next year and meet up with colleagues. The meeting is always in October and you will always be certain of a friendly welcome.

Henry Noble History of Dentistry Research Group

Rufus M Ross: Chair

Unwelcome news from the Royal College of Physicians and Surgeons Glasgow who have increased their charges for the use of their lecture theatre to over £450. The future of the *Dental History Magazine* came up for discussion due to the rising cost of production. Suggestion was put forward that perhaps the magazine should switch to being "online." The feeling of the committee was that this was undesirable but the members would be asked for their opinion and considered at the next executive meeting.

Professor Malcolm Nicolson reported that the feedback from the medical students who took part in the Student Selected Components (SSC) was very positive and he would be pleased to incorporate the dental input next year if our members wished to repeat the lectures. The committee joined with Lindsay Society noting with regret that the BDA had sacked two members of its staff.

The subject of the history of the Glasgow Dental Hospital and School was raised as this had been one of the reasons for the foundation of the History of Dentistry Research Group. T B Brown Henderson's original account had been updated by Bill Smith from 1979 to 1989 and it was thought appropriate that the history could be updated to coincide with the 150th anniversary in 2029. A sub-committee will be formed for this purpose with a view to finding a suitable person to lead the research.

Our featured speaker in November, Mrs Carol Parry, is Library and Heritage Manager at the Royal College and is also in charge of College Archives. Carol gave a lecture of some of the rare books in the College library from esal ius , Ambrose Pare , Peter Lowe, Fauchard, John Hunter and other distinguished dental personalities. Also shown were early Registers of the College containing the first Licentiates and illustrations of the Fairley Instrument Collection loaned by the Lindsay Society.

The next lecture will be given by Dr David Whittaker in March 2014 in association with the Menzies Campbell Memorial Lecture and will be held in the Glasgow Dental Hospital and School.