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Dental Historian

1972

1878

2014

1962

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1957

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1655

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1808

239

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1870

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1893

1894

1946

DENTAL HISTORIAN

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Dental Historian

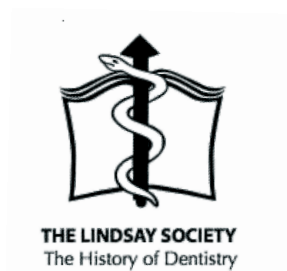
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Editorial

History is made

This year has seen a historic milestone in UK dentistry. I refer to the formation of the College of General Dentistry, the first independent UK-wide college for the whole of the dental team. Although there have been two previous attempts to form an independent College of Dentistry exclusively for dentists, this is the first time that an organisation has been set up to include the whole dental profession. This came about after the Faculty of General Dental Practice (UK) which had an ambition from its inception in 1991 to form an independent college. Up until 2021 the FGDP (UK) was hosted by the Royal College of Surgeons of England. The decision to separate away from the RCS Eng and form a college was taken around the time of the 25th Anniversary of the Faculty in 2016. Mick Horton, the then Dean of the FGDP (UK) invited Nairn Wilson to lead the initiative.

The venue

The full activation of the College was on 1st July 2021 and this event was held in the Barber-Surgeons' Hall London. The decision to hold the ceremony in the ancient Hall of the Barber Surgeons Company is, from a historical point of view, perhaps an even more memorable event. The ancient Guilds were set up in around the 12th century by those people following the same craft or trade. They often wore the same ceremonial dress or livery so that in London the guilds were known as Livery Companies. The first record of the Barbers' Company was in 1308 when Richard le Barber was presented before the Court of Aldermen of the City. He was the first recorded Master of the Company. It was not until 1312 that the first surgeon was recorded as a member of the company.

Barbers practised minor surgery, such as bleeding, cupping, tooth extractions and the lancing of boils and abscesses. Barbers and surgeons had overlapped in their duties for many years, largely because in the thirteenth century Pope Honorarius III had prohibited all persons in holy orders from practising medicine or the letting of blood. As a result of this papal decree, barbers in the monasteries, who were used to working with sharp blades, also began to add minor surgical skills to their repertoire. It was Thomas Vicary, surgeon to Henry VIII, who urged his master to introduce the proper regulation of surgeons practising in the City of London, and in 1540 the Company of Barber Surgeons was founded. A fine painting illustrating the granting of the charter is a prized possession of the Barbers' Company.

The picture shows the King celebrating the Act of Union between the Company of Barbers and the Guild or Fellowship of Surgeons in 1540. Whilst it was commissioned to celebrate this Act of Union, it was probably painted in 1542 and has remained in the possession of the Company ever since. In 1745



“King Henry VIII and the Barber Surgeons by Hans Holbein the Younger”.

the Barbers and the Surgeons went their separate ways. The Barbers retained the Hall, the silver and much of the treasure; the surgeons founded the Company of Surgeons, forerunner of the Royal College of Surgeons of England, and kept the eponymous lectures and scholarships¹. The surgeons and barbers continued together for about 200 years, both being able to extract teeth. Barbers advertising their bloodletting surgical skills by the familiar red and white pole outside their premises. The poet John Gay (1685-1732) best remembered for his *Beggar's Opera* described this:

From "The Goat without a Beard, Fable XXII"

*'His pole with pewter basons hung
Black rotten teeth in order strung,
Rang'd cups, that in the window stood,
Lin'd with red rags to look like blood,
Did well his threefold trade explain,
Who shav'd, drew teeth and breath'd a vein.'* 1727

As the professions grew apart, some barber poles introduced an additional blue stripe, which indicated that only barbering skills and not surgical skills were being offered.

The new College

The formation of the College of General Dentistry in 2021, the first UK wide College in dentistry for the whole dental team, was a landmark event. The full activation and installation of Abhi Pal as the first elected President was in July 2021. This event was held in the Barber-Surgeons' Hall and can therefore be viewed as a most symbolic occasion.

Subsequently, the College of General Dentistry had a formal launch in October 2021, again at the Barber Surgeons' Hall. At long last dentistry has its own independent UK wide College. Hopefully it will not be too long before the College warrants the granting of a Royal Charter.



Ian Mills former Dean of FGDP UK, Janet Clarke Chair of Board of Trustees, Abhi Pal first elected President, Nairn Wilson Hon Founding President, Simon Thornton-Wood, Chief Executive of College General Dentistry.

References

1. Ellis, Harold (October 2001). "The Company of Barbers and Surgeons". *Journal of the Royal Society of Medicine*. **94** (10): 548–549.

Good News for the Dental Historian

The 2021 British Dental Editors and Writers Forum and the British Dental Industry Association (BDEWF/BDIA) New Communicators Award for graduates was won by Charlotte Schofield's paper "*The early history of local anaesthesia*" in Dental Historian. This followed the 2020 BDEWF/BDIA award which was won by Shir Lynn Tan for her paper in the Dental Historian- "*The History of Rubber Dam*". The winners of this prestigious prize are invited to a dinner where they are presented with a cheque. Due to the Covid pandemic, the 2020 the dinner was cancelled so the two winners were invited to the RAF Club in October 2021. Congratulations to both these young dentists, I am sure they will be successful in their future careers.



Shir Lynn Tan and Charlotte Schofield at the celebration dinner

Bath Conference 2021 – A Roman thing and so much more!

It was a long time coming; having cancelled the 2020 Annual Conference. But on Friday 15th October 2021 the first of 63 delegates checked into the Doubletree Hilton Bath City Hotel at the start of a weekend which promised an eclectic mix of lectures, speakers, meals, sightseeing and laughter and all wrapped in an atmosphere of companionship. Yes, the Lindsay Society's Annual Conference was back!

Situated in the very heart of the historic city of Bath, the hotel did us proud with an excellent welcoming buffet on the Friday evening followed, by 'bar time' to catch-up with friends not seen for two years.

Following a welcome from our President, Roland Hopwood, the first lecture session started at 9.15am the next morning with Andrew Sadler tracing the development of Oral & Maxillofacial surgery from hospital dentistry. Anna Beaven, a Year 2 core trainee dentist, was the second speaker with her fascinating talk about the first English dental text book. The theme now changed to mystery and magic in the first half of the 20th Century, with Alasdair Hopwood explaining the fakery, including the use of dental wax, in convincing the general public of the authenticity of spiritualism. Very profitable for some! After coffee the subject switched to Jane Austin with Melanie Holiker giving the delegates an insight to dentistry in Regency Bath and the famous dentists who worked there.



Hard at work at one of the lecture sessions



Student speaker Lauren Neil



Neil Handley- speaker

For the first time at an Annual Conference the prestigious The Lindsay Memorial Lecture was held. Professor Jonathan Shepherd CBE, Emeritus Professor of Oral & Maxillofacial Surgery and Professor of Crime & Security Research Institute at Cardiff University presented his lecture '*Tackling Violence: Evidence based alternatives to a tooth for a tooth*' to a very appreciative audience.

After lunch a walking tour of the city was organized and led by three of Bath's finest blue badge guides. They gave us all a wonderful insight into why Bath became so famous from Roman times through the Regency period to the present

day. A very enjoyable and informative two hours strolling the sunny streets of this World Heritage City.

By now the Conference Dinner was on everyone's mind and we were not disappointed. A reception around the iconic Roman Baths with guides explaining the uses of the various rooms still well preserved

after nearly 2000 years; followed by dinner in the Pump Room Gallery overlooking the Baths we had just left. The wine flowed, the food proved sumptuous and conversations bubbled louder as the evening progressed. A memorable time was had by all.



Delegates at the Roman Baths reception

The last session started with Jenny Pinder showing how Genealogy proved such an invaluable tool in tracing a complicated family history- Matland Dental Dynasty. Then Quentin Anderson closed the programme with a centenary snapshot of the workings of the Royal Army Dental Corps. Every theatre, war or humanitarian response, where the army has been deployed over the last 100 years the RADDC has been there caring for soldiers and civilians alike. A very impressive record and a great way to end the lecture programme.

Barring lunch, the AGM was the last item on the weekend agenda when Roz McMullan was confirmed as the next President of the Society, taking over from Roland Hopwood who had served a third year in post because of the pandemic restrictions.

Further images from the 2021 Conference in Bath



Dinner in the Pump Room, outgoing President Roland Hopwood making sure the delegates, guests and speakers are enjoying themselves.



Pre-dinner drinks at the Roman Baths



Stanley Gelbier in the lecture room



Some Lindsay Society committee members with the retiring President

A Date for your Diary in 2022

Founded in 1962 as the Lindsay Club, the Diamond Jubilee of the Society will celebrate 60 years of promoting interest, study and research into the history of dentistry with a Black-Tie Dinner at the Titanic Centre during next year's Conference in Belfast between Friday 7th – Sunday 8th October 2022. A weekend NOT to be missed.



Titanic Centre, Belfast

Brian Williams Hon. Secretary Lindsay Society

Hunters, dealers, collectors and scientists and the origins of the Elliot Smith Primate Collection at University College London

Christopher Dean

Abstract: Many primates are now listed as endangered species and so historical museum collections that contain primate remains have become an invaluable research resource that can never be replaced. Consequently, it is increasingly important that we document what is known about the origins and the age of specimens in our museums. The Elliot Smith Primate Collection at UCL originated at a time of change immediately after the First World War and while primarily a research collection it was used to teach aspects of comparative anatomy to generations of medical and dental students until the late 1980s. The lives of the people involved in acquiring and using the collection at the turn of the twentieth century provide us with a fascinating insight into their attitudes and ambitions at the time and on what, sadly, was once considered acceptable collecting practise.

Introduction

Many collections of primate material have their origins in the late nineteenth or early twentieth centuries. For the most part these collections arose for one of three reasons. First, it was once commonplace for individuals with the means to amass private collections that would often include examples of diverse animal, plant and/or fossil remains. Notable examples include Lionel Walter Rothschild, 2nd Baron Rothschild, (1868-1937), and Major Percy H. G. Powell-Cotton (1866-1940). Walter Rothschild was born into a prominent banking family but through his passion for natural history, particularly ornithology, built up a large private museum of natural history at Tring in Hertfordshire (Fig. 1). Rothschild also had a special interest in the great apes (Rothschild, 1905). Major Percy Powell-Cotton grew up with a passion for natural history, particularly wildlife, hunting and ethnography. After an early military career, and in collaboration with various well-known hunters, Powell-Cotton embarked on a series of expeditions which led directly to the creation of the Powell-Cotton Museum (Fig. 1). He brought back large

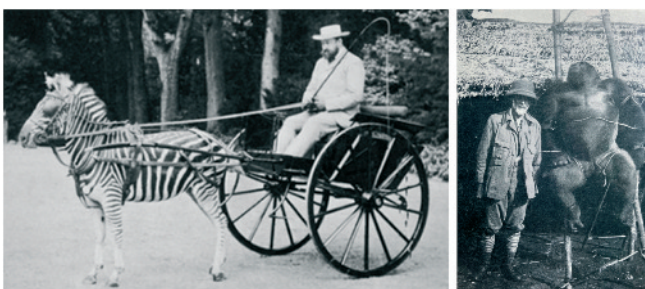


Figure 1. Baron Lionel Walter Rothschild amassed an enormous collection in his personal museum and trained zebras to pull a trap seen here at Tring in Hertfordshire circa 1898. Major Percy H. G. Powell Cotton seen here in Cameroon, West Africa with a recently shot male gorilla circa 1930. (Images in the public domain).

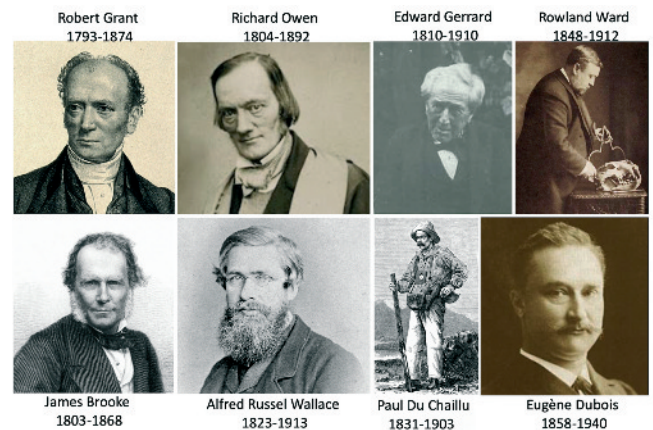


Figure 2. Museum curators, taxidermists, adventurers, collectors and hunters of the late nineteenth century. (All images in the public domain).

numbers of zoological specimens and contracted the taxidermist, Rowland Ward (Fig. 2) of Piccadilly, London, to prepare many of them for display and enlisted his brother Gerald to oversee the construction of a museum in the grounds of the family home, Quex House, Birchington, Kent. The Powell-Cotton Museum came to contain large numbers of zoological specimens and ethnographical items collected across Africa and Asia between 1887 and 1939. It still contains the best documented collection of African great ape skulls, skeletons and skins in the UK.

A second group of collections containing primate material in the UK began as teaching collections in universities, medical schools and other institutions. An example is the anatomy museum at The Royal Veterinary College (RVC), University of London, founded in 1791 but perhaps the most notable is the Grant Museum of Zoology and Comparative Anatomy at University College London (UCL). Robert Edmond Grant (1793-1874) had taught medicine at Edinburgh University but moved to London in 1828 where he discovered there was no

material with which to teach zoology in the then newly established UCL. Over his long career at UCL until 1875, Grant (Fig. 2) built up a diverse and rare collection of specimens spanning the whole animal kingdom and including many primates. Since this time, many medical schools, and particularly dental schools where comparative anatomy was part of the taught curriculum, acquired specimens primarily for teaching purposes that still now include rare and important specimens. Some of these collections that contain primate material are listed in Jenkins (1990).

A third group of collections that contain important primate material arose primarily as research collections. John Hunter (1728-1793) was a Scottish surgeon who assisted his brother William, (1718-1783), in his London medical school (originally on the site of the present Apple store in Covent Garden). John Hunter's passion was for research, preparation and experimentation towards a better understanding of structure, function, pathology and surgery and of the natural world in general. The results of his lifetimes work grew into the Hunterian Museum that was eventually inherited by The Royal College of Surgeons of England. Through John Hunter's successors, William Clift (1775-1849) and then Richard Owen (1804-1892) the Hunterian Museum came to contain some of the rarest and most diverse zoological specimens including many primate specimens.

Hunters, collectors and dealers

The original British Museum in Bloomsbury grew out of the purchase by the British Government in 1753 of the private collection of Sir Hans Sloan (1660-1753) as well as the purchase of the mammal catalogues of the Zoological Society of London museum and much of that museum's collection (Wheeler, 1997; Branden-Jones, Groves and Jenkins, 2016). In 1841, Edward Gerrard (1810-1910), who had until this time been a joint Curator of the Zoological Society of London's museum, transferred to the natural history department of the British Museum where he helped move the collections from their old location in Montagu House, Great Russell Street, to the new museum buildings in Bloomsbury (Morris, 2004, Fig. 2). Gerrard's job was to assist John E. Gray (1800-1875), keeper of zoology from 1840-1874, in building up a broad and representative skeletal collection but he also used his connections with the

Zoological Society of London and the British Museum to open his own taxidermy business in nearby Camden Town at 61 College Place, close to the RVC on Royal College Street (Morris, 2004). In 1856 Richard Owen (Fig. 2) was appointed superintendent of the British Museum's natural history collections and it was Owen who campaigned for a National Museum of Natural History that should be accessible to all and also quickly spearheaded the need to move to larger purpose-built premises in South Kensington, the British Museum (Natural History) as it was then and Natural History Museum as it is now. This eventually opened in 1881.

Well before the end of the nineteenth century, Gerrard's workshops in Camden Town became a famous meeting place for hunters, travellers and naturalists to meet and exchange or sell specimens (Morris, 2004). During the late nineteenth century both the Royal College of Surgeons of England and the British Museum (Natural History) continued to obtain specimens directly from explorers and hunters but also from local dealers such as Rowland Ward and Edward Gerrard. Among those who hunted and sold great ape material in London were Sir James Brooke (1803-1868, Fig. 2), soldier, adventurer, Governor (and then subsequently Rajah of Sarawak). Brooke is reported on one occasion to have supplied 25 skulls and 17 orangutan skeletons to the British Museum in 1841 (Branden-Jones et al., 2016) and Alfred Russel Wallace (1823-1913, Fig. 2) who from 1855, "*shot and procured as many orangutan specimens as he could*", shipped skins, skulls and skeletons back to his agent for sale in London (Wyhe and Kjaergaard, 2015). In 1861, the explorer and hunter Paul Du Chaillu (1831-1903, Fig. 2) also sold chimpanzee and gorilla skulls and skeletons from Gabon to the Natural History Museum, London, as well as supplying Gerrard's to order, who by 1865 were shipping skeletal material and mounted great ape specimens as far afield as the Melbourne Museum, Australia (Morris, 2004). Despite this, prior to 1861 the British Museum (Natural History) still had fewer than 10 chimpanzee and 10 gorilla specimens and fewer than 25 orangutan specimens listed in its mammal collection (Gerrard, 1862).

Fossil discoveries and the rise of comparative primate anatomy

Following the increasingly spectacular palaeoanthropological discoveries in Europe,

including those of Neanderthals in Germany in 1856, and then in Belgium and France, scientists in the UK were increasingly eager to compete. Alfred Hart Everett (1848-1898), encouraged and supported among others by Charles Darwin and Alfred Russel Wallace, obtained funds from the Royal Society and The British Association to explore the Niah caves of Sarawak in 1878-79 to search for evidence of early fossil hominins. This only eventually came true twelve years later when the Dutch anatomist and doctor, Eugène Dubois (Fig. 2), discovered the fossil remains of Java Man in 1891 on the banks of the Solo river at Trinil, yet again frustrating the aspirations of anatomists and scientists in the UK. While Everett's 1878-79 expedition was something of a disappointment he did nonetheless return with a quantity of sub-fossil and modern comparative material that was then largely distributed to the Royal College of Surgeons of England and the British Museum (Natural History). In particular, his collection of orangutan material, now at the Natural History Museum, as well as other material he may have passed on to private collectors, has come under scrutiny as the potential source of the famous 'fossil' Piltdown mandible found in Sussex in 1912 (Branden-Jones et al. 2016). The Piltdown fossils and the associated stone and bone tools were in fact forged, partly from an orangutan mandible, by a local solicitor, Charles Dawson (De Groote et al. 2016). Intriguingly, however, at present, the smallest orangutan cranium, and missing a mandible, in London, and one that matches the Piltdown mandible in size and surface texture and easily accommodates the Piltdown canine tooth (Fig. 3), resides in the Elliot Smith Collection (number CA 27, but with a much



Figure 3. The Piltdown mandible and lower right canine (placed here, however, as a maxillary left canine as proposed by the London dentist Alvin Marston 1889-1971) together with the small female orangutan cranium CA27, 1142, from the Elliot Smith Collection.



Figure 4. Charles Dawson, the solicitor who fabricated the Piltdown remains held here in his hands, with the anatomists and comparative anatomists closely involved in comparative craniodental research in the early twentieth century. (Image of Colyer from Miles and Grigson, (1990) and courtesy of RCS all other images in the public domain).

older accession number 1142 of unknown origin also clearly visible). Dawson, seen holding his reconstructed skull in figure 4, cleverly took advantage of an over-enthusiastic scientific community eager to put the UK at the forefront of anthropological breakthroughs and in so doing drew many anatomists into bitter disputes with each other about early human evolution. This changed the focus of research in many UK anatomy departments and museums and it was the resulting renewed interest in human and great ape comparative anatomy at this time that further contributed to the expansion of many primate collections.

At the time of the Piltdown forgery the primate collection of The Royal College of Surgeons of England was as extensive as that at the British Museum (Natural History), if not more so, and was used in preference by Charles Dawson to devise and concoct many of his ideas, even under the nose of its then Hunterian Professor, Arthur Keith (Grigson, 1990). Prominent anatomists such as George Busk (1807-1886), Charles Tomes (1846-1928), Arthur Keith (1866-1955, Fig. 4), Frank Colyer (1866-1954, Fig. 4), Osman Hill (1901-1975) and Alexander (A.J.E.) Cave (1900-2000) all subsequently promoted the comparative primate research collections at the Royal College of Surgeons of England but also eventually donated their own personal collections to the College (Miles, 1959; Miles and Grigson, 1990; Berkovitz, 2018). The result is one of the most comprehensive odontological and comparative craniodental collections in the UK, if not worldwide. In the 1920's and 1930's the primate collection at the

Natural History Museum also continued to grow with new acquisitions of private collections and with bequests, notably from Walter Rothschild who left his whole museum and its contents to the British Museum (Natural History) in 1937.

The origins of the Elliot Smith Collection at UCL

Generations of medical students, but in particular dental students who were all examined in comparative craniodental anatomy in their first year of university, were taught in practical classes with specimens from the Elliot Smith Collection at UCL. Its precise history is undocumented but its origins clearly derive from a time when there was a major shift in attitude towards anatomical research at UCL and there are clear links to the network of hunters, dealers and researchers and to other historic collections in the UK. The driving force behind the need for such a collection was probably the assumption in the early twentieth century, in the UK at least, that anatomists rather than zoologists or palaeontologists should lead the way in studies

of human evolution and great ape comparative anatomy. In this sense, unlike the Grant Museum at UCL, the Elliot Smith Collection was unlikely to have been created for teaching purposes nor was it intended as a museum collection to simply display individual representatives of taxa across hugely diverse groups of animals.

The Elliot Smith Collection at UCL is primarily a collection of primate skulls and skeletons and contains over 135 primate specimens including more than 50 mostly wild-shot great ape specimens (Table 1). What stands out is the large number of infant, juvenile and subadult specimens that make up a fairly comprehensive growth series for each great ape taxon. This also holds true for the 40 or so *Cercopithecus* monkey specimens of which 29 are also either infant, juvenile or subadult specimens (Fig. 5). Another remarkable fact is that for each of the great ape taxa there are complete mounted skeletons of a male and a female and there are further mounted specimens of juvenile chimpanzees, baboons and a gibbon. In short, the

Table 1. The primate specimens in the Elliot Smith Collection

Genus	Adult M	Adult F	Adult U	Subadult	Juvenile	Infant	total
<i>Gorilla</i>	7	3	2	1	3	3	19
<i>Pan</i>	2	3	3	1	2	3	14
<i>Pongo</i>	2	4	1	2	6	3	18
<i>Hylobates</i>		2	1	1			4
<i>Papio</i>			3	1	3		7
<i>Mandrillus</i>	2						2
<i>Cercopithecus</i>	1	1	13	6	17	6	44
<i>Cercocebus</i>				1			1
<i>Macaca</i>		1			2		3
<i>Colobus</i>			1		1		2
<i>Galago</i>			3				3
<i>Lemur</i>			7				7
<i>Loris</i>		1					1
<i>Indris</i>			1				1
<i>Tarsius</i>			1				1
<i>Alouatta</i>			1				1
<i>Ateles</i>					1		1
<i>Cebus</i>				1			1
<i>Callithrix</i>			1		1		2
<i>Callicebus</i>				1			1
<i>Chiropotes</i>			1				1
<i>Lenotideus</i>				1			1
Grand total							135



Figure 5. Some of the great ape and monkey skulls of the Elliot Smith Collection at UCL arranged here in growth series in their original glass wall cabinets.

collection seems designed to enable research questions rather than serve the needs of teaching or of a museum.

The catalogue numbers run from CA01 (it is presumed that CA stands for Comparative Anatomy) to CA92 in order through *Gorilla gorilla*, *Pan troglodytes*, *Pongo pygmaeus*, *Hylobates* (Sp. Id.) and *Cercopithecus* sp. Other specimens (not only primates) appear to have been added either intermittently as they became available or in the case of some non-primate specimens at a later time. The first published reference to specimens in this collection appeared in 1928 (Zuckerman, 1928, Fig. 4) alongside a description of the developing dentitions and cranial capacities of 97 of them. Among the others listed were four from the Zoological Society of London, 32 from the Royal College of Surgeons collection, 24 from the Rothschild Collection and 41 from the British Museum (Natural History), all collections that had grown considerably by this time. In all, Zuckerman (1928) listed 112 chimpanzee specimens located in and around London at that time 40 of which were immature. His description of the UCL Elliot Smith specimens (8 infant, juvenile and subadult specimens, CA11, CA12, CA13, CA14, CA14a, CA14b, CA14c, CA14d) matches the dental development status of each as observed today and so dates the collection and the latest catalogue system to a time prior to November 1927 when this paper was submitted for publication. Interestingly, nine of the 18 *Pongo pygmaeus* specimens in the

Elliot Smith Collection were more than likely acquired as a single batch and each have the accession number CA28. Eight of these have an additional suffix -JS2 through -JS8 and one, (CA28-JS4) is also marked 18.1.23 that may be a date.

Elliot Smith transforms anatomy at UCL

Sir George Dancer Thane (1850-1930, Fig. 4) had entered UCL as a medical student in 1867 and held the chair of anatomy there from 1877-1919 during which time, according to Sir Arthur Keith who in 1892 briefly worked under Thane as a young anatomy demonstrator, things had stagnated and Thane's anatomy lectures had become especially boring (Keith, 1950). Keith, full of enthusiasm for primate comparative anatomy and human evolution, was not understood by Thane at all but he was still granted permission to receive and dissect primates that had died at the nearby London Zoo from the prosector there, Frank Beddard (Keith, 1950). It is possible some of the older specimens in the Elliot Smith Collection date from this time, but more likely that Keith kept them as part of his own personal collection. In 1919, the year after the end of the First World War, UCL appointed Grafton Elliot Smith (1871-1937) as its new professor of anatomy (Fig. 4). Elliot Smith, while primarily a comparative neuroscientist, was also deeply involved in studies of human evolution and had played a very public role in supporting Sir Arthur Smith Woodward at the British Museum (Natural History) in his efforts to defend the Piltdown fossils, presumed wrongly by Woodward, Elliot Smith and many others to represent the 'earliest Englishman'. Besides this, Elliot Smith had bigger visions for medical education and anatomical research. Alongside a fellow surgeon and war artist, Henry Tonks (1862-1937), who had been appointed Slade Professor of Fine Art at UCL in 1918, Elliot Smith devised a compulsory course in human anatomy for all Slade fine art students. Among plastic surgeons and maxillofacial surgeons Tonks is best known for his watercolours and drawings of war wounds and their surgical repair but at UCL his reputation was as a renowned but formidable teacher of fine art. Elliot Smith immediately raised £370,000 from the Rockefeller Foundation in the USA to build a new institute of anatomy at UCL focused on neuroscience but also, alongside others at UCL, a further £835,000 to fund and promote the teaching of clinical medicine as separate modular disciplines, as we do today, rather than as a single seamless subject (Dawson, 1958).

One of the anatomy demonstrators to join Elliot Smith's department in 1919 was a young doctor, Raymond Dart (1893-1988, Fig. 4) later to become Professor of Anatomy at the University of the Witwatersrand, South Africa. At the same time, Elliot Smith had learned that the brilliant Russian neurohistologist, and by then Imperial Minister of Education for all of Russia, Nikolai Kulchitsky (1856-1925) had fled the Bolshevik armies with his family and was now penniless in London and so Elliot Smith assigned him to Dart as an assistant to pass on his knowledge of histology and staining techniques (Drozdov, Modlin, Kidd and Goloubinov, 2008). Very soon after leaving UCL in 1923 Dart boldly published a paper in *Nature* (Dart, 1925) describing the first juvenile fossil hominin to be found in Africa. Found in a limestone quarry at Taung, South Africa, it became known as the Taung child. It is quite likely Dart had become very familiar with juvenile great ape craniodental anatomy while at UCL having had access to whatever specimens in the Elliot Smith Collection had already been acquired by that time. However, it was strong opposition to Dart's claims about the Taung child, and in particular its hominin status, that fuelled Zuckerman's 1928 study of chimpanzee brain development that was of course sponsored and communicated by, and quite likely proposed by, Elliot Smith and written while Zuckerman was in the anatomy department at UCL (Zuckerman, 1928).

During his early days in Sydney, Australia, in the early 1890s (Fig. 6) Elliot Smith had met James Peter Hill (1873-1954), a young Scottish zoology demonstrator, who subsequently in 1906 became Jodrell Professor of Zoology and Curator of the Grant Museum at UCL. With Elliot Smith's arrival

at UCL in 1919, Hill soon joined the newly formed Department of Anatomy in 1921 and went on to become its Professor of Embryology and Histology. Regarded as a rather dour Scot (Fig. 4) and nicknamed 'old oatmeal' by his colleague Sir Gavin De Beer, Hill remained in the department until 1954 when he succumbed to a terrible London smog. It seems highly likely given Hill's experience in acquiring and curating specimens for the Grant Museum at UCL that he would have had a role in setting up the Elliot Smith Collection and even perhaps in transferring some specimens from one collection to the other. In his book '*Gorillas were my neighbours*', Fred Merfield, a renowned hunter and adventurer (Fig. 6) who worked closely with Major Percy Powell Cotton in Africa, writes that he supplied Professor Hill at UCL with great ape and embryological material as well as supplying Sir Frank Colyer who had requested any skulls that showed signs of dental decay. Later on, following their 1932-1939 field trips to Cameroon, both Merfield and Powell Cotton, besides collecting primarily for the Powell Cotton Museum, also sold chimpanzee and gorilla specimens to the Royal College of Surgeons of England (Odontological Museum) and to the BM(NH), as well as to other museums and institutions around the UK (Jenkins, 1990).

The origins of the wild-shot animals in the Elliot Smith Collection are not precisely known, although many, if not all, were probably purchased from dealers such as Edward Gerrard & Sons in Camden Town, Rowland Ward of Piccadilly, Adam, Rouilly of Fitzroy Street, London and/or Maison Tramond in Paris (Fig. 7). Orders placed with one dealer were often supplied by another and Adam, Rouilly were closely associated with *Etablissements du Dr*



Figure 6. Left: Elliot Smith (seated left) J. P. Hill (centre) and J. T Wilson (seated right, and later to become professor of anatomy at Cambridge, UK) hunting for platypus on the Duckmali River, Blue Mountains, NSW, Australia, September 1895 (from Dawson, 1958). Right: Fred Merfield, adventurer and hunter who worked closely with Major Powell Cotton hunting in Africa seen here holding an African elephant molar tooth circa 1940 (from Merfield, 1956).



Figure 7. The shop front of Maison Tramond at 9 Rue de l'école de Médecine, Paris, as it was prior to becoming *Etablissements du Dr Auzoux* circa 1920 and the interior of the shop sometime

Auzoux in Paris for 70 years passing on great ape material to, for example, the Grant Museum at UCL, The National Museum of Australian Zoology, Canberra and The Museum of Zoology, Toronto, Canada but all at later dates than the early 1920's when it is most likely the Elliot Smith Collection was already well established (Whitebread and Whitebread, 2018). It is worth reflecting that in 1928 a fully articulated gorilla skeleton was sold by Adam, Rouilly & Co for £28.4s.0d (Whitebread and Whitebread, 2018) equivalent to about £1,300 today. Evidence from the labels on the mounted specimens in the Elliot Smith Collection (Fig. 8) shows that some wild-shot great ape specimens at least were indeed originally supplied by "Maison Tramond, Paris N. Rouppert successor". These individuals must predate 1929 when this shop was sold to Henri Barral and thereafter became Etablissements du Dr Auzoux. At the time of the sale the address book of the suppliers included some extraordinary people such as Albert Schweitzer and Pierre Teilhard de Chardin. Maison Tramond, and then subsequently Etablissements du Dr Auzoux, had developed a papier-mâché paste, later known as "Auzoux paste" for repairing and casting skeletal material. This consisted of a mixture of torn paper, flour glue, mineral filler, chopped fiber, alum as a vermicide and powdered cork (Morlot, 2011;



Figure 8. An example of a label from 'Maison Tramond, successor N. Rouppert', as they were around 1920 with a label from the Elliot Smith Collection affixed to the base of an articulated chimpanzee skeleton (CA13) that has at some point been painted over with black paint.



Figure 9. Two fully articulated orangutan skeletons on their original wooden bases and hung from iron rods showing damage to the right ascending ramus of the mandible, left individual (CA23), and to the right proximal femur and right proximal radius of the individual on the right (CA21). Repairs have been made with bone-coloured material resembling the papier-mâché described by Dr Auzoux.

Deguerce and Adds, 2015). It is notable that several of the mounted and articulated wild shot great apes in the Elliot Smith Collection have repairs, to what are likely damage caused by bullets and/or machettes at the time of death, to long bones and mandibles that have been made with a material that fits this description (Fig. 9).

Comparative anatomy teaching and dentistry

At the same time comparative collections were starting to grow in size and number around the UK, the earliest anatomy textbooks for dental students that helped define the curriculum for the LDS RCS exam (first drafted by the Odontological Society in 1859) increasingly included comparative material (Cope, 1957; Tomes, 1876). A later examiner for the LDS RCS exam (from 1900-1910) and Professor of Dental Surgery at Kings College London, Arthur Swayne Underwood (1854-1916), even wrote a textbook for dental students devoted entirely to comparative odontology aimed specifically to illustrate the principles of natural selection and the adaptive nature of cranial and dental morphology (Underwood, 1903). Until the mid 1980s, all medical and dental students at UCL were taught a course in human biology, "An introduction to the study of man", by the then Professor, J. Z. Young, who's book was the set text (Young, 1971). For a number of these lectures, primate skeletons from the Elliot Smith Collection were used for demonstrations of comparative anatomy in the context of primate evolution. Dental students also studied craniodental comparative anatomy as part of the second BDS exam and again

this collection was central to that. With the closure of UCL dental school in 1991 this all came to an end and soon after this, comparative anatomy was dropped from the dental curriculum across the UK (Gelbier, Berkovitz and Smith, 2019). Many collections no longer had a teaching role and were suddenly vulnerable. Nonetheless, the Elliot Smith Collection was always, and continues to be, a research resource and was central to many intercalated BSc, MSc, and PhD projects on comparative craniometry, radiographic imaging and dental histology. Over the years, the resulting radiographs, CT-scans, and histological sections of teeth have enhanced the usefulness of this collection. Recently, some specimens in the collection have even proved to be a viable source of trace elements, acquired from natural habitats over 100 years ago, and now successfully retrieved from the teeth of some specimens (Dean et al. 2020). In the future this kind of research may enable studies of climate change, seasonality and diet in the past as well as being an invaluable source of historical primate DNA, all of which serves to illustrate the continuing value and importance of preserving our historic museum collections.

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Author Biography

Christopher Dean (BDS, Dipl. Hum. Biol., DGDRC Eng., PhD) qualified BDS at UCL in 1975 and after a brief period as a dental officer in Camden and Islington worked as a principal in general dental practice, first full time and then part time until 2003. In parallel he studied human biology for a year in Oxford in 1976/77 and then

completed a PhD on the comparative anatomy of the hominoid cranial base at The Middlesex Hospital Medical School in 1983. In 1985 he was appointed Wellcome Trust Lecturer in the Department of Anatomy, now Cell and Developmental Biology, at UCL where he first taught dental histology and then anatomy to medical, dental and science students. He was promoted to Reader in 1990 and then Professor of Anatomy in 1996. He is currently part time at The Natural History Museum, London, and is an emeritus professor at UCL. He has published extensively on comparative primate anatomy and dental histology and in 1990 with Prof. Leslie Aiello wrote "*An introduction to human evolutionary anatomy*", Academic Press.

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David Dury Hindley-Smith (1916-2001), the Dental Board of the UK and the General Dental Council

Stanley Gelbier

Abstract: After a distinguished war service, holding several important military and diplomatic appointments, David Hindley-Smith was successively Registrar of the Dental Board of the UK and of the GDC from 1947 until his retirement in 1981. He played an important role for the profession during its discussions after entering the European Union.

Keywords: Dental Board of the UK. General Dental Council. David Hindley Smith.

David Dury Hindley-Smith

David Hindley-Smith was born on 20 February 1916, the son of James Dury Hindley-Smith. He was educated at Uppingham School in Rutland whose motto is:

‘For the forward thinkers, makers, debaters and creators.

The pioneers who ask why. And why not. For tomorrow’s leaders;

not defined by where they have gone. But where they are yet to go.’

This and university certainly defined the young man in question. He then went to King’s College Cambridge, which dates back to 1441. From there he gained an MA degree. Studies in Paris and Vienna followed to improve his language and other skills. In 1938 Hindley-Smith was awarded the Cecil Peace Prize named after Robert Cecil who received the first Woodrow Wilson Peace Prize in 1924 and was awarded the 1937 Nobel prize for Peace.

In 1939 Hindley-Smith passed the examination for the Diplomatic Service but World War 2 intervened. He immediately joined the army, initially serving in the Artists’ Rifles. It’s interesting that his father had served in the Royal Artillery. In 1940 Hindley-Smith was commissioned into the Royal Fusiliers.¹ By 1942 he was a Liaison Officer to Général Philippe François Marie Leclerc, a Free French General; and by 1944 to Général Charles de Gaulle’s first administration. He rose to become an acting Colonel.

After the war Hindley-Smith (Fig 1) was offered opportunities to return to the Diplomatic Service or join the Conservative Central Office. However,

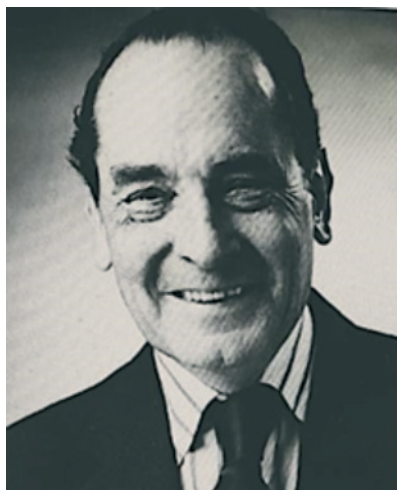


Figure 1. David Hindley-Smith

following an advertisement he was appointed Registrar of the Dental Board in 1947.² It became the General Dental Council in 1956. He remained there until retirement in 1981.

Previous Registrars

In 1876 William John Clarke Miller BA was Registrar of the General Medical Council so was there when the GMC established a Dentists Register following passage of the 1878 Dentists Act. Miller was followed in 1897 by Henry E Allen LLB BA. The 1921 Act stated that for the purposes of the Act there should be a Dental Board of the United Kingdom. The GMC had to appoint its first Registrar with the approval of the Privy Council after which the Board would do so. In 1911 Norman C King became Secretary of the GMC. In 1922 all GMC dental functions were transferred to the Dental Board and King was also named as Dental Secretary, with an Assistant Dental Secretary. Michael Heseltine CB was Secretary by 1942.

Hindley-Smith at the Board and in Europe

When Hindley-Smith arrived Eric Wilfred Fish, an elected member of the Board since 1939, had

been its chairman for three years. Fish was created CBE in 1947 and knighted in 1954.

Pressures were building for the separation of dentistry from the GMC and establishment of a General Dental Council to replace the Board. Hindley-Smith worked with Fish to draft new Dentists Acts in 1956 and 1957 and to ensure the setting up of a General Dental Council. The latter was established in 1956 “to set and maintain standards in UK dentistry, with the aims of protecting the general public from unqualified dental professionals.” Sir Wilfred was its first president. Supported by Hindley-Smith he oversaw the freeing of dentistry from medical control but ensured strong oversight of the profession.

As part of that separation the GDC needed a new home. Hindley-Smith was the linchpin in planning the Council's new premises at 37 Wimpole Street to which it moved from Hallam Street.

Hindley-Smith was instrumental in looking ahead to the possible effects on the dental profession and dentistry from the UK's entry into the European Economic Council (predecessor of the European Union).³ It became obvious that it was to be the regulatory body and not the BDA which would take the leading UK role in any discussions. A wily Hindley-Smith realised the need to take the BDA along with him so ensured he worked closely with Geoff Howe, Ronnie Allen and Gerald Wootliff amongst others (Fig 2). He became recognised as an authority on dental matters European. From 1972 he was an observer on the EEC Dental Liaison Committee. That was a very delicate role, entering the discussions after the original group had bonded. Nevertheless, he was very involved in drawing up Dental Directives and their subsequent implementation and was highly respected by continental colleagues. No doubt his diplomatic training came in handy. These Directives led to harmonisation of dental education and practice throughout the EU.

When Hindley-Smith retired in 1981 Sir Frank Lawton, President of the GDC said: “I can think of no other layman who has contributed in the same generous measure to the good name and reputation of the dental profession, and the profession owes him an incalculable debt.” Hindley-Smith spent his retirement years in Bury St Edmunds, Suffolk from where he undertook a number of activities.



Figure 2. David-Hindley Smith (left) facing Ronnie Allen (with glasses) and Geoffrey Howe (to his left). The British team at a meeting of the European Dental Liaison Group

Hindley-Smith was replaced by Norman Davies (1981-1996).

Honours

In the 1972 Birthday Honours Hindley-Smith was made a CBE. 1975 saw him become an honorary member of the BDA followed by honorary FDSRCS Ed in 1977 and FDSRCS Eng in 1980.

Away from the GDC

Hindley-Smith had a number of interests, not all related to dentistry or health. Whilst still working he was a member of Council of the Royal Dental Hospital's London School of Dental Surgery (1976-84; chairman 1981-84). He was the vice-chairman of the Surrey Association of Youth Clubs (1950-70; vice-president 1970); executive chairman National Association of Youth Clubs (1970-74; vice-president 1974); and chairman of the Sembal Trust, 1972-81.

After retirement Hindley-Smith was a member of the West Suffolk Health Authority (1982-86; chairman of its Mental Health Committee 1982-86). He was also chairman, Suffolk Association of Youth (1982-84; vice-president 1984).

Personal life

In 1947 David Hindley-Smith married Dorothy Westwood Legge, daughter of Arthur Collins and Mary Fielding. There were two step-daughters.

His interests included gardening, cooking and youth clubs. And he had good knowledge of wine which informed the stocks in the cellars under the GDC.

He was a member of the Royal Society of Medicine.

Davis Hindley-Smith died on 23 Apr 2001, St Georges Day, in Bury St Edmunds, Suffolk. As his obituary stated:

“David was an administrator 'par excellence' who left his mark on the GDC, the wider profession and on The National Association of Youth Clubs whose Executive Chairman he was from 1970 to 1974. He was a man of sharp intellect with excellent expertise in written English; indeed, the Council's papers were always succinct and well researched. For all his outward success and achievement, he was a man of modesty and understatement.”

It said David was much supported by his wife Dorothy, especially in the Council's domestic and gastronomic arrangements. She sadly lived to share only a few of his retirement years, dying in 1987. He left two step-daughters and step grandchildren and great grandchildren of whom he was enormously proud.

Acknowledgements

The late Professor Geoffrey Howe provided the photo of the European meeting.

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¹ Hindley-Smith, David Dury, *Who's Who*, 1 December 2007, <https://doi.org/10.1093/ww/9780199540884.013.U20247>

² PRW. Obituary: David Dury Hindley-Smith, *Br Dent J* 2001; 191: 222.

³ Ibid.

Battlefield Dentistry, 1914 to the Somme 1916.

J Stuart Robson

Abstract: Very poor dental facilities existed for volunteers and troops of the British Army in early stages of first World War. This paper outlines how this was partially rectified. The conflict between the British Government and the British Dental Association is recorded. The development of general anaesthesia to assist war wounded is described. The dire state of affairs demonstrated the urgent need for the Royal Army Dental Corps

Key words: World War 1, Royal Army Dental Corps

An interest in this period of dental history was sparked by an article from the Daily Telegraph archives concerned with dental affairs in 1914-16 and the notice that the Royal Army Dental Corps celebrated the centenary of its foundation in 2021.

The dire state of soldiers' teeth

In 1914, volunteer recruits into the British Army for the 'war to end all wars', were of poor health. Indeed many were out of work and were attracted to join the armed forces not just out of patriotism, but because the forces offered wages (albeit meagre, but better than nothing), food, clothing, a certain stability of life and a bit of excitement, all before the mayhem of the Western Front in France became apparent.

It was recorded that one in three volunteers were rejected due to 'bad teeth and mouth disorders' and therefore could not cope with army rations including 'hard tack' (hard biscuits issued in lieu of bread as they had a long shelf life). Indeed, Lord Burnham said at the Annual General Meeting of the British Dental Association that of the three million volunteers, one million were rejected on dental issues alone. This article concentrates on the Army, but no doubt the Royal Navy was similarly disadvantaged.

Poor quality treatment

The army at that time had very few and inadequate dental facilities, whilst the army doctors in the RAMC had little or no understanding of the oral cavity. They would do some extractions with limited technique and limited local anaesthesia as the novocaine used was in very short supply even if injected in the correct place. Those men who were accepted into the army were frequently being withdrawn from the front line because of the pain of toothache, the consequential infections causing abscesses and the

so called 'trench mouth' (aka necrotising ulcerative acute gingivitis) all of which was debilitating and demoralising for the British soldier and many ended up being malnourished. Treatment was very basic. It only involved extractions by the poorly trained and ill-equipped medical officers. This sounds critical, but most medical officers had not received any, or at best very limited, experience of problems associated with the mouth. Extractions were the perceived method of pain relief as this was the era prior to antibiotics and with very limited pain relief pharmacology. Many soldiers experienced the loss of dentition. This appalling situation could not be overlooked. The atmospheric and hygienic conditions were dire, and at that time soldiers were issued with a crude toothbrush, but no toothpaste or powder. An article in 'Le Petit Parisien' on 2nd December 1915 stated, 'Mouth diseases are constantly bringing about neurological crisis to those not endowed with exceptional dentition'. The ingenuity of the British Tommy soon found out that the issued brushes were the precise size necessary to clean the firing mechanism of their rifles! As a result of these circumstances the Government authorised a special grant of between £2 and £4.10.00 per patient to pay for dental attention by civilian dental surgeons so that rejected recruits could attain 'sufficient dental fitness to facilitate military service'. This was not necessarily brilliant dental treatment as many unqualified dentists were on the High Streets and this grant system was deemed inadequate. To help matters further, 200 qualified dentists were voluntarily enlisted into the army. Only qualified dentists were used, remember the Dentists Act was only introduced in 1921 so there were only a limited number of qualified dental surgeons available. Of those 200 dentists appointed, note appointed not recruited, an MP Mr Tennant, stated in the House only 43 were employed in France for the armies of nearly two million souls. Eventually those appointed became commissioned

officers to be co-terminus with the other Colonial Dentists

The consequence of a General's dental abscess

This dire state of affairs was brought to the attention of senior commanders by a curious incident in late 1914 when the Commander of the 1st Army, General Sir Douglas Haig was experiencing severe pain in the mouth whilst he was trying to concentrate on planning the Battle of Aisne which rendered him ill tempered and lacking in sleep. History has it that he had a dental abscess the size of a small golf ball. Assistance was summoned and it was realised there was not a single dental surgeon attached to the entire First Army in France. Therefore, a civilian dentist was summoned from Paris, Charles Valadier. Mr Valadier had an eventful trip to the front-line HQ as his vehicle was hit by 3 shells and although he was luckily not injured much of his equipment was damaged or lost. He managed to salvage some of it and continued on foot to reach Haig's HQ, whereupon he extracted the offending premolars and drained the abscess, stayed three days and treated several other officers solving painful problems.

At that time, quoting from the War Department annals 'this childish complaint of toothache was unworthy of military planning or attention'. Indeed, the army rated veterinary surgeons and blacksmiths higher than dental surgeons, presumably to look after the cavalry horses. The consequence was that soldiers experienced indigestion and malnutrition especially rendering rank and file privates less fit to fight effectively. This was made more noticeable due to the lack of dental prosthesis. Officer classes often managed to get leave to return to the UK to visit civilian dentists

The BDA steps in to help

Back in the UK, the British Dental Association delegated their then President, William Dolomore, and a small group of senior officials to approach the War Office and offer not only professional assistance, but also some financial assistance to provide and equip 'dental motor cars' i.e. mobile surgeries for use just behind the front line and also to supervise all the arrangements in connection with these vehicles at the BDA's expense. This very generous patriotic offer was refused by the government as the quid pro quo was that the BDA wanted the same terms of service as the other armies i.e. Honorary Military ranks to be conferred



Fig. 1. Earl Haig

on dental staff involved with the army. This caused a major rift between the Government and the BDA and was only resolved albeit unsatisfactorily when compulsory conscription was introduced much later. Most other armies in the field, including the German and Austrian Armies had dental facilities of varying standards, and significantly many had technicians with laboratory facilities capable of constructing and repairing dentures and some making splints. This lack of dental services was a situation which was peculiar to the British Army. Other nations had already provided their troops with dental care. In 1914 the New Zealand Gazette publicised official regulations quoting the existence of the New Zealand Dental Corps led by a Colonel, a bevy of majors and other officers all of whom were dentally qualified. They were supported by a group of sergeant dental mechanics and clerical support staff. The regulations also specified that although these were civilian dentists, they would receive honorary military ranks.

Oral and dental issues of the troops

Having briefly outlined the dire situation of oral conditions and the intransigence of senior officers and politicians to address these needs, the effects of combat on the fighting soldiers in the Western Front up to the Somme in 1916 must be considered.

Black and white pictures have frequently been seen in TV documentary films show infantry 'going over the top' from the trenches during the infantry battles such as the Somme.

The first part of a soldier's anatomy that emerged from the trenches was the head. The German machine guns usually situated at ground level set up a barrage of fire. Consequently most early casualties, both dead and wounded, were due to

head wounds, and it should be noted that the 'tin hats' helmets were not much protection against these bullets. These head wounds, if not fatal, required the expertise of surgeons who understood facial and head anatomy, that is to say dental surgeons.

On the first day of the Somme, 1st July 1916, 60,000 soldiers were shot, of which 20,000 were killed, the worst day in the history of the British Army. Of the 40,000 wounded, whilst there are no accurate statistics, the probability is that 50% suffered head wounds, and this continued at the rate of 4,000 casualties per day until November amongst all the allied armies mainly the British and French contingents.

Whilst many wounded were treated in casualty clearing station just behind the front line, approximately 2,000 men were sent to the UK for surgery on facial injuries, some to Frognal House in Sidcup, but only 50 beds were initially available, although by 1917 over 1,000 servicemen were being treated there.

Of the casualties with head wounds, sadly many died on stretchers, choking on their own blood until the stretcher bearers were instructed to lie the patients face down so that blood could drain away and avoid clogging the airway. This simple advice, whilst uncomfortable for the wounded, undoubtedly saved many lives whilst they were being evacuated which often took many hours under continuous fire.

Three poignant stories

Space only permits a thumb nail sketch of the dire circumstances that prevailed at that time. However, three stories of individual and group achievements should be remembered.

Firstly, a dental officer, Lieutenant Sidney Bevis who qualified at Guys in 1909 was awarded the Military Cross when he volunteered beyond his normal duties and carried three messages on 18th August to senior commanders when the telephone system failed. He survived the war but lost a leg. He returned to civilian practice in 1919, however, how did he manage to operate a treadle drill with a prosthetic leg?

Secondly back in the UK some ladies under the guidance of Lady Maud Wilbraham had the idea of collecting silver thimbles from 'needlewomen'. 50,000 thimbles were donated by the public



Fig. 2. Trenches in France



Fig. 3. German machine guns at ground level



Fig. 4. Soldier with typical head wound

together with other unused silver items. Aspreys, the bullion dealers, melted it all down realising £40,000. Amongst the beneficiaries was £6,000 to purchase and equip two motorised dental surgery cars. On completion, these were driven to Buckingham Palace to be inspected by the King before being sent to France.

Thirdly, this would not be complete without reference to Dr Gaskin Boyle. He was a captain in the RAMC having previously been an anaesthetist at St Bartholomew's Hospital in London. He was appalled at the lack of general anaesthetics (GAs) available to front line casualties. As a consequence, he developed the Boyle's mobile anaesthetic machine with which he personally administered over 3,000 GAs, thereby saving many lives including many with facial and head wounds at casualty clearing stations just behind the front line. This enabled more rapid treatment, within hours and it is claimed the recovery rate increased by 50% by minimising the loss of blood, surgical shock and wound infections.

A mislaid partial denture

A strange story was revealed about General Rawlinson who was awoken during the night and evacuated from his billet due to a sudden advance by the Germans. He barely had time to get dressed before retreating several miles, whereupon he was aware he had forgotten his upper partial denture. A month later the ground was retaken, and his orderly searching his former billet now destroyed by shell fire found the denture undamaged under a pile of rubble!

Finally

On a sombre note, the war memorial outside the lecture theatre in the BDA headquarters at 64 Wimple Street London, sadly depicts the 26 members who were killed in WW1. Other dentists also lost their lives but not being members of the BDA are recorded in memorials across the country.

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Fig. 5. Silver/thimbles collection



Fig. 6. Dental Motor Cars



Fig. 7. Dentists war memorial BDA headquarters

committees. Chaired several committees of the BDA, and is a former National President of the BDA. In addition, was a former secretary and chairman of the Lindsay Society.

Dioscorides on dental and oral treatments

Dimitrios Koutroumpas, Evangelia Lioumi, Hermione Konstantina Koutroumpas

Abstract: Unprecedented advances in dental knowledge took place during the Roman imperial period. Dioscorides was a leader in the field of traditional dental pharmacology both with his original work "De Materia Medica" and the spurious "Euporista". Thanks to Dioscorides we have an early classification of oral and dental diseases and a greater understanding of dental practice in the first post-Christian centuries. Dioscorides advocated more than 120 drugs for the treatment of toothache and diseases of the gingiva and oral mucosa. Most striking is the use of different verb forms to describe the effects of the drugs he proposes.

Keywords: Dioscorides, Ancient Dentistry, Ancient Pharmacy, De Materia Medica, Euporista

Introduction

Throughout the time of the Roman Empire, dental knowledge increased, culminating in the recognition of dentistry as a field of medicine¹. This is evidenced by the vast number of references to oral and dental diseases in literature of the time, together with the impressive list of medications for the treatment of these conditions. The recording of this rich, dentally related pharmaceutical tradition is largely due to Dioscorides, a pioneer in the field. This is thanks to both his original work "De Materia Medica" and the spurious "De Simplicibus Medicinis" or "Euporista" (which translates as- *remedies that are easily produced*)².

Who was Dioscorides?

Pedanius Dioscorides lived during the first century AD. The exact dates of his birth and death are unknown. Unfortunately, no testimonies on Dioscorides have been salvaged. The limited information about him is included in the prologue of "De Materia Medica". He is believed to have been born in Anazarbus of Cilicia, even though Galen mentions that he hailed from Tarsus, calling him Dioscorides of Tarsus³. For this reason, he bore two ethnic names. Galen's may, however, have been mistaken as there is no evidence confirming his understanding. Moreover, consideration of Galen's belief indicates that his misconception came from the link of Dioscorides with his mentor, Arius of Tarsus, and the recipient of the treatise. Dioscorides' main work can be placed in the second half of the first century AD, according to two references he gives in the prologue to his treatise. The first reference is relevant to the dedication of his work to his fellow-craftsman and mentor Arius of Tarsus, who encouraged Dioscorides to write "De Materia

Medica"⁴. The second and more enlightening evidence is the mention of Lecanius Bassus, who must have been a Roman Senator⁵ and friend of Arius⁶. Subsequently, the book "De Materia Medica" refers to the years between 64 AD and the beginning of the decade of 70 AD. Little is known about Dioscorides' life and studies, other than from a young age he had a never-ending desire for the study of drugs and their effects. For this reason, he travelled widely to study and to develop a personal knowledge of plants and their therapeutic properties⁷. It was commonly thought that he worked as a doctor for Roman legions, but doubt has been cast on this opinion in recent years.

De Materia Medica and Euporista

De Materia Medica

It is considered that "De Materia Medica" was written in the decade of 70AD, the same period that Plinius wrote his encyclopedia titled "Naturalis Historia", which omits to mention the work of Dioscorides. The *De Materia Medica* comprises five volumes⁸. In the first volume, simple drugs derived from herbal aromas, oils, and ointments are recorded. The second volume mentions drugs that are derived from animal products, while in the third volume herbal drugs are presented. In the fourth volume, the description of therapeutic herbs continues but there are also presentations of medical preparations made by fermentation. In the fifth book, Dioscorides focuses on various wine products used as orally administered medicines. In total, over 1000 medicines were included, a remarkable number, when one considers that in the Hippocratic Corpus only 450 types of drugs were recorded. Theophrastus mentioned about 550 and Nikandrus just 300⁹.

Euporista

In "*Euporista*", there are 12 chapters, including descriptions of many medicines for the treatment of dental conditions. As stated, these drugs were easily produced in the home, being made from readily available materials. The classification system, however, is different from one followed in "*De Materia Medica*". The classification is according to ailing parts of the body. This form of categorization, in the later Roman tradition, is called "*a capite ad calcem*" - from top to toe. The system begins with remedies for infirmities on the head and ends with those for the lower parts of the body. In general, this is a reorganization of the drugs mentioned in "*De Materia Medica*", along with later additions, based on the diseases that they treat. Perhaps listing the drugs, according to their natural properties, without explanation of their applications and effects, confused practitioners making "*De Materia Medica*" impractical. This may be why the remedies in "*Euporista*" were rearranged according to the area of the body that they treated. The work is dedicated to the doctor and pharmacologist Andromachus, who practiced during the first century AD in Rome as the head doctor of Emperor Nero¹⁰. As to its authenticity, research has not reached any final conclusions. Undoubtedly, its author had "*De Materia Medica*" as a primary source of information. Later additions support the hypothesis that "*Euporista*" is the work of an unknown author, traced back to the third century AD. This was the initial opinion of Max Wellman, the most reliable scholar and critic of the latest and most accurate editions of the two works. Wellman later revised his opinion, crediting Dioscorides with the treatise¹¹. Apart from questions of authenticity, these two texts are important as they describe the rich pharmaceutical arsenal that was available to the healer of dental and stomatological ailments, whether it be a dentist in Rome, Alexandria or a travelling doctor, as was commonplace in ancient times.

Of great interest is the method used to document medicaments in "*Euporista*", the healer had to make a diagnosis and then identify the most suitable prescription. In contrast, in "*De Materia Medica*", the healer had to know the therapeutic properties of each drug to treat symptoms. Although "*Euporista*" was considered easier to use, it was not as popular as the original work of Dioscorides. "*Euporista*", however, is a better aid to understanding dentistry in the first centuries AD.

Oral conditions

In "*Euporista*", the following dental problems are considered: toothache, tooth extraction, tooth eruption, teething, numbness of the teeth, tooth cleaning, mobile teeth and loose gums, swollen gums, epulides (hyperplasia of the gingiva), gingival recession, aphthae and ulcers, oral decay and bad breath. This list of dental conditions and the therapeutic treatments reveals the rapid development of knowledge in the field of dentistry. Given the occasional mention of dental issues, without any corresponding treatments, in the Hippocratic texts, there is no evidence of advances in dentistry during the period of the Roman Empire. Subsequently, a remarkable pharmacological knowledge of the treatment of dental problems began to emerge.

Drugs for toothache

A vast number of pharmaceutical substances were used to alleviate toothache. Of the 120 drugs recorded in "*De Materia Medica*", almost half (n=58) were used to treat toothache. The vast majority were in liquid form, usually administered as mouthwashes. The treatment for ailments of the mouth was still in an embryonic stage, largely due to the lack of knowledge regarding the anatomy and histology of teeth¹². The first person to study the anatomy of the tooth and to record that they had a nerve supply was Galen of Pergamon, who practiced during the second century AD - a century after Dioscorides. Galen was the first to differentiate between toothache from conditions of the gums, roots, or the interior of the tooth. From the works of Dioscorides', it may be perceived that his use of the term "toothache" was very general and had many meanings.

The number of drugs recommended to treat toothache suggests two things. Firstly, Dioscorides chose the recommended drugs from a collection of pharmacological works written by his predecessors and, following custom at the time, did not cite his sources. Secondly, and most importantly, Dioscorides and previous pharmacologists were reluctant to limit their recommendations, given variation in the effectiveness of the pharmacotherapies to combat toothache. This problem becomes more evident if attention is paid to the words and phrases with which Dioscorides often hides his ignorance and doubts over certain substances. The pharmaceutical substances used to

treat toothache were prescribed in the following manner:

- i) boiled in wine or vinegar to produce a mouthwash
- ii) chew on the aching tooth
- iii) for filling the cavity in the decayed tooth
- iv) as a plaster around the ailing tooth
- v) drops in the ear on the opposite side to the ailing tooth
- vi) drops in the nostril on the opposite side to the ailing tooth
- vii) amulets against pain.

The prescription often included the use of an adjunct amulet. The use of amulets, with claimed therapeutic actions, was recommended by Dioscorides and other important pharmacologists, such as Galen of Pergamum¹³.

The study of drugs to alleviate toothache offers valuable information about the organic and inorganic substances used and their effectiveness. The first question is: To what extent Dioscorides believed that these drugs were effective? A second question is: Could the drugs be classified according to their potency?

If the prescriptions for each pharmaceutical substance are examined, it is possible to categorize their potency, according to the verb used to describe their action. Usually, the first mentioned substance in each treatment group is the most suitable and most effective. Dioscorides then uses a series of verbs to categorize the potency of each substance. He does not give detailed information about their therapeutic value. So, it is possible to categorize the substances into five groups:

Group 1 is the substance that heals (*ἰᾶται*) toothache as no other does [*καὶ ὀδονταλγίας ὡς οὐδὲν ἕτερον ποιεῖ*]¹⁴. An Arabic Gum, Bissa Bol (*κάγκαμον*, Table 1) is the drug that treats toothache more effectively than any other. Dioscorides mentions that Bissa Bol consists of the sap of the trunk of *Balsamodendron Katuf*. Of the same potency is the mineral melanterite (*σῶρι*) which Dioscorides says “*treats toothache when placed on teeth cavities*”¹⁵.

Group 2 includes the strongest drugs and uses the verb «*παύω*» (stop). There are thirteen drugs in this group, with three types of therapeutic properties. Within the 2nd group there are three



Figure 1. Pimpernel (*Αναγαλλίς ἡ κυανή*, *Anagallis arvensis*) according to Dioscorides stops toothache among other pharmaceutical properties, [Codex Neapolitanus Graecus 1 of the National Library of Naples fol. 15r]

different expressions in Greek which have exactly the same meaning: *stop the pain*. Through these three equivalent phrases, Dioscorides chooses to notify the capability of the drugs in group 2 to radically control dental pain. Pimpernel (*ἀναγαλλίς*, Table 1), a type of milkweed, stops toothache [*καὶ ὀδόντος πόνον παύει*] when it is poured into the nostril on the opposite side of the mouth that said tooth is located¹⁶. The second expression commonly used is to declare the drug stops the pain [*παύει ... τὴν*]. Cedar (*κέδρος*, Table 1), a coniferous tree, can stop the pain when drops of cedar decoction are placed in the tooth cavity, or if it is mixed with vinegar and *ἀλγηδόνα* used as a mouthwash in the painful area¹⁷. The third phrase used is that it stops toothache [*ὀδονταλγίας παύει*]. For example, the root of the plant Plantain (*ἀρνόγλωσσον*) stops toothache either as a decoction for a mouthwash or when the root is chewed [*ἢ δὲ ῥίζα ἀφεψηθεῖσα καὶ διακλυζομένη ἢ αὐτὴ διαμασσωμένη ὀδονταλγίας παύει*]¹⁸.

Group 3 includes the drugs which have the property of alleviating, but not eradicating toothache. This category of drugs is one of the largest in "*De materia medica*" and includes fourteen medicines.

Two verbs are used to describe their actions. The first expression is that it calms the pain [*ὀδόντος τε πόνον πραΰνει*] or [*ὀδονταλγίας τε πραΰνει*] calms toothache. For example, Hyssop (*ὕσσωπος*, Table 1) calms the pain [*ὀδόντος τε πόνον πραΰνει*] when boiled in vinegar and the mixture is administered as a mouthwash¹⁹. The beverage of the root of Mullein (*φλόμος*, Table 1), a herb which is known by the same name today, when mixed with wine and used as a mouthwash, calms toothache [*ὀδονταλγίας τε πραΰνει*]²⁰. The second expression of identical meaning is «*κουφίζει*» that means it



Figure 2. Ivy (Κισσός, *Hedera helix*) boiled with rose oil was instilled to the opposite nostril of the aching tooth to help in case of the toothache as Dioscorides mentions. [Codex Neapolitanus Graecus 1 of the National Library of Naples fol. 55r]

lightens the pain (the word is of the same root and meaning as in *ἀνακουφίζει*). The use of the verbs to lighten (*ἀνακουφίζω*) or calm (*καταπραΰνω*), characterize the same beneficial influence of a drug which does not stop toothache but makes a noticeable difference. A characteristic example is Spurge (*τιθύμαλλος*, Table 1), which can relieve the pain [*τῶν ὀδόντων τὰ ἀλγήματα*] when it is used to fill “corroded cavities”²¹. The term “corroded cavities” (*διαβρωμένες κοιλότητες*) was used to describe loss of tooth tissue either by caries or abrasion. Similarly, the root of the herb *Ranunculus* (*βατράχιον*, Table 1), a species that looks like celery, is used as a plaster and reduces toothache [*καὶ ὀδονταλγίας κουφίζειν*]²².

Group 4 contains substances which either just help (*βοηθεῖ*), or benefit (*ὠφελεῖ*), in cases of toothache, possibly, with limited effectiveness. For

example, Tamarisk (*μυρική*), a beverage made out of its leaves mixed with wine and used as mouthwash, can help with toothache [*καὶ ὀδονταλγίας βοηθεῖ*]²³. Also, *Μελάνθιο* (lat, *Nigella sativa*), commonly known as Black Cumin, is beneficial for toothache [*ὠφελεῖ καὶ ὀδονταλγίας*] as a mouthwash when boiled with vinegar and pinewood with high a concentration of resin (*δαδί*)²⁴. The degree of benefit is unknown, since effectiveness is not discussed.

Group 5, comprises simple medicaments which Dioscorides believes are suitable against toothache and are described using the verb “make” (*ποιῶ*). This group included herbs like Fish Thistle (*λευκή ἄκανθα*, Table 1). The decoction of its root is suitable for treating toothache when used as mouthwash [*πρὸς ὀδονταλγίας ποιεῖ διακλυζόμενον*]²⁵. There are also these without any special reference to their action, but they are just mouthwashes for toothache.

Most of these remedies are plant based. Usually, the extract of the root is mixed with either wine or vinegar. Wine has mild antiseptic properties, as it contains ethyl alcohol but it is doubtful that it would have any effect on toothache. However, many of the herbs described have some therapeutic and possibly analgesic properties. For example, the root of Henbane (*ὕοσκάμος*, Table 1), when boiled with vinegar, can be used as mouthwash in cases of toothache²⁷. The leaves and roots contain potent alkaloids, such as scopolamine and hyoscyamine. These alkaloids are suppressants of the central nervous system and it is possible that they might have had some local analgesic action when used as mouthwash²⁸.

The use of lizard liver to fill the cavity of a decayed tooth cannot be considered as an orthodox dental practice. It was therefore surprising to read in Dioscorides work that “*the liver of the lizard when placed in the decayed tooth cavities ceases pain*”²⁹ [*τὸ δὲ ἥπαρ αὐτῆς {σαύρας} ἐντεθὲν τοῖς τῶν ὀδόντων βρώμασιν ἀπονίαν ποιεῖ*]. The description of snake skin being boiled in wine³⁰ or of frogs boiled in water and vinegar³¹ will probably revolt the modern reader. Nevertheless, before criticizing Dioscorides, it needs to be remembered that the majority of these substances were also used as components in Galen’s complex medicaments, and in medieval dental practice.

	Substance	Administration	group ^a
1	κάγκαμον (~ Commiphora kataf Forsk., ~ Styrax benzoii Dryand., Balsamodendron Katuf, Bissa bol)	diluted in wine	1 st
2	ρόδιον (Rose oil)	as mouthwash	5 th
3	πίτος (Pinus laricio, Pine)	leaves decoction with vinegar	2 nd
4	άσφαλτος (asphalt)	molded and placed around the tooth	3 rd
5	κέδρος (Juniperus L., Cedar)	a. instillation in the decayed tooth b. mouthwash with vinegar	2 nd
6	πλατάνου τὰ τρυφερά τῶν φύλλων (The tender leaves of the plane tree)	decoction with vinegar as mouthwash	5 th
7	μορίκη (Tamarisk)	decoction with wine as mouthwash	4 th
8	άμόργη (Amorge)	application with vinegar, wine or mead	5 th
9	Αιθιοπική ελαία δάκρυον (The sap of the Ethiopian Olive tree)	instillation into the decayed tooth cavity	5 th
10	κηκίς (Cecis)	coating the decayed cavity	2 nd
11	ρόυς (Rhus Coriaria L., Sumac)	inserted into the decayed cavity	5 th
12	μορέα ή σκκάμινον δένδρον (Morus nigra L., Mulberry)	as mouthwash	5 th
13	όπως συκής (Ficus Caria L., Figs)	lamb's wool impregnated with the juice and packed into the cavity	4 th
14	γῆρας ὄφεως (The slough of a serpent)	boiled with wine as mouthwash	4 th
15	τρυγόνος θαλασσίας τὸ κέντρον (The slough of a serpent)	because it breaks and unroots the ailing tooth	3 rd
16	Βάτραχοι (Frogs)	decoction of boiled frogs in water and wine as mouthwash	4 th
17	Ελάφου κέρας (Hart's horn)	boiled in vinegar as mouthwash	5 th
18	σαύρας ἥπαρ (Lizard liver)	packing the liver in the decayed tooth cavity	2 nd
19	γῆς ἔντερα (Earthworms)	boiled in oil and instillation to the ear of the opposite side	4 th
20	Λάπαθον (Rumex sp. L., Monk's Rhubarb)	decoction boiled with wine as mouthwash	5 th
21	ἀσπάραγος (Asparagus Officialis L., Asparagus)	decoction for mouthwash	4 th
22	ἀρνόγλωσσον (Plantago major sp. L., Plantain)	as decoction of its root or chewing	2 nd
23	ὀρίόσκορδον (Allium Sativum L., [The wild]Garlic)	the decoction with resin rich pine wood and frankincense hold in the mouth	3 rd
24	ἀσφόδελος (Asphodelus sp. L., Asphodel)	the soup of the root with incense, honey, wine and myrrh; instillation to the ear of the opposite side to the aching tooth	3 rd
25	κάππαρις (Capparis spinosa L., Caper)	boiled with vinegar as mouthwash or chewing by the aching tooth	2 nd
26	λεπίδιον (Lepidium latifolium L., Pepperwort)	as an amulet hanging from the neck	5 th
27	βατράχιν (Ranunculus sp. L., Ranunculus)	dressing the tooth with the root	3 rd
28	ἀναγallis (Anagallis arvensis L., A. caerulea, Schreb., A. phoenicea Scop., Pimpernel)	instillation to the nostril of the opposite side to the aching tooth	2 nd
29	κισσός (Hedera helix L., Ivy)	boiled with rose oil; instillation to the ear of the opposite side to the aching tooth	3 rd
30	χελιδόνιον μέγα (Chelidonium majus L., Celadine)	plaster of the root with wine; chewing	2 nd
31	[χαμαιλέον] ὁ μέλας, ἡ οὐλόφορον (Cardopatum Corymbosum L., Chameleon thistle)	the decoction of the root or mixed with equal quantities of pepper and wax	2 nd
32	ἄκανθα λευκή (- Cnicus ferox L. or ~ C. acarna L., Fish thistle)	decoction of the root as mouthwash	5 th
33	ἀνονίς (Ononis antiquorum L., Rest harrow)	decoction with sour wine and water as mouthwash	3 rd
34	λευκάκανθα (Cnicus tuberosus sp. L. or Cirsium Tuberosum All., Tuberosus thistle)	chewing the root	3 rd
35	ὕσσωπος (Satureia graeca L. = Micromeria Graeca Benth., Hyssop)	decoction with vinegar as mouthwash	3 rd
36	πάνακς Ἡράκλειον (Oporonax hispidus Grisp., Hercules' woundwort)	placed in the decayed tooth cavity	5 th
37	πύρεθρος (Anacyclus Pyrethrum DC = Anthemis Pyrethrum L., Pellitory)	decoction with vinegar as mouthwash	4 th
38	πενκέδανος (Peucedanum Officinale L., Sulfurtwort)	placed in the decayed tooth cavity	5 th
39	μελάνθιον (Nigella sativa L., Black cumin)	decoction boiled with resin rich pine wood and vinegar as mouthwash	4 th
40	σίλφιο (~ Ferula Tingitana L., Laservort)	in the cavity and coating perpendicular to the tooth along with frankincense	4 th
41	χαϊβάνη (Ferula Galbaniflua Boiss. and Buhse., Galbanum)	in the cavity and coating perpendicular to the tooth	2 nd
42	μελισσόφυλλον (Melissa officinalis L., M. Altissima Sibth. and Sm., Balm)	decoction as mouthwash	5 th
43	ἀλθαία (Althaea officinalis L., Marsh Mallow)	decoction of the root with vinegar as mouthwash	3 rd

44	κλήματις (Vinca Minor L., Periwinkle)	chewing the leaves and sprouts	2 nd
45	Πολέμωνιον (Polemonium Caeruleum L. or Hypericum olympicum L., Jacob's ladder)	chewing the root	2 nd
46	Πεντέφυλλον (Potentilla reptans, L., Ciquefoil)	decoction of the root	2 nd
47	ὕοσκάμος (Hyoscyamus sp., L., Henbane)	decoction of the root with vinegar as mouthwash	5 th
48	στρόχον ὕπνωτικόν (Withania somnifera L., Sleepy nightshade)	decoction of the skin with wine as mouthwash	4 th
49	ἐφήμερον (Polygonatum Multiflorum All. and P. verticillatum All., Ephemerum)	decoction of the skin as mouthwash	5 th
50	φλόμος (Verbascum sp. L., Mullein)	decoction of the root with wine as mouthwash	3 rd
51	ἄρκτιον (~ Inula Candida L., ~ Celsia Orientalis L., ~ C. acaulis Bory etc., Bearwort)	decoction of the fruit and the root with wine as mouthwash	3 rd
52	σίκος ἄγριος (Ecballium Elaterium Rich., Squinting cucumber)	decoction of the root with vinegar as mouthwash	4 th
53	σταρίς ἄγρια (Delphinium Staphisagria L., Stavesacre)	decoction of the root with vinegar as mouthwash	4 th
54	ἐλλέβορος μέλας (Helleborus Cyclophyllus L., Black hellebore)	decoction of the root with vinegar as mouthwash	3 rd
55	τιθύμαλλος (Euphorbia L., Spurge)	filling the tooth cavity with the juice and perpendicular obturation with wax	3 rd
56	κολόκυνθα ἄγρια (Citrullus Colocynthis Schrader, Colocynth)	decoction with vinegar as mouthwash	4 th
57	ὄζος (Vinegar)	mouthwash	5 th
58	σάρι (Melanterite)	when placed on teeth cavities	1 st

^a group1 (most effective) -> group5 (least effective)

Table 1: Substances suitable to treat toothache according to Materia Medica (translation of ancient Greek names of substances as suggested by Beck²⁶)

Drugs for periodontal diseases

The second large category of medicaments is for the treatment of periodontal diseases. These are mostly plant based remedies for the management of mobile teeth. Unfortunately, the medicaments described are not accompanied with any information about the causes or the type of disease resulting in tooth mobility. From studies conducted on skeletal remains, it is evident that ancient man was subject to many periodontal diseases which resulted in the loss of teeth³². The main remedies in both of Dioscorides's works acted as styptics. These were substances which had the property of causing contraction of the gingiva, following the principle of antipathies. According to this principle, a drug which reverses the cause of the ailments is administered. Vinegar flavored with squills (*antipathies ὄζος*) when used as a mouthwash supposedly hardens the gums making teeth less mobile [πρὸς *antipathies*as *antipathies*]³³. Similarly, the leaves of the pomegranate tree (*antipathies*α, Table 2) have styptic properties and their extract was thought to be useful for cleaning loose gums and mobile teeth [*antipathies πλαανipathies καὶ antipathies antipathies*]³⁴. The juice of olives that have been turned into a paste in brine, referred to as “*olives that swim in pickling brine*” (*antipathiesβantipathies ἐλαῖαι*), were thought to contract swollen gums and stabilize mobile teeth. Generally, olives and especially wild olives have styptic properties and were used in

many ways to treat oral and dental problems. The chewing of wild olives was recommended for curing aphthous ulcers, mouth ulcers, preventing gingival discharge and of course, alleviating toothache³⁵.

Apart from organic materials, *De materia medica* also advised the use of minerals to tackle mobile teeth. Alum which has styptic properties, when mixed with either honey or vinegar was thought to tighten the gums and strengthen loose teeth³⁶. Other inorganic materials used to combat loosening of the teeth were: melanterite (σῶρι)³⁷, pumice stone (*antipathies*)³⁸ and mineral salt mixed with honey³⁹ (Table 2). What all these inorganic substances have in common is their styptic action which contracts the gums and limits the movement of loose teeth.

There is a group of organic and inorganic substances used as a cure for mobile teeth which can only be found in "*Euporista*". For example, a mixture with equal quantities of myrrh, shale and starch⁴⁰, or a mixture of pomegranate skin, ceca and vitriol. Most of the ingredients have styptic properties contracting the gums.

A search of the literature confirms that many books on herbal therapy dedicate page upon page to the healing properties of mandrake. Mandrake is not included in "*De materia medica*" even though it contains alkaloids similar to those found in Henbane.



Figure 3. Henbane (Ὑοσκύαμος *Hyoscyamus niger*: the decoction of the root with vinegar can be used in case of toothache as mentioned by Dioscorides. [Codex Neapolitanus Graecus 1 of the National Library of Naples fol. 146r]

Yet, in "*Euporista*", mandrake is part of an unusual remedy to cure mobile teeth. This involves boiling frogs, vitriol⁴¹ and mandrake root. However, it is not a coincidence that it is the last one recorded in that section. It is usually observed that unusual medicines or ones with mystical properties appear at the end of the list.

Periodontal diseases continued to be discussed in chapters 74 and 75 of the Wellmann edition of "*Euporista*". Only limited numbers of substances are used to treat any kind of inflammation, ulcers or other problems of the gingiva in "*De materia medica*" (Table 2). They are remedies which were believed to be able to combat a large variety of dental illnesses. The action of the herbs bisabol and green olive oil have already been mentioned in the first volume of "*De materia medica*". These substances were thought to have antiseptic properties and to tighten gums. The same applies for the plant Cecis (κηκίς, Table 2) the fruit of which has styptic properties that, is recommended for limiting epulis and gum discharge [ἀμφοτέρα δὲ στύφουσιν ἱκανῶς καὶ στέλλουσι λεῖται τὰς ὑπερσαρκώσεις ρευματισμούς τε οὐλῶν]⁴².

The second and third books do not contain any substances for gingival ailments. In the fourth book, caltrops (τρίβολος χερσαῖος, Table 2) and water chestnut (τρίβολος ἑνυδρος, tabl. II) are the only plants recorded, thanks to their styptic action. They can be used as a plaster for every inflammation. According to Dioscorides, when combined with honey, it cures ulcers, purulent drainage of the oral cavity, the tonsils and gingivae⁴³. Wild raisins have similar properties when boiled with vinegar and used as mouthwashes⁴⁴.

In the fifth book, both organic and inorganic materials are recommended for the healing of pathological conditions of the gingiva. For example, according to Dioscorides, wine flavored with myrtles (μυρσινίτης οἶνος) is recommended for curing small ulcers of the gums⁴⁵.

Drugs for diseases of the oral mucosa

Other conditions considered by Dioscorides were inflammation and ulceration of the oral mucosa. Just as with the management of periodontal problems, there were more medicaments to treat the mucosa recorded in "*Euporista*" than in "*De materia medica*".

The most interesting oral pathological condition

	Substance	Indication
1	κάγκαμον (~ Commiphora Kataf Forsk., ~ Styrax benzoin Dryand., Bisabol)	gingiva putrefaction (mixed with wine)
2	ἐλαίον ὀμφάκιον (Olive oil from unripe olives)	tightens the gums
3	σμήρνα (Commiphora myrrha Engl., C. anglosomaliae Chiov., Myrrh)	strengthens the gums
4	σχίνος (Pistacia lentiscus L., Mastc)	tightens the gums and stabilizes the mobile teeth
5	ρόδα (Rosa, sp. L., Rose)	discharges of the gingiva
6	λύκτιον (Rhamnus petiolaris Rh. lycoides, Rh. punctata Boiss., Dye's buckthorn)	lesions of the gingiva
7	ἀγριελιά (Olea europaea L., var. silvestris Miller, Wild olive)	a. shrinks swollen gums (wild olive brine pulp), b. gingiva putrefaction (wild olive oil), c. discharges of the gingiva (steam bath with oil)
8	κολυμβάδες ἐλαῖαι (The olives that swim in pickling brine)	brine pulp minimizes swollen gums stabilizes the mobile teeth
9	Κηκίς (Cecis)	hypersarcomas and discharges of the gingiva
10	ρόδα (Punica granatum L., Pomegranate)	tightens the gums and stabilizes the mobile teeth (flower decoction)
11	κοκκυνηλέα (Prunus domestica L., Plum)	discharges of the gingiva (decoction of the leaves with wine)
12	αἰδοῦρνό γάλα (Ass's milk)	strengthens the gingiva (as a mouthwash)
13	βοῦτυρον (Butter)	Gingiva irritations in kids (mixed with honey)
14	γλήχων (Mentha Pulegium L., Pennyroyal)	gingiva-strengthening (broken and burnt)
15	ἀρνόγλωσσον (Plantago major sp. L., Plantain)	blood supply of the gingiva (swallow the juice of leaves)
16	ἀριστολοχία (Aristolochia Rotunda L.A. longa L., A / Clematitis L., Birthwort)	cleanser of the gums
17	ἀλόη (Aloe vera L., Aloe)	suitable for the gums without any specific indication (mixed with honey or wine)
18	A.τρίβολος χερσαῖος (Tribulus Terrestris L., Caltrops) B.τρίβολος ἔνυδρος (Trapa Natans, L., Water chestnut)	inflammations of the gums (mixed with honey)
19	βάτος (Rubus Ulmifolius Schott, Bramble)	strengthens the gingiva (chewing the leaves)
20	σταφίς ἀγρία (Delphinium Staphisagria L., Stavesacre)	ceases the discharges of the gingiva (decoction with vinegar)
21	οἰνάνθη (Oinanth)	a. beginning gingival abscess (fresh and dried as a cataplasm), b. treatment of bleeding and retracting gums (mixed with honey)
22	ὀμφάκιον (Omphacium)	loose gums (mixed with wine or honey)
23	ὄξος (Vinegar)	Shrinks bleeding and retracting gums
24	σκιλλητικόν ὄξος (Vinegar flavoured with Squill)	gingiva putrefaction
25	μυρσινίτης [οἶνος] (Wine flavored with Myrtles)	Gingiva ulcers
26	ἰὸν ξυστόν (Verdigris)	Tackles Epulides (hypersarcomas) and protrusion of the gums
27	χαλκίτην (Rock alum)	gingiva inflammations
28	σῶρι (Melanterite)	strengthens the mobile teeth
29	στυπτηρία (Alum)	tightening loose gums
30	κίσηρις (Pumice stone)	strengthens the gingiva
31	ἄλας ορυκτὸν (Salt mine)	tackles loose gums
32	λίθος ἀλαβαστρίτης (Alabaster)	strengthens the gingiva
33	λίθος σμύρις (Emery)	cleansing loose gums

Table 2: Substances suitable to treat gingival diseases according to Materia Medica (translation of ancient Greek names of substances as suggested by Beck²⁶)

of this category was the management of aphthous ulcers. This is the only condition that is described in detail. Other ulcerations were described as “corrosive ulcers” or “oral decay”. Unfortunately, there is no detailed description of these conditions. For instance, it is difficult to perceive how foul-smelling exudates in the mouth [ἐν στόματι



Figure 4. Birthwort (Ἀριστολοχία, Aristolochia clematitis) is proposed by Dioscorides as a cleanser for the gums, [Codex Neapolitanus Graecus 1 of the National Library of Naples fol. 1r]

σηπεδόνες], are treated with mouthwash from the sauce of the blotched picarel fish (μενίς=Spicara maena)⁴⁶. Unfortunately, Dioscorides does not make any other mention regarding the appearance or aetiology of pus in the mouth.

Regarding aphthous ulcers, a significant number of remedies can be found in both works. Treatment for ulcers included; henna tree (κύπρος = Lawsonia inermis), thanks to its styptic properties, tribulus (τρίβολος), wild raisin, alum (στυπτηρία), omphacium (ὀμφάκιον) and bramble (βάτος). If bramble leaves were chewed it was thought that this would strengthen the gingiva and heal aphthae, [ἡ βάτος κρατύνει δὲ καὶ οὖλα καὶ ἄφθας ὑγιάζει διαμασσωμένων τῶν φύλλων]⁴⁷. Similarly, omphacium is a juice of unripe psithion or aminnaian grape, which does not belong to any of the modern varieties. When mixed with honey or sweet wine it was thought to counter a variety of ailments. Apart from ulcers, it is claimed it could reduce pus from the gums and inflammation of the tonsil⁴⁸. Of course, the currently most famous herb for tackling ulcers is oregano (ὀρίγανος). It is easily prepared, and is found in many homes. It has anti-inflammatory properties even today is cited in folk herbal medicine books. For the treatment of ulcers, Dioscorides recommends the use of a pabulum of freshly cut oregano⁴⁹.

In “Euporista”, Dioscorides discusses both aphthae and the “nomas” (τὰς ἄφθας καὶ τὰς νομάς), which means gangrenous inflammation of the mucosa. Hence, in the chapter regarding aphthae ulcers Dioscorides states:

“The aphthae and inflammations of the oral mucosa are healed by honey and all these

written above [previously]..... Additionally, though, and especially on this occasion, the following; leaves of wicker or Cypress tree, if rubbed on along with honey, Tribulus juice, the same the juice of Acacia, the same the juice of Cytinus or tanning pomegranate, Omphacion, Oregano, and the same pomegranate used in food; the same and the flower of wild pomegranate if dried and placed on top and its decoction if used as mouthwash, and Sandarac along with Rose oil for mouthwashes, the juice of British herb and the same and the leaves of wild olive tree; one part of arsenic and three parts burnt papyrus to be used dry and with honey; the soup of the blotched Picarel when used as mouthwash, the juice of plantain, Cecis with oil for mouthwash the same the liquid alum”⁵⁰

In chapter 79 of the Wellmann edition related to oral mucosa decays he mentions the following: [τὰς δὲ ἐν τῷ στόματι σηπεδόνας ἴστησιν μὲν καὶ τὰ πρὸς νομὰς ἀναγεγραμμένα, ἰδίως δὲ ταῦτα· μαράθου ἀγρίου ρίζης κεκαυμένης ἢ τέφρα· ἢ μαινίδων κεκαυμένων μέρη β', ἀλόης μέρος α', ξηρά· ἢ ἀρσενικοῦ δ', χάρτου κεκαυμένου ιβ', ξηρά· ἢ σταφίς λεία χωρὶς τῶν γιγάρτων καταπλασθεῖσα, ἀμόργη ἐλαίου ἐψηθεῖσα ἐπιχρισμένη]⁵¹

“the putrid humors in the mouth treat and all these that have been written already for the gangrenous inflammations of the oral mucosa and especially these: the ash of the burnt root of wild fennel; or two parts of burnt blotched Picarel and one part of Aloe Vera, dry; or four drachmae arsenic and twelve drachmae burnt papyrus, dry; or melted raisin without the seeds as plaster; or coating with boiled Amorge”

Drugs for cleaning teeth and halitosis

A final category of medicaments refers to teeth cleaning and mouth fresheners. This is the first time that substances used to clean the teeth have been mentioned in any of Dioscorides works which is a milestone in the history of preventive dentistry. In the Hippocratic texts there exists a rather odd prescription for improving a woman's bad breath, yet we now clearly encounter substances that are appropriate to clean the teeth [ἀρμόζουσι πρὸς σμῆξιν ὀδόντων], such as murex (marine molluscs) (πορφύρα) and trumpet shells (κήρυκες)⁵². Oysters and animal horns were also used for cleaning teeth.

Burnt shells were thought to cure leprosy and clean teeth [δύναται δὲ πάντων τὰ ὄστρακα κεκαυμένα θερμαίνειν καὶ καίειν, σμήχειν λέπρας, ἀλφούς, ὀδόντας]⁵³. Deer horn seems to be important in both Greek and Roman literature of that time. During the Roman Imperial Period authors such as Aulus Cornelius Celsus in his work "De Medicina", Scribonius Largus in his work "Compositiones Medicamentorum", and even Caius Plinius Caecilius Secundus, known as Plinius Senior, in his work "Naturalis Historia", were interested in oral diseases and recorded ways of healing them either through medicaments or surgically. Amongst the drugs that tackled oral conditions many remedies used for teeth cleaning can be found. There is a prescription which uses deer horns as a main ingredient which reveals similarities between Roman and Greek therapies. This demonstrates the influence that the Ancient Greek medical literature had on the evolution of Roman medicine⁵⁴.

Dioscorides specifically recommends rubbing deer horn on teeth as a cleaning agent [καὶ ὀδόντας δὲ παρατριβόμενον σμήχει]⁵⁵. Meanwhile, in "De materia medica" materials of inorganic nature like pumice stone (κίσσηρις) and of organic nature like Alcyonium (ἀλκυόνιον) are used to either clean⁵⁶ or whiten⁵⁷ the teeth. In "Euporista" deer horn, pumice stone, burnt mussels with honey or the burnt shell of cuttlefish are used to clean teeth. Additionally, the root Birthwort (ἀριστολοχία, Table 2) and burnt Arabic stone, crushed and mixed with honey are mentioned. However, the same substances mixed with either Spikenard (στάχυν νάρδου, Nardostachys Jatamansi), Flower of Schoenus (ἀνθὸ σχοίνου, βούρλου) or unwashed burnt hair and melted with the addition of salt were used to obtain a pleasant mouth odour and eliminate bad breath (εὐωδίας χάριν)⁵⁸. Besides the remedies recommended purely for teeth cleaning, there are, according to Dioscorides, drugs which tackle the bad odours of the mouth [τὰς περὶ τὸ στόμα δυσωδίας] such as vinegar flavored with squill (σκιλλητικόν ὄζος)⁵⁹. In "Euporista" the extract of agai wood root (ἀγάλοχος = *Aquilaria malaccensis*) with mouthwashes, myrrh, flower of schinus or cinnamon when chewed and bay leaf (μαλάβαθρον = Cinnamomum Tamala) which is placed under the tongue⁶⁰. These treatments, which are described in both works were clearly effective against bad mouth odour in the cases in which oral hygiene was limited. Under no circumstances, though, can we suppose that all these substances had the power to eliminate halitosis, which was a result of some oral

ailment, since obviously the cause of the smell was not treated.

Conclusion

Dioscorides's contribution to dental therapeutics and the value of his works have been immense, especially in our attempt to comprehend the way in which dental practice took place in antiquity. The large number of medicaments available, and the extent of the oral and dental diseases that were treated is astonishing. With the aid of Dioscorides's work on simple drugs and Galen's on complex drugs, we have a much greater understanding of dental practice in the ancient world. From the study of Dioscorides' treatises, we can appreciate the relatively high caliber of Greek dentistry at that time. However, a great number of drugs recommended by Dioscorides would now be considered to be ineffective. Despite this, the work of Dioscorides reveals a higher level of dental knowledge in antiquity than previously suspected.

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History of Orthodontics in Brazil – 19th century

Oswaldo de Vasconcellos Vilella

Abstract: Foreigners with a wide range of occupations, including dentistry, settled in Brazil following the transfer of the Portuguese Crown to Rio de Janeiro (1808). The French were the first to arrive, soon followed by the Americans. Their presence contributed to the level of dentistry practiced in the country; however, many Brazilians traveled abroad for their dental education as formal programs were lacking in Brazil. This problem was solved in 1884, when the first dental courses in Brazilian colleges were created. The American Louis Burdell (1815 - 1870) and the Brazilian Carlos Alonso Hastings (1838 - 1905), graduated in the United States, performed orthodontic procedures in Brazil in the nineteenth century. Antonio Gonçalves Pereira da Silva (1851–1916) was the first Professor of the Prosthetics, a specialty to which orthodontics was subordinated. A question lingers...as a Prosthodontist would he have taught how to construct orthodontic appliances?

Key words: Brazilian dentistry history, 19th century, orthodontics, orthodontic appliances

Introduction

Oliver Wendell Holmes (1809 – 1894) admittedly one of the great reformers of medicine, once said that to understand what is happening in the present, or what will happen in the future, it is necessary to look to the past. He was also a professor, an expert speaker and one of the few men capable of influencing Edward Hartley Angle (1855– 1930) and his disciples.¹

Angle followed Holmes's wise guidance and upon assuming the presidency of the American Society of Orthodontists, in 1901, organized a commission to elaborate studies on the history of the specialty. The laudable initiative has borne fruit, and many articles on the subject have been published in the last 120 years.²

There are, however, few studies that identify and clarify the facts regarding the development of orthodontics in Brazil. The shortage of historical records or simply their non-maintenance seems to be the biggest problems. While they do not represent insurmountable obstacles, they do make the researcher's task very difficult.

The history of orthodontics in the 19th century is particularly obscure. Shoulder to shoulder with uneducated surgeons, French, Americans and some Brazilians who graduated or perfected abroad practice dentistry within Brazil.³ Would they have performed the correction of malocclusions throughout the vast geographical expanse of the country? If the answer to this question is “yes”, what kind of appliances did they use?

Orthodontic practice in Brazil in the 19th century

Until 1850, the French were among the predominant foreign dentists who came to practise their profession and try their luck in Brazil. These foreign entrepreneurs were extremely well regarded, to the extent that one of them had become the first dentist of the Imperial House. Eugène Frédéric Guertin, who graduated from the Faculty of Medicine of Paris, arrived in Rio de Janeiro around 1820. From 1829 he took care of the teeth of Dom Pedro I, Empress Amelia de Leuchtemberg (second wife of Pedro I) and the young Dom Pedro II. His office was located at Ouvidor Street, Rio de Janeiro downtown. For the nobility, however, home care was readily available.³ The details of Guertin's dental practice are little known. Cunha³ supports the fact the Guertin's prosthetic devices were based on the technique recommended by Pierre Fauchard (1678 – 1761) or on some other more modern processes.

Fauchard published the first book entirely dedicated to dentistry, *Le chirurgien dentiste ou Traité des dents* in 1728.⁴ This work featured among other topics, an orthodontic apparatus called *bandeau*, which functioned as an expansion arch whose purpose was to align the teeth. This device was later modified by Etienne Bourdet (1722 – 1789), making it possible to expand the dental arches also from the lingual side.⁵ Although it is quite plausible that Guertin knew the work written by Fauchard, there is no evidence that neither he nor any other dentist of that time performed orthodontic treatments.

The North American influence

Finding evidence of orthodontic practice as we approach the second half of the 19th century seemed more promising. The American dentists who migrated to Brazil began to replace the French. At this time, European dentistry could be considered outdated in relation to that of North America.⁶

The first to arrive in Rio de Janeiro was Louis Burdell (1815 – 1870) in late 1839 or early 1840. He set up his office in building number 20 of Direita Street (today, Primeiro de Março Street), downtown. Soon he would also become dentist of the Imperial House.³ Burdell was newly married to Adelina Louisa Graham Burdell when he landed in Rio de Janeiro. Soon they had a son, born in 1840, who received the same name as his father.⁷ He seemed quite at ease in his new country. In 1851, he and his son climbed the *Pedra da Gávea*, a monolithic mountain in Tijuca Forest, in Rio de Janeiro. There they spent the night and hoisted the flags of Brazil and the United States on its summit, a feat that would become famous history in Brazilian mountaineering.⁸

RD Addington⁹ a dentist from North Carolina who had been visiting Brazil between 1845 and 1846, reported that Burdell had raised a vast clientele, composed of the ruling elite of Rio de Janeiro society. Addington was very well impressed with Burdell's degree of excellence in dentistry. On one of the occasions he visited his compatriot's office, he witnessed what follows:

*“One of the Emperor's ministers, whose daughter, about thirteen years of age, had her right lateral (upper) incisor so irregular as to come behind the lower teeth, desired it to be placed in the line, which was finished after she had visited his office about four times”.*⁹

The questions still remains “Which technique did Burdell use to correct the anterior crossbite?”

The most successful book on the history of dentistry may have been *The Dental Art, A Practical Treatise on Dental Surgery*, published by Chapin Aaron Harris (1806 – 1860) in 1839. It was reissued for 74 years, reaching the incredible attainment of 30 editions.¹⁰ Was Burdell's treatment based on the knowledge acquired by reading this book to perform orthodontic intervention on the minister's daughter?

Harris¹¹ postulated that two conditions are necessary for the treatment of this type of irregularity: First, placement between the teeth of some hard substance, so that the lower ones do not prevent the uppers from being brought forward. Second, apply a force that exerts constant pressure on the deviated tooth, until it passes over the lower teeth that obstruct it. To achieve this goal, he recommended the apparatus proposed by the Englishman Joseph Fox (1775 – 1816), composed of a 0.16" gold arch wire tied to the (upper) molars and perforated on either side of the tooth to be moved. Ivory blocks encrusted in the arch wire, inserted between the occlusal surfaces, promoted the separation of the dental arches (Harris suggested its substitution using golden caps in the first permanent molars). The cross-biting tooth can then be pulled with silk ligatures, which could be renewed every three or four days.

Coelho e Souza¹² stated that in the mid-nineteenth century Brazilians began to recognize the technical superiority of North American dentistry, understanding the reason for its hegemony around the world. By the 1870s many dentists from the United States had settled in Brazil, especially in the city of Rio de Janeiro. The exchange with these professionals stimulated some Brazilians to study dentistry in the USA.

Dental training in Brazil

The presence of foreign dentists has contributed to raising the quality of Brazilian dentistry. In 1884 the Dentistry Course was created, attached to the Medical Schools of Rio de Janeiro and Bahia (decree no. 9311, of October 25th). For the first time Brazilian dentists could gain formal education. In 1889 the Republic was proclaimed. In the same year the Institute of Dentists of Rio de Janeiro was founded, the first organization of Brazilian dentistry. Among the founding members some were a number of U.S. nationality.³

Carlos Alonso Hastings (1838 – 1905) was also a founding member. He was the first Brazilian to graduate in dentistry from a North American school. Born in the city of Rio Grande (Rio Grande do Sul State), he left his homeland to study at Philadelphia Dental College.¹³ Upon his return he settled in Rio de Janeiro, opening a practice in Quitanda Street. He became famous in the dental world for having modified the *Weber-Perry engine*,³ a foot pedal dental engine that differed from the others by the

absence of backlash.¹⁴ It was known in Brazil as *Hasting's Engine*.

In one of the scientific sessions held at the Institute of Dentists of Rio de Janeiro in 1890, Hastings presented plaster casts of a patient treated with an orthodontic appliance. According to Cunha the appliance used in the correction had been designed by Edward Angle.³

During the 9th International Medical Congress, held in 1887 in Washington, DC, Angle read the paper *Notes on Orthodontia with a New System of Regulation and Retention*, which in the same year was published in the *Ohio Journal of Dental Science*.¹⁵ This paper presented the *Angle System*, a standard orthodontic device composed of a defined number of basic components. It allowed the development of a more rational and efficient treatment plan.¹⁶ As it was produced in series, it could be purchased in the dental suppliers' shops, initiating the relationship between manufacturers, suppliers and orthodontists. Hastings most probably imported the components of the *Angle System*. It can be inferred, therefore, that he kept up-to-date with regard to the scientific development of his profession.

In the session held on March 5th, 1890, Antonio Gonçalves Pereira da Silva (1851–1916) (Fig. 1) discussed with colleagues at the Institute of Dentists of Rio de Janeiro the treatment of a patient with a cleft palate.³

Pereira da Silva was an *approved dentist*, which means he had no formal education. He underwent the certification test applied by the Faculty of Medicine in 1870. Despite being considered a barrier to charlatanism, this exam added little to the development of dentistry. The examining boards were composed of physicians, who knew only the rudiments of the practice of dentistry. However, in

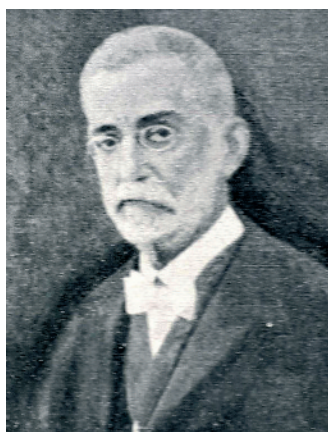


Fig.1. Antonio Gonçalves Pereira da Silva. First Brazilian prosthesis's professor



Fig. 2. Rio de Janeiro Medical School. Part of the medical clinics was housed in the Santa Casa da Misericórdia (Holy House of Mercy, in the first plan) and in the Military Hospital (on the hill) around 1884. The Dental Course was housed in the building on the right, along with the library and other laboratories.

the decree that created the exam (n. 1764, of May 14th, 1856) appears the first official mention of orthodontics in Brazil. Article five charged the candidates to know the means of making the appliances used in *dental orthopedics*.¹⁷

In 1896 Pereira da Silva was approved in a contest as a prosthesis trainer in the Dentistry Course attached to the Rio de Janeiro Medical School (Fig 2) where he would serve as a teacher.¹⁸

At that time orthodontics was a sub-specialty of prosthetics. Orthodontics academic content was taught side-by-side with those of the fixed, removable and oral-maxillofacial prostheses,¹⁹ because the devices used in both specialties were made in the same laboratory. Therefore, it can be assumed that from 1896 the subjects pertaining to orthodontics began to be taught in the Dentistry Course, mainly focusing on the manufacture of some types of appliances. Most likely it was not an easy job, as there was no orthodontic literature published in Portuguese. It is not known, however, if Pereira da Silva practiced orthodontics in his dental office, as there is a lack of information in his biography.

Final considerations

Louis Burdell performed orthodontic procedures in Brazil in the first half of the 19th century. However, it is possible that he was not the only one. Guertin and other compatriots were practicing in Rio de Janeiro at the time. The very term *dental orthopedics*, used in the decree of 1856, refers to French dentistry. It was coined in 1839 by Pierre-Joachim Lefoulon to define the "science that deals

with deformities that can affect teeth".²⁰ The precariousness of the records, in this case, seems to be the main obstacle to fully clarify the pertinent historical facts.

At the end of the century Edward Angle's influence on Brazilian orthodontics began to be felt. Hastings used the *Angle System* to treat a case of malocclusion. Professor Pereira da Silva, being his contemporary, taught classes to the students of the Dentistry Course, attached to the Rio de Janeiro Medical School. As orthodontics was considered a sub-specialty of the prosthetics, it is likely that he taught the technique of making some orthodontic appliances.

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My First Dental Histology and Anthropology Conference in 1966 and lifelong colleagues

Barry K B Berkovitz

Abstract: This paper describes the participants and the scientific programme for the Second International Symposium on Dental Anatomy held at Royal Holloway College in 1966. It represented the author's first scientific meeting. It coincided with the beginning of a golden age of scientific research in British Dental Schools. The attendees represented established figures in the dental community and a number of young researches at the outset of their careers. A number of the latter, with whom the author later collaborated with, made major contributions to scientific research, some still being active 55 years later.

Keywords: Second International Symposium on Dental Anatomy, Dr Albert Dahlberg, Royal Holloway

The consequences of a conference

A group photograph at a conference has been common practice for many years. The photograph can be an interesting historical artefact, particularly when important people are included in them. It freezes one particular moment in time and allows you to see what the participants looked like. Take the image in Fig. 1 for example.

It is a group of physicists at a meeting in Solvay, Bruxelles in 1927. This was the fifth and most famous Solvay Conference meeting to discuss the

newly formulated quantum theory. It is of interest to me for two main reasons. Firstly, the scientists were the most important in their field and, although I have little knowledge of advanced physics, I am aware that 17 of the 29 attendees were or became Nobel Prize winners, including Einstein, Curie, Dirak, Heisenberg, Bragg, Planck, Lorentz and Bohr. Secondly, many delegates subsequently participated in the Manhattan project to develop the atomic bomb used to end the Second World War against Japan. This possibly saved my father's life as he was still fighting in that theatre of war (on the side of the allies).

Fig. 1. A conference of physicists.



SOLVAY CONFERENCE 1927

A. PICARD	E. HENRIOT	P. EHRENFEST	Ed. HERSEN	Th. DE DONDER	E. SCHRÖDINGER	E. VERSCHAFFELT	W. PAULI	W. HEISENBERG	R.H. FOWLER	L. BRILLOUIN
P. DESYRE	M. KNUDSEN	W.L. BRAGG	H.A. KRAMERS	P.A.M. DIRAC	A.H. COMPTON	L. DE BROGLIE	M. BORN	N. BOHR		
I. LANGMUIR	M. PLANCK	ANNE CURIE	H.A. LORENTZ	A. EINSTEIN	P. LANGEVIN	C.E. GUYE	C.T.R. WILSON	O.W. RICHARDSON		

Absents: Sir W.H. BRAGG, H. DESLANDRES et E. VAN AUDEL

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Fori Farg



Fig. 2. Participants of Dental Anthropology and Evolution Conference, 1966.

1. John Brown. 3. Karen M Hiiemae. 4. Kenneth A Joysey. 6. C Howard Tonge. 7. William J Moore. 8. Christopher LB Lavelle. 10. Barry KB Berkovitz. 13. David Beynon. 14. David FG Poole. 15. Alfred W Crompton. 17. William A Miller. 18. Edward J Kollar. 19. Alan Boyde. 21. JRE Mills 22. Maurice V Stack. 25. Elwyn L Simons. 26. Albert A Dahlberg. 28. Dorothy A Lunt. 29. Sheila J Jones. 30. AEW Miles. 32. Moya M Smith. 36. Percy M Butler. 37. Francis R Parrington. 38. Shirley Glasstone Hughes. 40. Donald C Johansen.

discovered nerve growth factor.

For those interested in the history of dentistry, the photo shows a group of people who made important contributions to research and teaching in dental histology. As many had careers extending over decades,

I spent most of my working life as a dental histologist. I also have a group photo taken at a conference (Fig. 2).

It captures a moment in time when a number of scientists interested in dental histology and anthropology came together for a conference in 1966. Obviously, this group cannot compare in scientific importance with that of Fig. 1. Working on advancing knowledge in the field of dentistry is unlikely to win a Nobel Prize, yet one Nobel Prize had a dental association¹. This was the 1986 Nobel Prize for Medicine or Physiology, when Stanley Cohen injected a protein into rats that caused precocious eye opening and incisor eruption. He named the protein epidermal growth factor and shared the Prize with Rita Levi-Montalcini, who

they taught thousands of dentists, who treated millions of patients. So, their influence could be thought to have had some significance.

This was my first conference. As with typical conferences, it consisted of established, older, research workers and some younger scientists just starting their careers. It is now 54 years later. Many are no longer alive and research papers of that period are seldom quoted in the literature nowadays, despite their quality. Few today would even recognise these people. As I was there and can still identify many of them, I feel it my historical duty to provide a brief record of the event and the people, and also to indicate how far they rose professionally and how I interrelated with some of them.



Fig. 3. Founders Building, Royal Holloway College. Courtesy Wikipedia.

Royal Holloway College

The conference in the summer of 1966 was entitled *Dental Anthropology and Evolution* and was held at Royal Holloway College (RHC) in Egham, Surrey. RHC was founded in 1879 by Thomas Holloway, a Victorian entrepreneur. Not sure how best to spend a quarter of a million pounds, he opened a public debate. His wife Jane suggested he should build a college especially for women. He eventually increased that sum of money to half a million pounds. The building, inspired by the Chateau de Chambord in the Loire Valley in France (Fig. 3), was called by Sir Nikolaus Pevsner "the most ebullient Victorian building in the Home Counties".

It was officially opened in 1886 by Queen Victoria, who permitted the College to use 'Royal' in its name. October 1887 saw the first 28 women arrive. Male postgraduate students arrived after World War II, followed by undergraduates twenty years later.

After graduating from the Royal Dental Hospital in 1962, I undertook postgraduate research at RHC until 1966, initially part-time at my own expense and then full-time with an MRC Junior Fellowship. My research on tooth development in marsupials was undertaken in the Department of Zoology under Percy Butler. During my time there, I obtained an MSc via a research thesis in 1965.

My first year at RHC was spent in the large, triangular-shaped, partitioned attic in the roof of the main building. In the winter, it was very cold and unheated (apart from a one-bar electric fire). After the first year, the Zoology Department was relocated to a nearby, large, private mansion named

Alderhurst, with beautiful gardens and a large fish pond. The best part of the day during the summer was an (extended!) tea break by the pond, with cakes provided from a local bakery, although I never worked out who paid for them. The early arrivals had the added choice of a limited number of jam doughnuts, so a strategy was required to get a doughnut without seeming to arrive too early. Life was leisurely and, knowing no better, I thought all academic life was like this. I was rudely awakened on subsequently arriving at my first academic post in the busy research institution that comprised the Anatomy Department at Bristol Medical School.

During my stay at RHC I was isolated in my dental research, but received help and advice from Alwyn Gaunt, who had a laboratory nearby and was an external fellow of the Medical Research Council. His studies on tooth development via serial sectioning and three-dimensional reconstruction are classic but rarely quoted today. He moved to Guy's soon after I arrived, but sadly died relatively young at about the age of 50.

A valuable lesson I learned early on while studying at RHC concerned a visit to our department by the legendary American, Alfred Sherwood Romer. He was a world renowned palaeontologist from Harvard. One of his major textbooks was *Vertebrate Palaeontology*². In preparation for his visit, we were all instructed to prepare a demonstration board of our research. I, like my colleague with whom I shared a room, Derek Yalden, spent considerable time and effort in preparing my demonstration. When the great day arrived, Professor Butler brought Romer into our room. Professor Romer was relatively short with crewcut grey hair, a smile on his face and wearing a red bow tie. He was introduced to Derek Yalden and listened intently for about an hour to his research, which was on the comparative anatomy of the vertebrate forelimb, questioning him now and then. When the discussion was finally terminated, Professor Butler introduced me to the great Romer and informed him that I was researching tooth development in marsupials. Romer muttered "mmm", turned away and exited the room without further comment. Needless to say, I was bitterly disappointed, considering the time and effort I had invested in preparing my demonstration. Later that evening I went over the day's event in my mind and concluded that, as with Romer, my work might not be of interest to anyone else but myself. From that



Fig. 4. Professor Butler's centenary, with Dr BKB Berkovitz, in 2013

moment on, I came to accept the fact that it didn't matter to me if, in the future, I gave a talk at a research meeting and few, if any, attended or, if I had a poster demonstration, hardly anyone visited. As long as my research interested me, that's all that mattered.

My first conference

Just before leaving for Bristol, I discovered that a research meeting was being held at RHC later that year in September, 1966. I registered for the conference. Aged twenty-seven, this was to be my first scientific meeting. As yet, I had not published any research so I would be unknown. To remind me of the scientific papers presented at the conference, I was recently able to purchase a copy of the book of the conference proceedings. The book was published five years after the conference, in 1971, and I bought it on eBay at a cost of £77.81, which I will regard as tax deductible as a legitimate expense³. The papers had been updated to cover



Fig. 5. AEW Miles at Plymouth, 1969. Courtesy RP Shellis.

scientific developments between the conference and publication of the book, so references to 1966-1970 can be found. In the preface to this book it is stated on two occasions that the conference took place in 1968, rather than the true date of 1966. By an amazing coincidence, the book I purchased in July 2020 had the signature "WE Miller 1971" written on the front page. He had been a participant at the conference (see below). Even more amazingly, hidden within its pages it also contained on three separate type-written pages the full program of the Fifth International Symposium on Dental Morphology held in Turku, Finland on August 13-15, 1979. The following five people who attended my first conference also gave talks at this conference 13 years later: Kollar EJ, Butler PM, Dahlberg AA, Hiiemae K, and Crompton AW.

I only knew two people attending the conference, namely, Butler and Miles. However, during my subsequent career, I came to interact with many of the attendees. They represented important teachers and researchers who advanced the science of dental histology and anthropology in the following decades. Some I interacted with only slightly, others I formed strong associations and friendships that lasted for decades. Below I identify 25 people who appear in the photograph of my first conference. The numbers in brackets following their names relates to their identification number in Fig. 2.

Percy M Butler (36)

Butler was Professor of Zoology at RHC and my supervisor during my stay there. He was a major figure in the world of palaeomammalogy, with expertise in cusp nomenclature and function, mastication and evolution. He seemed to know every paper that was ever written on comparative dental anatomy. He wrote a very influential review on tooth development in 1956⁴ that I remember referring to constantly. In it, he proposed his "*field theory*" to account for the differences in tooth shape along the dentition, suggesting that dental characters are expressed, not separately on each individual tooth, but in morphogenetic gradients along the dentition. This provided a stimulus to research on morphogenesis. Modern developments in genetics, transcription and growth factors have continued to throw light on this basic problem. On a personal note, I remember once hearing his wife say that she wanted him to retire and work less hard. This wish was granted when he retired at 60 in 1973. Tragically, his wife died almost immediately

afterwards, while Butler lived for another 40 years, dying in 2015 at the age of 102. After his retirement from RHC, he carried out much research while based at the Natural History Museum. Butler was scientifically active right up until the end, even leaving two papers in press at his death!

I went to his centenary celebrations in 2013 (Fig. 4) and presented him with a copy of one of my own books, with a suitable dedication, indicating how much I owed him.

Unfortunately, he had no recollection of me (which seems to be par for the course!). Whilst there, I was reunited with Derek Yalden, with whom I shared a room at RHC and whom I hadn't seen since leaving 47 years previously. He hadn't changed at all, still tall, youthful and red-cheeked. He had an illustrious career as a mammologist at Manchester University. Sadly, he died very shortly after Butler's centenary celebrations, aged 72.

Albert EW ('Loma') Miles (30)

Miles, who was called Loma as the result of being the only student in his class able to identify a myeloma in a pathology exam, was a polymath based at the London Hospital Dental School in Oral Pathology (Fig. 5).

He had a deep interest in dental histology and archaeology, and edited one of the classic histology books that I still proudly possess: *The Structure and Chemical Organisation of the Teeth*, in two volumes⁵. Of very high quality, it can still be read today with advantage. It included a chapter by WA Gaunt on tooth development. Miles held a very influential position as the long term editor of *Archives of Oral Biology*. He built up this research journal to have high professional standing. He encouraged a multidisciplinary approach to research and recruited to the London Hospital young scientists from disciplines such as zoology, physics and genetics. Two were zoologists who made significant contributions to dental histology, namely Moya M Smith (who actually attended this conference as a young graduate student - see later) and Peter Shellis. My close interactions with these two scientists span the decades.

Miles was the Honorary Curator of the Odontological Collection in the Hunterian Museum at the Royal College of Surgeons of England (RCS) and did an enormous amount of work to maintain its reputation. Unfortunately, this internationally-

recognised collection of dental specimens and artefacts was, for a period, under threat of closure and its salvation was in no small part due to Miles' efforts. As Honorary Curator, he published with the Curator, Caroline Grigson, the encyclopaedic *Colyer's Variations and Diseases of the Teeth of animals* in 1990⁶. When Miles retired as Honorary Curator in 1989, I was honoured to be invited to succeed him, having just moved from Bristol to King's College London. I duly noted that there had only been two curators since 1900, namely Sir Frank Colyer and Professor Loma Miles. As the position seemed to offer a guarantee of long life, I hurriedly accepted the offer and have been in office for 31 years. As Hon. Curator this enabled me to publish two books with my co-author Peter Shellis on the teeth of vertebrates, based heavily on skulls within the Collection^{7,8}.

Miles was very interested in dental anthropology and developed a system for ageing human skeletons based on the degree of wear in molar teeth, known as the Miles System. He had a long term commitment to excavating ancient burial sites, including the island of Ensay in the Outer Hebrides and was active virtually into his 90's.

I owe a personal and professional debt to Miles. In 1965, Butler informed me suddenly that he would be off the next week to spend a year's sabbatical in America. This was for the whole of my final year and I was left more or less to my own devices. However, he arranged for Miles to keep an eye on me, which indeed he did. Miles encouraged me to visit the London Hospital Dental School and see how Dental Anatomy was taught. This allowed me to meet Ron Fearnhead and a young assistant Alan Boyde. Watching Fearnhead give a lecture had a profound effect on me. He would come into the class, slowly roll tobacco from a solid silver case



Fig. 6. E Kollar (left) and BKB Berkovitz (right) in Connecticut, 1983.



Fig. 7. CLB Lavelle at 1971 conference in Brussels. Ignoring the two persons in front and back row, from left to right: WE Miller, S Glasstone Hughes, CLV Lavelle, BKB Berkovitz.

into a cigarette, which he then proceeded to smoke, while holding the class spellbound by his presentation and knowledge, and without any notes. This was something I have always tried to emulate during my own career (although minus the cigarette).

Miles was also very encouraging to young scientists by inviting them to submit papers to his *Archives of Oral Biology*. Having been on my own, I was unaware that one was expected to submit papers of one's research for publication. Miles invited me to submit my first paper to his journal in 1966⁹, which he accepted for publication, despite the fact that it now seems to be pretty heavy going. He died aged 95 in 2008.

Albert A Dahlberg (26)

Dahlberg was the main organiser of the symposium and editor of the book of the Proceedings. He can be considered a founding father of dental anthropology. Based at the University of Chicago, he established a collection of dentitions representing the major geographical distributions of human dentitions and trained postgraduate students from all over the world. Of his numerous publications, a number are regarded as cornerstones for research in dental anthropology^{10,11}. Dahlberg died in 1993 aged 85.

Edward J Kollar (18)

Kollar was a young postgraduate scientist from Chicago, later moving to Connecticut. While having little memory of any other session, I clearly remember his talk on tooth development and what factors controlled morphogenesis. It was the first occasion that I became fully aware of the concept



Fig. 8. Tooth morphology prize award ceremony at Kings College London. 2019. From left-right: MM Smith, M Curtis (Dean), Ms S Said (winning student), BKB Berkovitz.

of epithelial/mesenchymal interactions during tooth development and tissue culture of tooth germs. The session was mediated by Shirley Glastone Hughes, a founding figure in the subject. Kollar gave a most impressive account of his studies in which he separated the enamel organ and dental papilla of mouse molar tooth germs and recombined them with other combinations from non-dental tissues. He showed that it was the dental mesenchyme that was the prime inducer at the cap stage of tooth development. It was most powerful and elegant work.

Following his return to America, Kollar's career thrived and he produced a number of classic papers on epithelial/mesenchymal interactions¹². He provided us with images of his work for our *Oral Anatomy* textbook³². Such tissue culture work continues today. At King's College Dental School, Paul Sharp is using tissue engineering principles to attempt to organ culture a human tooth for clinical use, the holy grail for dentistry. I was fortunate in meeting Kollar at further conferences. He was a pleasure to be with and had a great sense of humour (Fig.6).

William J Moore (7) and Christopher LB Lavelle (8)

These two academics had also recently started their academic careers, Moore at the Anatomy Department at Leeds and Lavelle in Oral Pathology at Birmingham. They subsequently wrote numerous important joint and separate research articles and books on a wide range of dental anthropological topic^{13,14}.

I later met Lavelle at a number of conferences (Fig. 7) before he moved to the University of



Fig. 9. DFG Poole (left) and RP Shellis (right). 1990.

Manitoba. He invited me to write my first book chapter on tooth eruption for his book *Applied Physiology of the Mouth*¹⁵.

Moya M Smith (32)

Smith was also attending her first conference. We already had things in common. She had recently obtained a BSc in Zoology at RHC and had developed an interest in teeth through the influence of Percy Butler. Smith was entering her final year as a PhD student with Loma Miles, studying mineralised tissue formation in amphibians¹⁶. I remember having seen her once previously when she visited Gaunt's laboratory at RHC. Our paths were to cross many times during the next 50+ years. Smith spent her career in London, teaching at King's, The Royal Dental and Guy's. We met again when I moved to London from Bristol to King's in 1987. Finally, we became colleagues in 1998 following the merger of the United Medical and Dental Schools of Guy's and St Thomas's Hospitals with King's College London. Having been on the wrong side of the tracks throughout my birth and career, I thought I would now finally be able to join the elite and call myself a 'Guy's man'. My hopes were dashed when the merged institute was renamed King's College London. About 30 years after we first met, Smith and I ended up teaching together. There is now an annual prize awarded to the best student on the tooth morphology course at King's: the Barry Berkovitz-Moya Smith Prize (Fig. 8).

Since my first conference, Smith has become a world authority on Chondrichthyes (sharks and rays) and lung fishes and all matters concerned with the evolution of these vertebrate dentitions. I contributed a chapter to a book that she edited¹⁷.

However, the collaboration I am most proud of was being a co-author of an important scientific paper on tooth development in 2006, 40 years after the conference¹⁸.

While some of us 80-year olds are in our dotage, Smith still has the energy and the neurones to be scientifically active today, collaborating with research staff at the Natural History Museum.

David FG Poole (14)

Poole was a zoologist and a leading member of the Medical Research Council's unit at Bristol Dental School, headed by Arthur I Darling. There were only a handful of MRC Units in Dentistry (another being in Leeds). The Bristol Unit was engaged primarily in studying mineralised tissue and dental caries. In addition to permanent staff, many important figures in dental research obtained postgraduate training there, including Leon Silverstone, Newell Johnson, Hubert N Newman, Philip Sloan and Keith Mortimer. I considered myself incredibly fortunate in having this MRC unit near my Anatomy Department in Bristol. Not only could I call upon them to lecture to my students, but my association with them greatly increased my own knowledge of dental anatomy.

Poole was very knowledgeable on all aspects of mineralised tissues. In addition to humans, he had a deep interest in comparative dental anatomy. This was reflected in his paper given at the conference entitled 'An introduction to the phylogeny of calcified tissues'. Amongst many, he wrote two important papers on the teeth of crocodiles and lizards that I referred to frequently in my own research (19-20). Through his scientific pre-eminence and the great respect shown towards him, he became President of the British Society for Dental Research (BSDR) in 1983.

It was my good fortune to form a friendship with Poole during my 21 years at Bristol. I contributed a paper to a book he edited²¹ and had the pleasure of writing a research paper with him²². I have encountered many people during my academic life but, every now and then, one stands out whose manner, generosity and goodness have made the world a better place. David Poole was certainly one of these (Fig. 9). He died in 2005 aged 77.

Maurice V Stack (22)

Stack was another long-serving stalwart of the



Fig. 10. Judges of poster competition, Newcastle 2013. From left: BKB Berkovitz, RP Shellis, D Beynon

MRC Unit in Bristol. He was a chemist who provided much of the early information about the growth of the primary dentition²³ and the nature of the organic matrix of enamel. In my capacity as Honorary Curator of the Odontological Collection of the RCS, I was pleasantly surprised to learn that our Museum held his important collection of developing human teeth, which he kindly donated. It is still being utilised in scientific research²⁴.

Before leaving the topic of the Bristol MRC Dental Research Unit, I must mention Peter Shellis. Like Smith, he was also a PhD student of Miles at the London Hospital. Shellis then became a permanent staff member of the Bristol MRC Unit. While in Bristol, I wrote seven papers with him, the last being when I left in 1987. When I retired, we worked very closely together for six years (2013-2018) to produce two comparative dental anatomy books describing the dentitions of all vertebrates^{7,8} (Fig. 9).

Karen M Hiiemae (3)

Hiiemae had recently qualified at my alma mater, The Royal Dental Hospital. She already had a PhD and was amongst the first to develop cine-radiography to study the movements of the jaws and mandibular joints in living mammals. At the conference, she presented a joint paper with AW Crompton using this technique to study feeding in the American Opossum. This was one of many influential papers that she produced while studying mastication, swallowing and dysphagia²⁵. Hiiemae continued her work at Guy's Hospital Medical School from 1969-1978 before moving to the College of Dentistry at the University of Illinois at Chicago. Here, in addition to her important

research, she was one of very few women who were appointed to major university research and administrative positions at the time, with great success. Her efforts improved the opportunities for women in science. Hiiemae died in 2007 aged 66.

C Howard Tonge (6)

Tonge was Head of Oral Anatomy at Newcastle. He qualified in Medicine at Durham in 1938 but, after the war, he turned to dentistry, qualifying BDS in 1947. His main research interests were associated with early tooth development. My research relationship with him occurred in a major textbook of dental anatomy where he provided the first chapter on "Tooth development" and I wrote the second chapter with BJ Moxham entitled "Tissue changes during tooth eruption"²⁶. Coincidentally, Alan Boyde (see later) also contributed a comprehensive chapter on "Enamel" to the same textbook. Tonge was on a number of important committees and was President of the International Association for Dental Research (IADR) in 1969. Tonge died in 1992 aged 76.

David Beynon (13)

Like me, Beynon was a young academic just starting out on his career, which was spent in the Department of Oral Biology in Newcastle, initially under Tonge. His interests were in the fields of dental histology, dental anthropology and evolution. He presented a paper at the conference entitled "The dentition of the Afghan Tajik".

As the extended period of infancy is a crucial feature associated with the evolution of the human species (compared to the much shorter period in non-human primates), a method had to be obtained for determining the age of a fossil dentition. With his research into incremental lines in dental tissues, Beynon produced some seminal papers providing a solution to this question.

By careful study and quantification of incremental lines, this method has been widely employed in contributing to our understanding of the evolution of man²⁷.

I met Beynon on a number of occasions over the years, particularly at the annual research meetings of the IADR and BSDR. Like others at my first conference, he provided material for our Oral Histology textbook. More recently, in 2013, I was invited, together with Peter Shellis and David

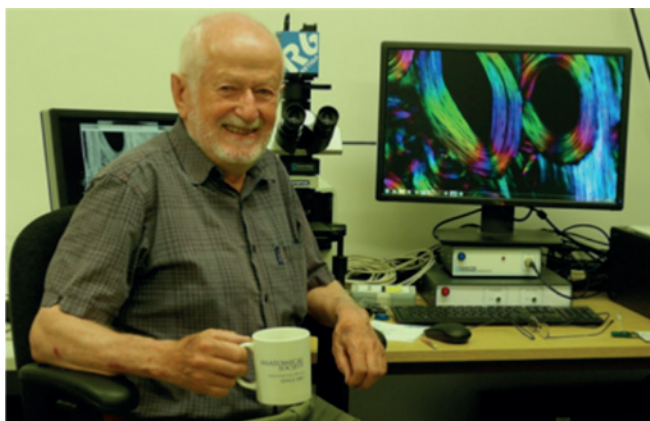


Fig. 11. A recent image of A Boyde in his laboratory at Queen Mary University of London.

Beynon, to be one of three adjudicators for the poster prize at the annual conference on Dental Anthropology at Newcastle (Fig. 10).

I can still hear the groans of the attendees who clearly didn't agree with our choice of winner of the prize!

Shirley Glasstone Hughes (38)

Glasstone Hughes ran a dental practice in Cambridge while combining it with innovative academic research. Her most important scientific contributions were made in the field of tissue culture. As early as 1936, she was one of the first to report success in culturing tooth germs²⁸. She earned her PhD from Cambridge in 1956 when aged 52. One of her important findings in the field of dental morphogenesis was to demonstrate that when a rabbit molar is bisected before cusps are present, each half can develop into a whole tooth. However, when divided at a later stage only partial teeth

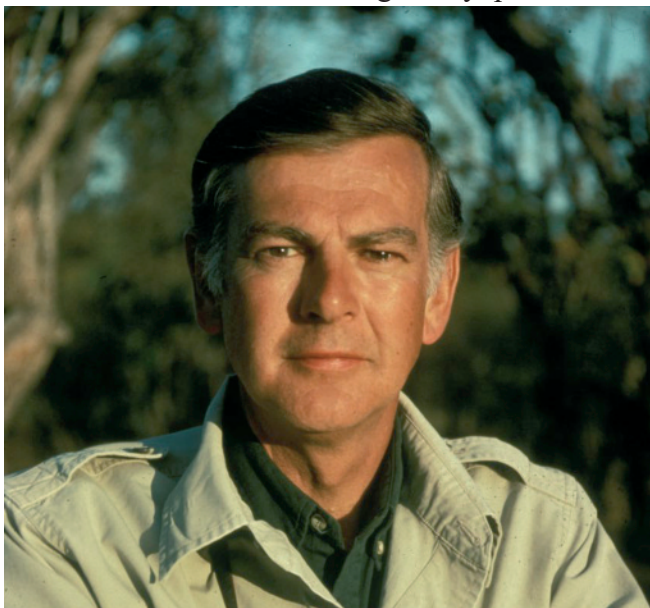


Fig. 12. Donald Johansen. Courtesy Wikipedia. Received in 2006

develop²⁹. I met her again at a conference in 1971 (Fig. 5). She died in 1990 aged 88.

Alan Boyde (19)

I had briefly met Boyde while gaining some experience teaching Dental Anatomy at the London Hospital. Another young dental postgraduate starting out on his academic career, he had already progressed enough to present a wide-ranging paper at the conference entitled "Comparative histology of mammalian teeth". This included many scanning electron micrographs of the enamel of different mammals.

He was to become a major figure in developing and refining this new technique and used it for all mineralised tissues. In addition to the dental tissues, he was to make many important observations on bone biology, remodelling and osteoporosis. He moved from the London Hospital to spend a major part of his career in the Anatomy Department at University College London (Fig. 11).

The closest I came to interacting with him academically was that I wrote a chapter on 'Tissue changes in tooth eruption' in the same book where he wrote one on 'Enamel'³⁰.

In 2018, Boyde attended the launch of our book "The teeth of mammalian vertebrates", which was 52 years after my first conference.

Sheila J Jones (29)

Jones was also just starting out in academic life. She joined Boyde at UCL. Jones contributed many major papers on mineralised tissues, especially bone³¹. The combination of Boyde and Jones, later joined by Christopher Dean and Timothy Arnett, formed a most important centre for mineralised tissue research. They all generously provided material and advice for our *Oral Anatomy* textbook.

Kenneth A Joysey (4)

Joysey was a stalwart of the field of dental anthropology and evolution. He held the important and influential position of Director of the Museum of Zoology at Cambridge from 1970-1995. He also was involved in studying molecular evolution. He died in 2012 aged 84.

Elwyn L Simons (25)

Simons is regarded as the father of primate

palaeontology. He spent his academic career first at Yale and then at Duke University, where he was in charge of the Primate Centre. He built this up to house up to 250 lemurs, representing more than 20 species. He produced over 300 publications and undertook expeditions throughout the world. One of his most important finds was the skull of a stem catarrhine, about 30 million years old, that predated the divergence between apes and old-world monkeys. This fossil is known as *Aegyptopithecus zeuxis*. At the very time of the conference, Simons was actually studying the fossil, which was first reported the following year in 1967³². My tenuous connection with Simons was that, in the first edition of our *Oral Anatomy* textbook in 1978, when we had a large chapter on the evolution of man, we had an illustration of the said specimen. Simons died in 2016 aged 85.

Donald C Johansen (40)

Johansen was probably the youngest person and least qualified at the meeting, having only just graduated with a bachelor's degree from the University of Illinois. He obtained his PhD from Chicago in 1974. His career was to change that year when, on November 24, 1974, excavating in the Hadar region of Ethiopia, he discovered the almost complete skeleton of a small fossil hominid. At the time, a radio was playing a Beatles song, so the fossil was nicknamed "Lucy". The rest, as they say, is history (Fig. 12). Lucy represented a new species of australopithecine called *Australopithecus afarensis*. The completeness of the skeleton confirmed that Lucy was bipedal, but with a small brain³³.

Johansen and his team subsequently founded the Institute of Human Origins in 1981, a non-profit, multidisciplinary research organization dedicated to the recovery and analysis of the fossil evidence for human evolution. In the second edition of our *Oral Anatomy* textbook in 2002, we referred to Lucy in the chapter on the evolution of man.

Francis R Parrington (37)

Parrington was one of our most eminent palaeontologists. Qualifying in Cambridge in 1927, he was appointed to a junior position in the Museum of Zoology, eventually becoming Director. He was influential in training a number of young palaeontologists who later achieved eminence, such as AW Crompton. Among his particular interests were fossil fish, amphibians and mammal-like

reptiles. One of his many papers that I remember reading was entitled "The dentitions of the earliest mammals"³⁴. He was awarded an FRS in 1962. He retired from the Museum in 1970 and died in 1981 aged 76.

Alfred W Crompton (15)

Crompton came to England from South Africa in 1952 and became one of Parrington's most eminent PhD students. He subsequently moved to Harvard where he became director of the Museum of Comparative Zoology. Here, he set up a formidable research group that, like Parrington, trained the next generation of influential palaeontologists. His most important contributions lay in his research on synapsids, many with a dental focus³⁵. He was also associated with Hiimae in studying the mechanics of mastication in living mammals and co-authored their joint presentation at the conference.

Dorothy A Lunt (28)

Lunt qualified at Glasgow Dental School in 1953 and spent her life there teaching and undertaking research primarily in dental anthropology. Among her topics of interest were the dentition of medieval Danes and early Scottish populations³⁶. We met intermittently at conferences but I was delighted to meet up with her again more recently in 2014 when I was invited to lecture to the Henry Noble History of Dentistry Research group.

William A Miller (17)

Miller was from the Oral Pathology Department, Birmingham University, who subsequently moved to New York. He presented a paper on the early dental development in mice at the conference. My research interest in tooth replacement in non-mammalian vertebrates was shared by Miller³⁷. I met him at a later conference (Fig.7) and he kindly hosted me when I visited New York a few years later.

John RE Mills (21)

Mills was an orthodontist at the Eastman Dental Hospital, with wide research interests in skull growth, dental occlusion, dental malocclusion. and mastication³⁸. He also produced papers on dental evolution in mammals. He died in 1995.

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William D Turnbull

Turnbull was unqualified when, after war service, he became employed at the Field Museum in Chicago. He obtained his Ph.D. in palaeozoology and rose to become its Curator of fossil mammals in 1973. He officially retired in 1987 but continued working until shortly before his death in 2011 at the age of 89. His wide-ranging interest concerned the evolution of mammals as indicated by the title of the paper he presented at the conference, namely "The trinity therians: their bearing on evolution in marsupials and other therians". A species of marsupial in the Thylacinidae family, was named as *Badjcinus turnbulli* in honour of his contributions to Australian palaeontology³⁹.

John Brown (1)

John Brown was a lecturer in Butler's Department of Zoology at RHC during my three years of full-time study.

The titles of papers read at the conference are indicated in Table. 13.

After the Conference

In looking back on the experiences at my first research conference in 1966, I met about 20 people with whom I subsequently interacted during my career, either directly or indirectly (Fig 13). The lasting impression the meeting made on me was to

Fig. 13. The scientific program for my first conference.

indicate the quality of work that I needed to aim for if I was to establish a career for myself in academic life. I spent 40 years teaching dental students gross anatomy and dental histology, first at Bristol and later at King's College London. In both Universities, I was a member of the Anatomy Department. At Bristol, I taught alone for the first six years before being joined by another dental graduate, one of my original students, Bernard Moxham, with whom I have collaborated for over 40 years. At King's, I was the only dentally-qualified member of staff during my 20 year stay. In order to keep the flag flying for dentistry (as compared with the non-medically qualified scientists comprising the majority of staff), I felt I had to maintain as high a standard for teaching and research as I could, fostered on me by those attending my first conference.

Of possible relevance in this cause was my publishing a number of books associated with both teaching and research, one of which was our textbook *Oral Anatomy, histology & embryology* (Berkovitz, Holland and Moxham), whose first edition was published in 1978, the 5th edition being published in 2018³². To be able to lecture authoritatively on all aspects of anatomy and dental anatomy, and to keep our textbook up-to-date, it was essential to keep up with my own research and other dental research literature at all times. Because of this necessity, I continued to follow the research of a number of people, including those who participated in my first conference. This enabled me to develop friendships with some of them that still exist today. Some generously provided advice and illustrations that appear in our textbook while,

with others, I was privileged to be a co-author on scientific papers. Although I sometimes considered myself as having been fairly isolated in my career, in going over my list of publications in writing this paper, I was pleasantly (and totally) surprised to find the names of 80 different people with whom I have written papers. No man is an island.

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Dr Barry K. B. Berkovitz (BDS, MSc, PhD, FDSRCS, LDSRCS) qualified at the Royal Dental Hospital of London in 1962. He spent 3 years as a Junior Medical Research Fellow at Royal Holloway College before moving to the Anatomy Department at Bristol University where he taught Anatomy and Dental Histology from 1966-1987. He moved to the Anatomy Department at King's College London from 1987 until his retirement in 2005. He has been the Honorary Curator of the Odontological Collection at the Royal College of Surgeons of England since 1988, through which he has gained an appreciation of dental history. This is reflected in his book "Nothing but the tooth" Elsevier, 2013. His most recent books are "The teeth on non-mammalian vertebrates", 2017, and "The teeth of mammalian vertebrates", 2018, written with RP Shellis, and "Oral anatomy, histology and embryology", 5th Ed, 2017, written with RG Holland and BMJ. Moxham.

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Moves to establish orthodontic therapists in the UK 1967- 2008

Chris Kettler, Chris Stephens and Sophie Riches

Abstract: Planck's Principle,¹ often paraphrased as "Science progresses one funeral at a time", would seem to apply equally to dentistry where most major changes have taken a generation to achieve. Thus, the proposal that there be a Dentists Register took from 1871-1921 to accomplish,^{2,3} and establishing a self-regulating Dental Council, as distinct from a Dental Board of the General Medical Council, took another 30 years to bring about.⁴ The same generational timescale applies to the introduction of orthodontic therapists in the UK which was first sought in 1967.

Key Words: British Orthodontic Society, Orthodontic auxiliaries, Therapists, Training

Background

The Dentists Act of 1921, limited the practise of dentistry to those on the Dentists Register of the General Medical Council which after 1923 was restricted to those who held a recognised dental qualification. The Dentists Act of 1957 empowered the newly created General Dental Council (GDC) to introduce dental hygienists and, following the successful experimental scheme for the training of dental auxiliaries, the GDC's Rolls for Dental Hygienists and Dental Auxiliaries were established.

By the early 1960s the rapid increase in demand for NHS orthodontic treatment and the relatively small number of specialist practitioners, had led to 2-3 year orthodontic waiting lists at most UK Regional Hospitals.⁵ In October 1967 Gordon Dickson, the consultant orthodontist at Portsmouth and the then Chairman of the Consultant Orthodontists Group (COG), acting on a request made at the Group's Annual meeting, sent a questionnaire to all its members seeking their opinion on the desirability of the use of orthodontic auxiliaries to assist the Hospital Service. In the light of the overwhelming support he received and the high level of agreement in the procedures members thought such auxiliaries should be permitted to undertake, he wrote to the GDC urging them to consider their introduction. Inexplicably, no reply was ever received.

By this time, it was widely believed that a small number of orthodontic specialists working in the General Dental Services (GDS) using their dental nurses illegally to fit headgear and a few were using them to take impressions. This put the GDS dental nurse in a very difficult position.

In 1970 a new report proposing the employment of orthodontic auxiliaries was again submitted by the COG to the GDC, the BDA and the Central Committee for Hospital Dental Services.⁶ While

Orthodontic Department,
Royal Portsmouth Hospital,
Commercial Road,
Portsmouth.

11th October, 1967.

Dear

At the last meeting of the Consultant Orthodontists' Group it was suggested that the Committee investigate the question of the use of ancillary workers in orthodontics. At the request of the Committee I have prepared the attached questionnaire and I would be very grateful if you would complete it and return it to me at the above address as soon as possible.

I will try to collate the replies and communicate them to the Group at the earliest opportunity.

Yours sincerely,

G.C.DICKSON.

Fig. 1. The letter sent to the GDC on behalf of UK orthodontic consultants.

this generated considerable discussion no progress was made as there was still considerable opposition within some sections of the profession to any idea of "dilution".

Three years later British Society for the Study of Orthodontics (BSSO) produced its report "The Extended Role of Dental Ancillaries" which was submitted to the GDC. This report suggested the integration of three classes of ancillary dental worker: the dental hygienist, the orthodontic auxiliary, and the dental auxiliary. Detailed recommendations were included about the training of these staff but no action was taken by the GDC. Similar proposals were being made in Australia at this time,⁷ but despite this no further progress was made in the UK during the next fifteen years.

In 1976 Margaret Seward became a member of the General Dental Council. She had by this time done much to advance the cause of women in dentistry and her inaugural speech to the Council was on the subject of dental therapists. The following year she

addressed the annual meeting of the BSSO in Birmingham when she explained the various stages which would have to be gone through before the General Dental Council would agree to sanction the establishment of orthodontic auxiliaries.

The Standing Dental Advisory Committee's Expert Orthodontic Working Group

By this time concerns were being expressed in various forums over the poor standard of UK orthodontic treatment in the General Dental Services of the NHS.^{8, 9} While there were several contributory causes,¹⁰ one of the main reasons was the lack of trained UK orthodontic specialists compared with our European neighbours.¹¹ This had resulted in the over-reliance on simple removable appliances and the underuse of multibanded fixed appliances.¹² Such undertreatment was the reason for the finding in 1983 UK Survey of Children Dental Health that a significant percentage of UK 15 year olds who had received orthodontic treatment were nonetheless judged to require further treatment.¹³ The publication of the Schanshieff Report into Unnecessary Dental Treatment in 1986 brought urgency to the need to address this issue.^{14,15}

In 1989 Professor Norman Robertson, at his last meeting as a member of the Standing Dental Advisory Committee (SDAC), persuaded the Department to set up a working group to look at all aspects of the provision of orthodontic treatment in the UK and an SDAC Expert Orthodontic Working Group was established in January 1991 (Table 1). It would produce its report two years later.¹⁶ This included the recommendation that "*An experimental training programme should be established to evaluate the training needs and use of orthodontic auxiliaries on similar lines to the Experimental Dental Care project (Allred 1977)....*" (Recommendation 25) and Appendix 8 suggested the way in which this could be piloted.

However, when the report was presented to the full Standing Dental Advisory Committee in August 1992 the late Roger Anderson, Professor of Dental Public Health at the University of Birmingham and a founding father of the British Association of Community Dentistry (BASCD), lead a strong attack on the grounds that adoption of the report would take away precious NHS funds from the more essential dental needs of UK children. As a result, the SDAC Committee chaired

Table 1. The membership of the 1991 SDAC Expert Orthodontic Working Group on Orthodontics in the NHS

CHAIRMAN

Ralph Followell Dental Practitioner

MEMBERS

Mr D J Birnie, Consultant Orthodontist,

Mr D DiBiase, Consultant Orthodontist,

Mr R A Heesterman, Specialist in Community Dental Health,

Mr D B Lawton, Specialist Orthodontic Practitioner,

Mr D W Lester General Dental Practitioner

Professor N Robertson CBE, Dean of the Dental School, Cardiff

Mrs M H Seward Member, Standing Dental Advisory Committee

Mrs A Smith Policy Development Officer, National Consumer Council,

Professor C D Stephens, University of Bristol

by Professor John Murray decided that publication of the Report would be inadvisable and so it was merely received. (Despite this, 30 years later all but 3 of its recommendations have now been implemented.)

The Nuffield Enquiry into Personnel Auxiliary to Dentistry

In January 1992 a letter published in the British Dental Journal announced the setting up the Nuffield Foundation's "Enquiry into The Education and Training of Personnel Auxiliary to Dentistry". By this time, discussions which would eventually lead to the unification of the five British orthodontic societies were well advanced, and so a joint response was submitted.¹⁷ As might be expected, this contained much in common with the unpublished report of the SDAC Orthodontic Working Group, including the recommendation that a pilot training programme be set up as had been the case for the New Cross Dental Therapists in 1960. At the launch of the Nuffield Foundation's Report in September 1993, it was observed by its chairman that "*There seems to be general support for the introduction of an auxiliary to assist in the provision of orthodontic treatment*".

In February 1994 a meeting was organised by the orthodontic societies and held at the Eastman Dental Institute to discuss a possible route for the

training and deployment of orthodontic auxiliaries. Invited delegates included the panel members of the Nuffield Enquiry and representatives of the GDC, BDA and dental ancillary groups. In the course of the meeting, Jean Gorham of the GDC Secretariat described the current legislation and outlined how the Dentists Act could be amended to permit new classes of auxiliaries to operate. It was considered that, with Primary Legislation, the earliest time for orthodontic auxiliaries to be introduced would be late 1996 or 1997. However, John Galloway, secretary of the Nuffield Committee, suggested that by using secondary legislation such changes might be approved by the Privy Council as early as 1995.

A unified British Orthodontic Society

In May 1994 Margaret Seward, having just completed her year as BDA President, was elected to the Presidency of the General Dental Council. Two months later the unified British Orthodontic Society came into being chaired by David DiBiase who two years later would become an elected member of the GDC.¹⁸ Both Margaret Seward and Brian Mouatt, who had become Chief Dental Officer (CDO), for England and Wales in 1990 had long been convinced of the need for "Team Dentistry". The CDO, was acutely aware of the constraints which the 1984 Dentists Act were placing on forward-looking developments in dentistry and the long waiting lists for NHS orthodontic treatment which were the cause of more complaints to the Department than any other aspect of UK dentistry.¹⁹

On 26 July 1994 a significant meeting took place at Didcot, Oxfordshire. This was a Seminar organised by the Kings Fund and sponsored by Nuffield Foundation, the Anglia & Oxford Region, the Cordent Trust and the British Orthodontic Society. Its aim was to consider the changes and training requirements that would allow the deployment of orthodontic auxiliaries in the UK. Among the 37 delegates were representatives of the Department of Health, UK Armed Forces, the BDA, BASCD, Dental Hygienists, New Cross Dental Therapists, Dental Technicians, Dental Surgery Assistants as well as the Chairman of the Auxiliary Personnel Committee of the GDC. Among the many contributions to this meeting was a paper delivered by Dr Paul Witt of the University of British Columbia Dental School who with Marjorie Sorflett had for 10 years been running a

highly successful residential training course for orthodontic auxiliaries in this Canadian province.

In 1995, a year into her GDC Presidency, Margaret Seward was well aware that there were still a number of members on the Council who remained doubtful about the prospect of dental auxiliary nurses such as those proposed for orthodontics. In order to allay these concerns, she believed a pilot study was required, as had been the case for Dental Therapists,²⁰ yet there was no provision under the 1984 Dentists Act for such pilots to be undertaken. However, in July 1995, following the Council's Retreat which she instituted to reconsider GDC's core functions,²¹ the necessary changes to Sections 37 (1) and (2) of the Act were agreed by the Council. These allowed such pilots to be undertaken, as had been recommended by Nuffield Enquiry,²² although each would still require the prior approval of the Council.

Ways and Means

In anticipation of these changes being implemented, a meeting took place at the GDC on 28th March 1995 at which Professor Stephens of Bristol Dental School was asked by the CDO, Brian Mouatt, and the President of the GDC, Margaret Seward if the School could to run a small trial to determine the training needs of orthodontic auxiliaries in the UK for which funding would be provided by the Department of Health. The trial was to be a "pre pilot" to make it clear to all concerned that it was a not a new course, or one which required GDC approval, but an experimental module added to an existing course for dental hygienists in which the participants would be left in no doubt that this was a fact-finding exercise and not a training course. It was further agreed that the team from the University of British Columbia (UBC), whose representative, Paul Witt had so impressed the Didcot meeting, would be invited to supervise such a course at Bristol. The trainees would be the new intake to Bristol Dental Hygiene School whose entrants would attend a month earlier than usual. The UBC team of Marjorie Sorflett and Paul Witt duly flew in just before the August Bank Holiday to allow the Bristol orthodontic staff assisting them to become fully familiar with the structure and content of the course which began on September 4th 1995.

Two weeks into the Bristol course the Canadian instructors were greatly impressed with the quality



Fig. 2. The Course and Trainers of the Pre pilot study

of the Bristol trainees and the progress they had made on their typodont-based course. Paul Witt pointed out that in Canada the course would have been supplemented by work on patients. He believed that the UK dental profession would be more likely to be convinced of the appropriateness of orthodontic therapists being trained in the UK, if the pre-pilot also included a realistic assessment of the trainees' clinical skills at the end of the course. As luck would have it the British Orthodontic Conference took place in Bournemouth later that month. Since Margaret Seward lived in Bournemouth, Chris Stephens who was attending the Conference held an informal breakfast meeting there with Margaret on September 16th 1995 where it was agreed that the Bristol trainees could undertake some limited reversible intraoral procedures on each other.

At the conclusion of the pre-pilot trial a report was written ready for publication but as this was a time of great change both within the profession and at the GDC, the authors were asked to delay publication until a more appropriate time. Unfortunately, in the interim the Registrar of the GDC, Norman Davies who was not party to the decision to run the pre-pilot, learned of it and wrote in March 1996 to Professor Stephens asking him to explain why such a trial had been undertaken without the permission of the Council. Norman Davies, a man of the highest integrity who had served the Council for 15 years had no alternative but to question the project once he learned of it, and this led to several uncomfortable weeks of correspondence, solved only by the Registrar's planned retirement at the end of May 1996!

What might at first appear to have been risky cavalier action which had been sanctioned jointly by the President of the GDC and the CDO was later explained. Three months earlier, unbeknown to

anyone apart from a very small group, the GDC President had received a confidential request from the then Minister of Health Gerald Malone to undertake preliminary work with a view to drafting a new Dentists Act. On Wednesday 12th June 1996, only a few days after the Registrar's retirement, the Minister arose in the Commons to announce that it was the Government's intention to introduce a draft Dentists Bill to include proposals for the setting up of new classes of Dental Auxiliaries, and that it would "*shortly be seeking bids from health authorities in England for individual grants, in the region of £40,000, to enable them to fund local solutions to local problems of availability*".²³ Sadly things did not progress as rapidly as had been anticipated, for the Conservative Government lost its tiny majority in December 1996, and on 17th March 1997 the Prime Minister John Major, called a General Election.

The new Government

With a Labour Government now in power there was still much opposition within the profession to the idea of dental auxiliaries. At the 1997 Local Dental Committee's Annual Conference a motion that "*This conference believes that the Dentists Act must not be amended to expand the role of auxiliaries without the agreement of the profession*" was passed by an overwhelming majority. Despite this the GDC was not deflected from its course and in May 1998 published a consultation document "Professionals complementary to Dentistry" which had been prepared by its Dental Auxiliaries Review Group.

At the British Dental Association's annual conference in 1998, Alan Milburn, Minister of Health in the new Labour government, stated that one of the five challenges facing NHS Dentistry "*if it is to prosper into the next century*" was "*to allow all members of the dental team to use their full potential to improve patients' services*". It was at this point that Dame Margaret and the new Chief Dental Officer Robin Wild asked authors the Bristol pre-pilot to publish their paper which it appeared in the British Dental Journal on 22nd August 1998.²⁴

One month later Margaret Seward and Gordon Watkins Chairman of the GDC Auxiliary Personnel Committee attended a debate on the

subject at the British Orthodontic Conference meeting in Torquay. While it was clear that there was strong support for the introduction of orthodontic therapists within the specialty, members felt that the main source of such personnel should be trained dental nurses and that orthodontic auxiliaries should only be employed by orthodontic specialists. (Specialist lists had been introduced by the GDC in 1998). The formal response by the Society to the GDC's consultation document reiterated these points.

At its meeting on 30 September 1998, the new GDC Education Committee agreed that a Professions Complementary to Dentistry Working Group should be established to advise the Committee on matters relating to PCD education. Finally at a crowded meeting of the GDC on 11th May 1999 the decision to establish "Professions Complimentary to Dentistry" was taken, but there were still a number of issues yet to be addressed before orthodontic auxiliaries could be established.²⁵

Agreement at last

Margaret Seward, who would soon demit Office as President of the GDC, was keen to progress matters before she did so and thus called a meeting at the GDC on 12th August 1999 to discuss orthodontic auxiliaries and orthodontic nurses. It was attended by the new Registrar of the GDC Ros Hepplewhite, a number of GDC Officers together with members of the GDC Dental Auxiliaries Committee on Council. Also present were Steve Jones, and Chris Kettler of the BOS and Janet Robins, Alex Moss and Ann Jones of the Orthodontic Nurses National Group (ONG). (This group at the time represented orthodontic nurses but now represents orthodontic nurses, orthodontic technicians and orthodontic therapists and is affiliated to the BOS). At the meeting it was agreed that all the tasks undertaken by orthodontic auxiliaries should be reversible and of low risk and that all training should be undertaken by specialists; representatives of the orthodontic nurses said they would not want to work under the supervision of non-specialists even though the GDC had not yet excluded this possibility. At the subsequent GDC meeting in November it was agreed that the new class of orthodontic auxiliary would be recruited from dental nurses, dental hygienist and the former (New Cross) dental therapists.

In December 1999 the new GDC President, Professor Nairn Wilson, called a further meeting of interested parties at which the title "Orthodontic Therapist" was agreed and in March 2000 the GDC formally invited the British Orthodontic Society and its reconstituted affiliate the Orthodontic (Nurses) National Group to form an Orthodontic Curriculum Working Party (Advisory Group) on which Mr Birnie and Professor Sutcliffe of the Edinburgh Dental Institute would represent the Council. Table 1 covers sets out the timetable of the subsequent discussions which eventually led to the Curriculum for Orthodontic Therapists being approved by GDC.

One of the recommendations of the Orthodontic Therapist Curriculum Working Party which reported in May 2002 was that the curriculum should be delivered through nationally approved courses available in a small number of centres and but that trainees would be qualified by a national examination. It was proposed that this objective could best be met through a partnership between training providers, the General Dental Council, Dental Authorities, the Royal Surgical Colleges and the British Orthodontic Society. This took much longer to achieve than had been expected.

The First Diplomas

By 2005 with little progress having been made Laura Mitchell, Consultant Orthodontist at Bradford and now a member of the Board of Faculty of the Royal College of Surgeons of England, carried out a survey to gauge the level of interest in a Royal College-based examination for Orthodontic Therapists. All dental schools in the UK were contacted and the responses showed there was a high level of support for such an initiative. The proposal was now given the backing of the Royal College which approved the development of a formal business plan for the institution of a Diploma in Orthodontic Therapy to be run jointly by its Faculties of Dental Surgery and the General Dental Practice.

A founding team of six examiners was established, chaired by Steve Chadwick Consultant Orthodontist at Chester. These were assisted by Gareth Holsgrove, formerly a Lecturer in Medical Education at the London Hospital) and now employed by the College's Examinations Department, to help in developing appropriate methods for their examinations. Once the format of

Date	Event
December 1999	GDC Appoints Orthodontic Therapists Curriculum Advisory Group.
November 2000	Groups Report approved by GDC – sent out for consultation.
June 2001	Report amended in the light of the 36 comments received.
February 2002	GDC appoints Orthodontic Therapists Curriculum Working Group.
May 2002	The Group is asked to align their report* with the GDC's generic curriculum template.
September 2002	Curricula for all 7 classes of PCD approved by GDC.

Table 2

the Orthodontic Therapy examination had gained College approval, steps were taken to encourage the development of local training programmes. Simon Littlewood and Trevor Hodge, both based in Yorkshire, were the first to express an interest, and were asked by the FDS and FGDP(UK) to develop a course. This was of one year's duration with trainees attending intensive blocks at the training centre but receiving supervised hands-on practice in their working environment. Each had a nominated trainer who had been given training in supervision and assessment.²⁶ The model Trevor and Simon developed relied on the trainees' employers (Hospital, and Community Services and individual specialist orthodontic practices) to provide the funding. This approach has worked well as the costs incurred were subsequently recouped by the sponsors in terms of increased levels of orthodontic treatment and reduced waiting lists. The course has now run annually since 2008 until disrupted by the 2020 Covid pandemic and in the interim several other courses have been established.

The first English College examination (Dip OT RCS Eng) was held in Autumn 2008 and that of the Edinburgh College (Dip Orth Ther RCS Edin) followed a year later. In 2019 there were 695 Orthodontic Therapists recorded on the GDC lists.²⁷

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Fig. 3. The first Orthodontic Therapists to gain the Diploma in Orthodontic Therapy RCS(Eng) in Autumn 2008 (by kind permission of the Library and Archives of the Royal College of Surgeons of England)

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part. He was thus the obvious choice as the first Secretary of the unified British Orthodontic Society, a post which he held until 2008. In the interim Chris was a member of the GDC Orthodontic Therapist Curriculum Advisory Group (2000-2).

Chris Stephens: Emeritus Professor Chris Stephens was Head of the Department of Child Dental Health at the Bristol Dental School from 1982 to 2002. He was president of the British Orthodontic Society into in 2001 and from 2002 until 2020 he was a member of the BOS Archive and Museum Committee.

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

Authors Biography:

The late Chris Kettler: Chris was working on this paper when he died in 2019. He had qualified from University College Hospital Dental School in 1963 and undertook his orthodontic training at the Eastman Dental Institute. In 1969 he established a highly respected NHS specialist orthodontic practice in Bedford. When the five British orthodontic societies unified in 1994 it was the result of three years hard negotiation in which Chris, as Secretary of the Joint Orthodontic Unification Working Party, had played a major

Hippolyte Morestin, The Man

Xavier Riaud¹

Abstract: In June 1915, Sir Harold Delf Gillies, the well-known British maxillofacial surgeon, said the following about Morestin after having visited him: “*In the span of a few seconds, he could have the kindness of a little kitten, and a few moments later the savagery of a tiger*”.⁹ Gillies truly admired Morestin, so much so that he took on his surgical techniques and applied them back in England, later developing and improving upon them. Gilles would never go back to work on Morestin’s ward.

Keywords: WWI; Maxillofacial surgery; History of Medicine; Val-de-Grâce.

Hippolyte Morestin (1869-1919) (Fig. 1) was born in Basse-Pointe in Martinique. He was the youngest of eight children. He left Martinique at the age of 14.



Fig 1. Hippolyte Morestin ⁶.

After his arrival in Europe, Hippolyte was described as a young man who was, “*quiet, moody and unfortunately a loner.*”³ When he arrived in Paris, it didn’t take long for him to reach the position he occupied at the start of the war. He joined the Louis-le-Grand school in Paris where he worked as an intern. After obtaining his baccalaureate in science and humanities, he enrolled at the Faculty of Medicine in 1886. Extremely intelligent, he defended his thesis entitled: *Des opérations qui se pratiquent par la voie sacrée*, in 1898 and then became a doctor of medicine³. In 1898, he was appointed Hospital Surgeon and Surgery Associate in 1904^{8,9}.

In 1914, Morestin was working at the hospital of the Val-de-Grâce. He was the head of the Fifth Division for the Facially Injured in the general surgical ward (the first centre of maxillofacial surgery in France (Figs. 2, 3, 4, 5)⁸.

In the war, he only operated on soldiers who had facial wounds. Before the war, he specialized in cancer surgery of the face but also performed cosmetic surgery in women.

Such was Morestin’s fame that during a trip to the USA for a medical congress, the gangster Al Capone, who had heard of his surgical reputation,



Fig. 2. Paris, Hospital of the Val-de-Grâce. Clinical Room of the Stomatology Ward⁶.

Fig. 3. Paris, Hospital of the Val-de-Grâce. Second Prosthesis Laboratory in the new premises⁶.



Fig. 4. Paris, Hospital of the Val-de-Grâce. Fifth division of facial injuries

Fig. 5. Paris, Hospital of the Val-de-Grâce. Common room of facially injured patients⁶.



asked him to operate on an old scar on his face. Similarly, the famous actress Sarah Bernhardt also consulted Morestin as his reputation was worldwide⁵.

Morestin died in 1919 after suffering from Spanish influenza. He had published 634 articles and a book during his lifetime^{3,4}. We know many details about the eminent scientist, researcher and surgeon. However, who was he really? What kind of a man was he? Moreover, how do we go about describing him 100 years after his death when there

are no more living witnesses? We do this by of course avoiding the dangerous pitfalls of his hagiography.

Some insight into this eminent man can be gleaned from *La Greffe Générale* (General Registry) (Fig. 6) This was a satirical journal founded by the patients of the fifth division of the Val-de-Grâce, run by Morestin. There were just eight issues (15/12/1917; 15/01/1918; 01/02/1918; 20/02/1918; 10/03/1918; 01/04/1918; 07/05/1918; 08/07/1918), each consisting of four pages ². Its publishing manager was Gaston-Louis Malécot, its editor, Marcel Stenay-Gatuing, and its art director,



Fig. 6. The satirical journal founded by the patients

Marcel Mime, all of whom were patients of this famous surgeon¹.

The first issue was dedicated to Dr. Hippolyte Morestin, their surgeon and one of the pioneers of maxillofacial surgery: *"To the one whose science and devotion gave us hope. We respectfully dedicate this issue, first demonstration of our new founded cheerfulness."* Their gratitude is profound, as it is genuine and eternal. The second issue was dedicated to Professor Morestin's colleagues. These doctors gave hope to their patients, along with a new reason to live.

With drawings, caricatures, humour and testimonials, this was a journal open to all, but the doctors of Val-de-Grâce would never write anything for it. There were remarks of infinite and even cult-like respect for Morestin that blossomed in all of the issues. There is no shortage of superlatives to be found in them.

Issue N°1, N°3: The wounded called him "The Boss" (*le Patron*). There were poems as well. Title: Quack! Quack! (*Coin! Coin!*) (the cry of a duck). *Because of Dr. Morestin (Puisque le docteur*

Morestin). *Enabled to follow his destiny (Permet qu'il suit son destin)* (speaking of the publication and specifically of the authors) ¹⁰.

Issue N° 2: « ... Remarkable doctor... », « ... the inflexible... ».

In the first list of 75 benefactors, Morestin is the first name mentioned. Two other lists would follow the first one: in issue N°2 (number of benefactors: 57) and in issue N°3 (number of benefactors: 50) ¹⁰.

Issue N° 3: *"Ambassador of the Republic of dental knives" (... l'ambassadeur de la République bistouris...), " ... in the shadow of this Dome, a man who heals and reshapes these miserable faces, and by miraculous transplants gives them a human form. Just as they get their lives back, they laugh"*

Issue N° 6: *"... to him (Morestin) whose science and devotion gave hope and helped find the joy of life" ...to "the great Morestin"*

Issue N° 7: *"...The Master figure, ... one wound and I find that Mr. Morestin, who makes us look great again".*

Issue N° 8: A prayer *"Knowledgeable and revered Doctor"*; a satirical advert, *"After the battle, a small taste of Morestine-of-the-Val! sovereign against facial injuries"* ¹⁰.

La Greffe Générale is the embryo of l'UBF (Union of the Facially Injured), founded in 1921. It still exists today. Colonel Yves Picot (Fig. 8), one of its founding members, and a patient of the Fifth Division, wrote for (N°7). The patients' gratitude was so immense that, in 1923, they asked to rename the road of the Val-de-Grâce (Vth district) to Morestin Road, *"Benefactor of Humanity"* ⁴.

On 28th June 1919, officials met at the Palace of Versailles to sign the Peace Treaty. Clémenceau (1841-1929) wanted seriously wounded patients to be part of this event. He asked Morestin to choose



Fig. 7: Five patients chosen by Morestin. From left to right: Eugène Hébert, Henri Agogué, Pierre Richard, Albert Jugon and André Cavalier ¹¹



Fig. 8. The inauguration. From left to right: Colonel Picot, President Doumergue, and Bienaimé Jourdain¹¹.

some of his patients^{8, 9}. Morestin chose five men Fig. 7.

On 20th June 1927 there was the inauguration of the “House of the Broken Faces” (“La Maison des gueules cassées”). Fig 8 This was attended by: Colonel Picot, President Doumergue, and Bienaimé Jourdain¹¹.

Humorous sketches were produced, and Morestin was depicted in a caricatured way. A



Fig. 9: « The modern Pygmalion », in Rictus' cartoon strip (1909-1910), volume 3².

Fig. 10. “Doctor’s banquet at the Tenon Hospital”, in Paris médical: la semaine du clinicien, (in Paris médical: Clinician’s week) 1911, N° 02, Paramedical section (2). Morestin, second from the left.



Fig. 11. Hippolyte Morestin’s drawing published in Chanteclair⁷.

caricature is a portrait - either painted or drawn - or sculpture that exaggerates certain of its subject matter’s features. Often times funny, caricature is a type of graphic satire which derides the ridiculous or the unpleasant (Fig. 9, 10, 11).

Morestin as Head of Department was intelligent, empathetic, humanist, altruistic, paternal, protective of and generous towards his patients, seeking to master his environment, omnipotent, sensitive and patient, conscious of the importance of his work and what he had accomplished, looking for perfection, aestheticism...

Unsmiling, he was uncompromising in his quest for quality results. This was confirmed by his multidisciplinary approach to the quest for aesthetic perfection. In 1916, he refused to work with dental surgeons, as equals, even though he was the Department Head of the American Face and Jaw Hospital; this would force him out of the institution. This is what he had to say about them: “*I would want them only as technicians who I would call upon when I felt like it and when I felt the need for it*”. He would later come to change his mind, and was one of the first to understand the importance of working with other dentists in order to achieve the optimal aesthetic result. Deterred from working with them at first, he later had the intelligence to change his mind⁹.

Unsmiling, he seemed to be wholly preoccupied by his work. He brought along a professional journal to a meal with his fellow colleagues and, in all likelihood, asked himself why he was even there. He was disturbed by the waste of time at such events. Perfectly disharmonious with his colleagues, he chose not to talk to anyone. Shy or simply reserved, he protected himself. Geniuses are often solitary, even when surrounded by others, and often misunderstood.

With 634 articles and a book, Morestin was an author with a substantial body of work⁹. Beginning as a junior doctor in 1890 and passing away in 1919, this constitutes 29 years of writing - an average of 22 articles per year. He was silent, taciturn and focussed on his surgical work and on his writing. Innovative and brilliant at the same time, he had original ideas. Yet, he was also very lonely. To have ideas such as his, one needs to be sensitive and have the gift of exceptional observation. To write in this manner, one must only be preoccupied by writing. Unsociable and solitary, he would remain single and would not father any children.

In *La Justice* (07/11/1907), Clémenceau, said the following about the great surgeon: “*Respected by everyone and well appreciated in the Parisian high society ... a stern expression that reveals ... a heart*

of gold and great kindness ..., an accustomed gentleness toward his patients.. ”^{3,4}

In his biography, dedicated to Hippolyte Morestin, Dr. Louis Dartigues (1910) maintains that Morin possessed: “*A mind that is truly and extremely scientific ... a certain innate skill, selfless kindness and pity toward the patient who is looking to hide under the appearances of a desired indifference*”^{3,4}.

Of average height, he was known for his absolute generosity toward his patients, who vowed unlimited gratitude and endless respect to him; however, to his colleagues, he would often come across as a moody and highly pretentious person

The nurses who worked for him were filled with admiration for his devotion and his unending selflessness for his patients⁵. However, many also remembered his scientific curiosity, continuously renewed, his thirst for knowledge and his power to do extraordinary work. He may not have been the first to try out maxillofacial surgery, but he was indisputably the first to try to use all of its complimentary and adjacent specialisms, including odontology⁹. He understood perfectly that, even in the simplest of surgical interventions, there needed to also be an aesthetic approach. He left behind renowned pupils including: Raymond Passot, Suzanne Noël (1878-1954) and Léon Dufourmentel (1884-1957), who would succeed him in 1919 at the Val-de-Grâce – “founding fathers” of cosmetic surgery, as well as Thierry de Martel (1876-1940) – one of the pioneers of neurosurgery – and not forgetting author-doctor and academic Georges Duhamel (1884-1966) (9).

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