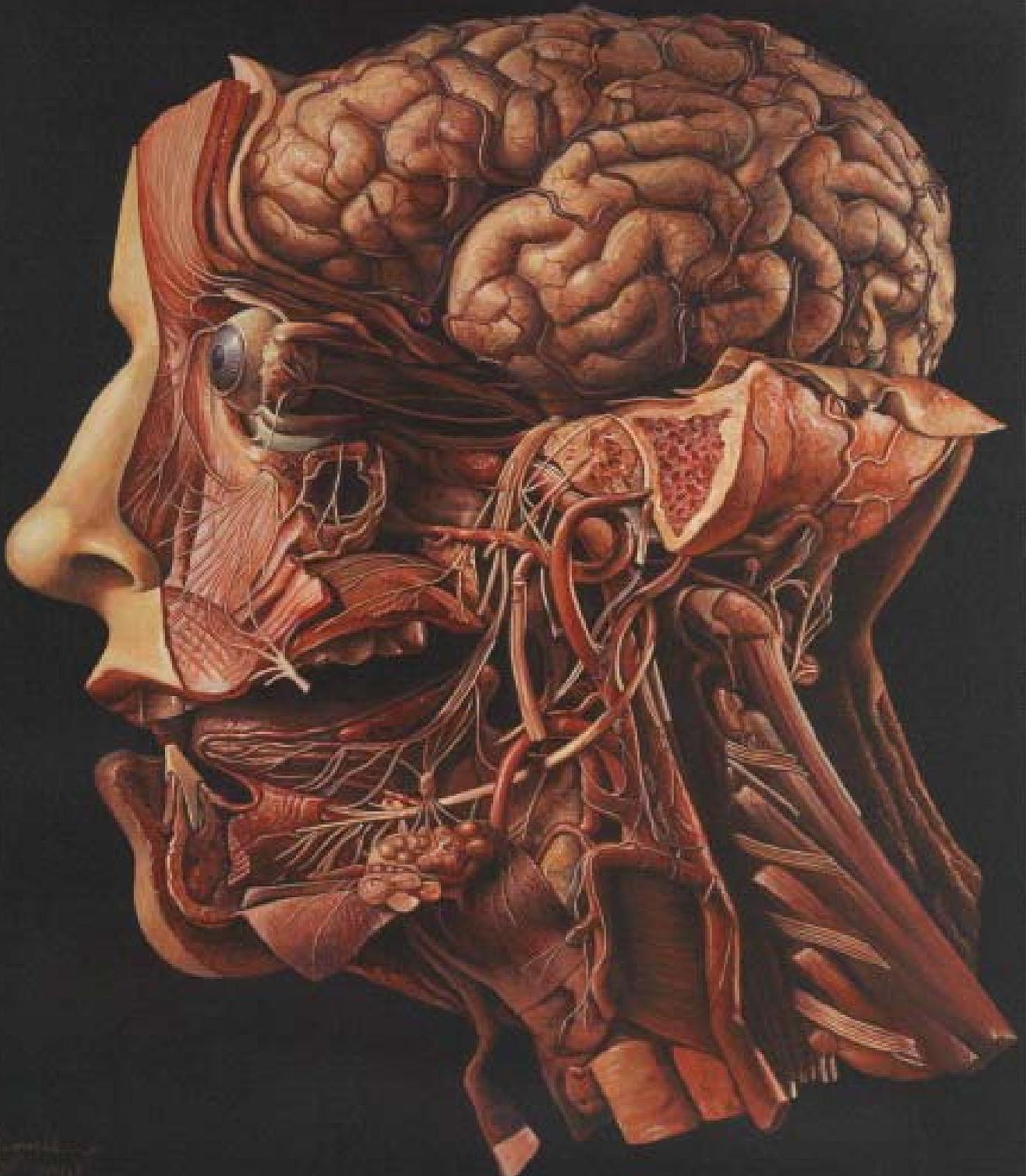
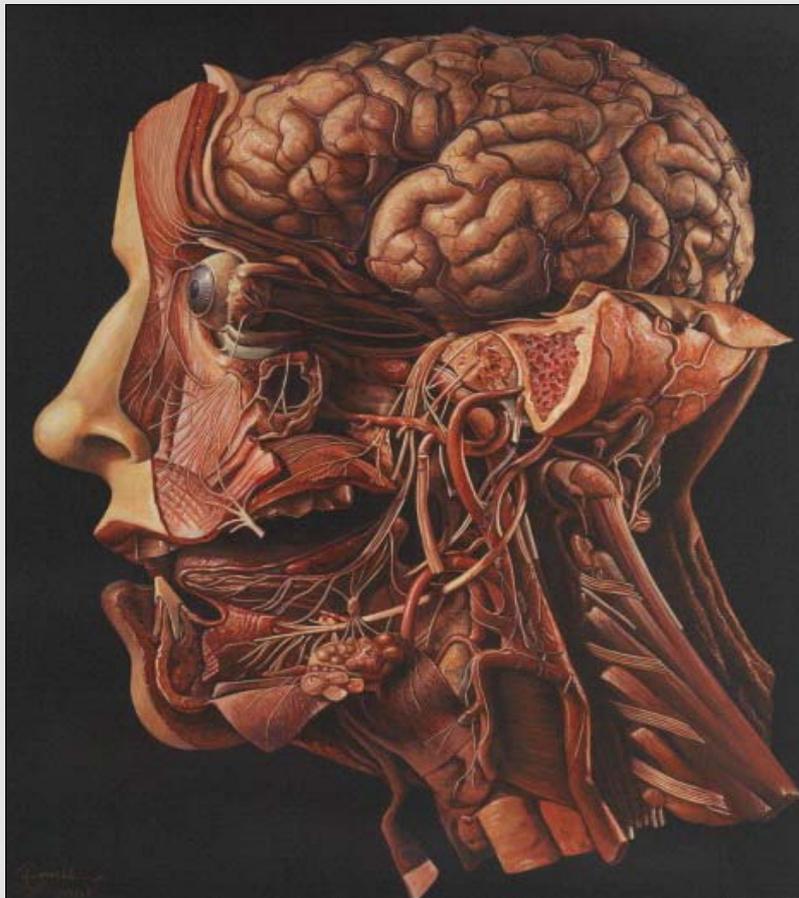


DHIM

Dental History Magazine

VOLUME 8 NUMBER 2 Autumn 2014





A Human Head Dissected: 'In Memoriam'

R. Ennis, Acrylic on wood, 140x120cms, 2001.

The Painting was created in memory of a friend of the artist who died of squamous cell carcinoma which manifested first on the lip and subsequently much of the face. The work highlights the complexity and beauty of the human head. The artist used the wax anatomical models at La Speciola in Florence as a guide and consulted with a pathologist and a surgeon.

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Contributions on the History of Dentistry from any source are welcomed. Word and JPEG files by e-mail are preferred but some other formats are acceptable.

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Update

Dr Rufus M. Ross Demits The Chair of the Henry Noble History of Dentistry Research Group



Dr Rufus M. Ross

When Dr Henry Noble, the Founder of the HNHDRG died in 2004, Dr Rufus M. Ross, who at that time held the post of Secretary and had been a member of the Group since its inception in 1996, stepped into the breach as Chairman. At such a sad and difficult time, Dr Ross's sound leadership and steady energy rallied the membership. In the same year, Dr Stuart Taylor replaced Dr Ross as Secretary and Professor David McGowan was appointed Editor of the *Newsletter*. After Dr Taylor's retirement as Secretary in 2006, Dr Ross invited Mrs Audrey Noble to become Secretary of the Executive Committee, a post which she held with distinction for the next eight years. In March 2014, after ten years of exemplary service, Dr Ross demitted the Chair of The Henry Noble History of Dentistry Research Group to Professor Khursheed Moos, OBE.

Rufus's professional and academic background made him eminently qualified for the post of Chairman of our group. His contribution to the Witness Seminar, *The Impact Of The National Health Service On The Practice Of Dentistry*, which was a joint enterprise by the HNHDRG and The Centre For The History Of Medicine, University of Glasgow [*DHM*, 4:2, 2010] which chronicled his practice during the early days of the NHS and beyond, was one of the highlights of the occasion. Rufus qualified LDS in 1947 but his taste for academia was far from assuaged by this early distinction. He has since put it on record that he will always continue to study 'to improve himself and gain a better understanding of his fellow human beings.' [*DHM*, 6:2, 2012]. He has certainly proved this to be true, graduating for the fourth time in 2012 when he received a BSc from the Open University. He also holds a BA (Hons) from The Open University and a doctorate from the University of Glasgow for his thesis, *The Development of Dentistry: a Scottish perspective circa 1800-1921*, PhD, June 1995.

In addition to his duties as our Chairman, he is a regular and valued contributor to *DHM* - most recently his erudite and witty article on early attitudes to female dentists. [*DHM*, 8:1, 2014.] Indeed, Rufus's reputation as a dental historian attracts international attention: not long ago we received a communication from a senior student at California State Polytechnic University, Pomona who was inspired to make Doc. Holliday and dentistry the subject of her thesis after reading his article on the subject. [*DHM*, 6:1, 2012.] As Chairman, Rufus has ensured that we maintain friendly links with our colleagues in other societies which study the history of dentistry. In the same spirit, he has always encouraged new projects and talent within our own Group. Dr Robin Orchardson, our current Secretary, notes that he is particularly appreciative that Rufus persuaded him to take up the post after Audrey Noble's retirement and of his constant and patient help thereafter. Similarly, in matters concerning the former *Newsletter*, (which Rufus edited from 1997 to 2001) or *Dental History Magazine* he is always quick to respond to requests from the current Editor for assistance or advice which is also much appreciated. In the committee room, he keeps the meeting in order with gentle humour and a firm hand.

During his chairmanship he continued to foster our spring and autumn lectures. He has a keen interest in the future of the Group and has always espoused the idea that it should aspire to set up a unit similar to that already established for the History of Medicine at the University of Glasgow under Professor Malcolm Nicolson. Over the last two years the HNHDRG have participated in the Centre's work by giving lectures to medical students on various aspects of dental history. Rufus is keen that this association should continue and that we strengthen our links with the Faculty of Dentistry at The Royal College of Physicians and Surgeons of Glasgow. The membership of the HNHDRG are most grateful to him for his many achievements in furthering the study of the history of our profession. Although Rufus has now demitted the Chair, we are glad to confirm that he will continue to sit as an Honorary Member of the Executive Committee.

JMC, Editor.

Appointment Of Assistant Secretary, HNHDRG

We are delighted to report that Mr Patrick Lilly of the HNHDRG Executive Committee, has accepted the appointment of Assistant Secretary to the Group with particular responsibility for Glasgow-based work.

HNHDRG Spring Lecture, 2014

Our 2014 Spring Lecture, which was again combined with The Menzies Campbell Lecture, was delivered by Professor David Whittaker at Glasgow Dental Hospital and School on 18th March. Professor Whittaker's title was, *Forensic Dental Science: an insight into history*. David Whittaker is Emeritus Professor of Forensic Dentistry at Cardiff University. He is the author of over one hundred publications on the subject including the standard text, *Colour Atlas of Forensic Dentistry*, Wolfe Medical Publications. He has been an expert witness for more than thirty years, and the author of more than four hundred court reports. As he was the forensic odontologist for the trial of serial killers Fred and Rosemary West in 1994, Professor Whittaker's unique insights on the case were of great interest. His talk was remarkably wide-ranging, covering the various techniques used to discover the identity of victims. He emphasised that if a forensic odontologist is engaged, he or she should visit the scene of the crime with the general investigative team, which is not always the case. He also described how the principles used by modern forensic odontologists could be used to discover more about historic cases, drawing examples from ancient Egyptian, Roman and Mayan civilisations. Each section of Professor Whittaker's lecture was linked by breathtaking photographs taken on his mountaineering expeditions which were much appreciated by his audience.

The HNHDRG Autumn Lecture and The Menzies Campbell Lecture, 2014

The 2014 Autumn Lecture in association with the Menzies Campbell Lecture, entitled: *Nothing But The Tooth*, will be delivered by Dr Barry Berkovitz, Reader in Dental Anatomy, King's College, London, on Monday 27th October, at 5 pm, Lecture Theatre I, Glasgow Dental Hospital and School.

The HNHDRG Spring Lecture, 2015 and The Goodall Lecture 2015

Professor Stanley Gelbier, President, History of Medicine, Royal Society of Medicine, will give The Goodall Lecture at the Royal College of Physicians and Surgeons of Glasgow on 18th June, 2015. The event will consist of the lecture and two talks. The Henry Noble 2015 Spring Lecture will be subsumed with Professor Gelbier's Lecture in June. Further details to be announced.

Donation Of Lithograph

A nineteenth-century lithograph entitled, *DerZahnbrecher von Gerard Honthorst* has been donated to the Dental Faculty of the Royal College of Physicians and Surgeons of Glasgow by Anthony Bryant via the Chairman of the Henry Noble Research Group, Professor Khursheed Moos. Full details can be found in the online magazine, 'College News', Summer 2014 edition at rcp.sg/cn10/CollegeNews Summer201.pdf

Correction *DHM* 8:1, Update, p. 6. The History Of Glasgow Dental Hospital And School

Our thanks to Bill Smith who has written to say that M.M. Paterson of Strathcashel Publications Project Management was the editor of the updated version of T. Brown Henderson's 'History of Glasgow Dental Hospital and School', and not himself, as stated in 'Update' *DHM*, 8:1, p. 6. Bill Smith, Rufus M. Ross and Henry Noble all contributed to the work. Our apologies to everyone concerned.

Warren Harvey: A Scholar And A Gentleman (Part I)

Warren Harvey (1914-1976) was a consultant dental surgeon at The Glasgow Dental Hospital and School. He was a distinguished forensic odontologist, the author of a seminal text on the subject, *Dental Identification and Forensic Odontology*, (Kimpton, 1976) and the lead dental expert in the groundbreaking Biggar Murder Trial [*DHM*, 2010]. The HNHDRG were honoured when Warren Harvey's literary executor, Rob Day, entrusted his late father-in-law's papers to the HNHDRG. In the first of a two part article based on these papers, Dr Robin Orchardson recalls Harvey's early life and career, including his service in the RAF during the 1939-45 War.

Dr Chidambaram Ramasamy: List Of Forensic Dental Cases With Descriptions, 49-2013 AD

We are grateful to Dr Chidambaram Ramasamy, Lecturer, Department of Prosthodontics, Faculty of Dentistry, AIMST University, Malaysia for a select list of cases involving Forensic Odontology, ranging from 49-2013AD. Each case is accompanied by a brief description. Dr Ramasamy's manuscript will be of interest to many of our readers and can be accessed on the HNHDRG Website at, <http://www.historyofdentistry.co.uk/>

'Thanks For The Memories'

We are delighted to publish the humorous poem, *Thanks For The Memories*, which was written by Mr Arthur Craig, Prosthetics Instructor, Glasgow Dental Hospital and School. The poem was composed in 1986 to commemorate Mr Craig's retirement in September of that year. Many of our readers will remember him and all the prosthetics instructors with great affection for their dedicated, patient teaching and also their willingness to see the funny side of various unfortunate events!

Reminiscences: *Parliamo Glasgow*, A Brief Project By Two Dentists Bites The Dust

Bill Smith of the HNHDRG Executive Committee, recalls a 1960s social project which he undertook with clinician, John Thomson of the Prosthetics Department, Glasgow Dental Hospital and School. Although Bill worked in Oral Surgery, and had already cooperated with John Thomson on joint dental projects, he was surprised, on this occasion to find himself, not on the Prosthetics Floor, but on a Drumchapel Dance Floor, as the two dentists set about organising a Youth Club for local teenagers.

Letter To The Editor

Dr Rufus M. Ross replies to Dr Lucy Worsley's comments on the history of dentistry, *DHM*, 8:1 pp. 15-17.

Word Of Mouth : 'Villains Do Not Suffer And This Face Is Full Of Pain.' *

Jo Cummins reviews, *The Search For Richard III: The King's Grave* by Philippa Langley and Michael Jones. This is a joint account of the search for the remains of King Richard III written by Langley and the noted, medieval historian Michael Jones. The latter contributes a typically even-handed, crystal clear disquisition on the controversy over Richard's reputation. On any fair reckoning, the King was a player in the real politik of his times but certainly not the venomous 'bottled spider' of Shakespeare's play. How refreshing that scholars, scientists and enthusiasts are repairing our knowledge of his character within the constraints of the time in which he lived. Philippa Langley's pre-excavation intuition that King Richard's grave lay under a couple of square metres of tarmac, exactly where it was later found, has astounded even the experienced archaeologists who carried out the dig. The book covers the identification of the King's remains using DNA samples derived from his molar teeth. *DHM* has obtained permission under license from the University of Leicester to illustrate this edition of 'Word Of Mouth' using four photographs of Richard's skull.

Re-interment: On 22 March, 2015, the King's remains will be placed in a coffin, which has been hand-made by his blood descendant Michael Ibsen. The coffin will then be carried to Bosworth, from where a cortege will travel to Leicester, through villages associated with the King's final battle. After three days lying in repose at Leicester Cathedral, Richard Plantagenet will be reburied there on 26 March, 2015 with the dignity which was denied to him by Henry Tudor in 1485.

* A quotation from *Daughter of Time*, by Josephine Tey.

Web News

Carol Parry, considers an ancient worm which is proving hard to eradicate.

Jessie Marjory Fraser, Medal For Excellence Dental Bacteriology, 1930.

Patrick Lilly informed us of a request from William Crothers of Cumbria who is researching a medal which was awarded in 1930 to a Marjory Fraser for excellence in Dental Bacteriology. Mr Crothers discovered the medal on a junk stall in Penrith market. Mr Lilly made enquires but no one knew of Marjory Fraser. However, when he consulted the Dentists' Registers for the period, he found that her name was actually Jessie Marjory Fraser who had lived in Nottingham Avenue, in Glasgow's West End. Ms Fraser had qualified LDS in 1932. Her name appeared on the Register for 1933, 1934 and in 1935 when it is noted that she had moved to Rotherham, Yorkshire. The Registers for 1937 and 1938 were unavailable and her name did not appear in subsequent years. The information will be sent to Mr Crothers.

Warren Harvey

A Scholar And A Gentleman

(Part I)
by
Robin Orchardson

John Warren Simpson Harvey was born on 14 July 1914. He was educated at Shrewsbury School before entering Guy's Hospital in 1932 to study medicine where he graduated, MRCS, LRCP in 1938. One year later he also qualified in Dentistry by taking LDS, Eng. Afterwards he found work in a dental practice in Newbury.

On the outbreak of war in 1939 he joined the Dental Branch of the Royal Air Force, where he served at the Central Medical Establishment, Farnborough engaged in research. After demobilization from the RAF in 1946, he was in general practice for 18 years in London. In 1962, he was diagnosed with cancer of the throat and chest; he retired from dental practice in 1964 due to ill health. Afterwards, he moved to Scotland where he took up a post as a locum consultant to Glasgow Dental Hospital and School and part-time Lecturer in Forensic Dentistry. He achieved distinction in 1967 when he was instrumental in identifying a murderer from his bite marks. The story of this case, *The Biggar Murder Trial*, appeared in *Dental History Magazine* (Laird, 2010). Warren Harvey received an OBE in 1975, and passed away on 7 May 1976, aged 61. This paper documents his research firstly, in the RAF, and then after the war. His research was varied and far-reaching. He was very methodical and painstakingly thorough in his arguments. Also, time after time he was ahead of the game, and this marks out his true genius.

Aerodontoalgia

Having served in the RAF, it is no surprise that he was drawn to the problem of pain while flying

(aerodontoalgia), which affects 1-3% of aircrew. (Harvey, 1943) There are a variety of possibilities to explain pain while flying. The high rise in temperature during cavity cutting; dehydration of dentine; the use of antiseptics, which harm the pulp; residual infection of the dentinal tubules; and the acidity of dental cements, were all thought to

contribute to subclinical pulpitis, and only produce pain as a result of particular circumstances such as flying.

He studied (Harvey, 1943) tooth temperatures at various positions in the mouth and found that it did not drop below 20°C, even when flying at altitude. Pain only occurred when iced water reduced the tooth temperature to 12°C or below. Also, in a separate investigation (Harvey, 1947), he found that the cabin temperature in a bomber varied from -36°C to +30°C, but the men in the coldest part of the aircraft or the most exposed positions (e.g, tail gunner), were not those who complain most frequently about dental pain while flying. It has also been suggested that a drop in atmosphere pressure

during ascent might be a cause of the toothache.

By Boyle's Law, the original volume of extracellular fluid is doubled at a pressure of 0.5 atmosphere at 18,000 feet. Thus, an apical area might flare up and cause swelling at altitude and become painful.

In an experiment raising the hydrostatic pressure to 300mmHg above atmospheric pressure pain was felt. (Harvey, 1944) When the patient was decompressed to 25,000 feet for 10 minutes (478mmHg), no pain was felt. Thus, air under fillings was not a likely cause of dental pain while flying.

In many of the cases, the painful teeth had



Warren Harvey, Shrewsbury School
Ca. 1930.



Warren Harvey, 1939.

recently been filled, and the damage caused by dental cements could have been a factor in the pain. At the time (1940s) there was confusion about whether or not these cements were acid and toxic to the pulp. In particular, he was very interested in the acidity of the cement on insertion into the cavity, as opposed to the set cement. After a series of experiments on various forms of oxyphosphate and silicate cements (Harvey, Le Brocq and Rakowski, 1944), the pH of the cements was found to be 1.6. He concluded that a zinc oxide and eugenol as a safety lining for all cavities, especially in young people and when the cavity is extended to open up new dentinal tubules, was essential as a sub-lining before insertion of the oxyphosphate and silicate cements. He said later (Harvey, 1946) "the crowning triumph of this *fifty-year-old* controversy will be when the doctrine is taught in dental schools!" He advocated that a slow running hand-piece and water or air-jet should be employed in *all* cavity preparations, especially when the pulp is anaesthetised. (Harvey, 1944)

Otitic barotrauma

During ascent or descent from altitude, failure to equalise the pressures on each side of the tympanic membrane may result in pain; this is known as otitic barotrauma. Various authors have described cases in which otitic barotrauma or impaired hearing due to flying is due to overclosure of the mandible (e.g. Costen, 1934). A common explanation of deafness or otitic barotrauma is that overclosure of the mandible has caused one or both pterygoid muscles to be relaxed, and caused pressure on the

Eustachian tube. Harvey (1948b) conducted a review of the literature between 1918-44, and found that a number of incorrect anatomical descriptions were repeated from article to article. He undertook a careful dissection of the Eustachian tube and its relations; he concluded that 'it is very difficult to see what structures can compress and occlude the Eustachian tube'.



RAF Dental Branch 1940-5

Dental Hygiene

In 1943, the RAF had established an oral hygiene service (Gray, 2001), whereby after training hygienists were sent to maxillofacial units and large dental centres. Hygienists have done a tremendous amount of good by demonstrating and training the correct way of using a toothbrush to stimulate the gums. He writes (Harvey, 1946): "It is my own personal conviction that no proposed national dental service can pretend to be comprehensive without the aid of fully trained dental hygienists working (as they are doing in the RAF) under the guidance of a dental practitioner." In passing, he noted the importance of local factors in the aetiology of gingivitis. Also, he reported on the clinical evidence that acute necrotizing ulcerative gingivitis (ANUG, known colloquially as trench mouth) is not contagious to a healthy mouth, but is primarily due to lack of oral hygiene and/or function. Furthermore, he observed that early scaling is of the utmost importance in the treatment of ANUG as is the copious irrigation of hypertonic saline. The main useful drug is penicillin but he noted that it should not be used a panacea, but rather as an adjuvant to careful local treatment. It may be of interest to record that a mobile team was formed during the 1939-45 war, to deal with epidemics of gingivitis; it was called out once throughout the

war! Now, seventy-five years on, we have almost reached the point of the end of the story of penicillin.

Sterilisation And Mass Bitewing Radiographs

During the 1939-45 war, when there was very little time to inspect large numbers of people, a dish of disinfectant into which the mirror and probes were dipped into was the only form of sterilization. Harvey wrote, "it has always seemed illogical to sterilise hand instruments, and not handpieces, which are contaminated by each patient". Harvey went on to develop a sterilisation process, which would meet the requirements (Harvey, LeMay and Shuttleworth, 1947). In 1992, forty-five years after the publication of this paper, the FDA first wrote to dentists in the USA telling them to sterilize handpieces and related instruments. Now everything is sterilized!

One of the common causes of dental pain while flying is untreated caries. In four RAF Stations, patients were X-rayed after they had been made 'dentally fit' as judged by probe and mirror. In 77 patients there were 52 cavities varying from 'enamel caries' to 'probable exposure'. Harvey devising a method of taking bite-wing X-rays of large numbers of aircrew cadets, during the dental inspection when they first enter the RAF. He wrote (Harvey, 1945): "This scheme is already being used; it was found that the time needed in the surgery to take bite-wing X-rays of right and left premolars and molars would be 1 minute. Batches of 30 patients were regularly X-rayed in half an hour and more than 600 patients were X-rayed during the preliminary investigation. It took about forty minutes to mount and develop 100 films".

Fluoride

There was growing interest in fluoride as an anti-caries agent and investigation was initiated to determine the fluoride contents of fish-pastes, since it was believed that whole fish (i.e. including the fluoride-containing bones) were blended into paste (Harvey, 1945). He compared 5 different pastes, and some brands contained as much as 9 ppm of fluoride and therefore constituted a useful source of the mineral in the diet. But, daily consumption of one and one third jars of paste would only just yield 1 milligram of fluorine, the estimated daily quantity needed to affect the incidence of caries. Also, he undertook a preliminary investigation of the mouths of air cadets in the RAF aged 15-18 for two years to determine the effect of the addition of sodium fluoride to the diet

to these air cadets. For all ages, less than 1% had caries-free teeth and more than 88% had five or more diseased teeth. The average number of teeth missing or decayed showed a steady increase with age suggesting a fairly rapid deterioration over this age-period.

Partially as a result of these papers, in 1948 Harvey was elected a Fellow in Dental Surgery of the Royal College of Surgeons, England. In the next paper, his time in Glasgow will be described.

Acknowledgements.

I would like to thank Rob Day for reading and commenting on the manuscript, and for providing background information on Warren Harvey and his family. Rob Day is a co-executor for the estate of Warren's widow, Sheila Phelps. (Warren used *Sheelagh* as a term of endearment for his wife, *Sheila*.) Rob joined the Harvey's extended family through marriage in 1974. The relationship was deepened when Rob and his wife, Jane (a niece of Sheila Phelps), adopted Warren and Sheila's grandson, Lance, after his parents were killed in a plane crash in 1991. I would also like to thank Rob's daughter Carol and Warren's grandson Lance, as co-executors, and for taking an interest in the project.

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THE STRANGE MYSTERY OF THE KING'S HEAD

Henry IV of France (1553-1610)

by
Xavier Riaud

On Sunday March 13th 2011, at half past eight in the evening, the French public national television channel, *France 5*, broadcast a controversial documentary on the investigation which had apparently succeeded in identifying a mummified head as that of King Henry IV of France. The project had been conducted by a team of scientists under the direction of the well known anthropologist and forensic medical examiner, Doctor Philippe Charlier, who provided the commentary for the programme. To some viewers however, the documentary may well have appeared to be too melodramatic and over-confident in tone. The team's findings were presented as incontrovertible proof of a positive identification of the King's remains but on reflection, from a purely scientific viewpoint, much of the evidence presented may be questionable. This paper re-examines the claims which were made in both the documentary and a subsequent book on the subject and, with respect, challenges the conclusions made by the investigators.

Although the first broadcast of the documentary was in 2011, the programme must have stimulated enough interest to be repeated in 2012 on the same channel. On the second occasion, it was presented, not by Dr Charlier as before, but by the journalist Stéphane Gabet. Charlier and Gabet co-authored the book on the subject which was published in February, 2013. Their methodology followed the same pattern as that in the documentary:



King Henry IV of France (1553-1610)

arguments in favour of the head's authenticity were presented to the reader followed by an examination of these claims along the lines of a police investigation. The text was written in popular, journalistic language, designed to attract a general audience. Again, the authors insisted that they had proved, beyond doubt, that the relic was indeed the head of King Henry IV.

Yet, considering the case under a more scientific optic and applying what is known from historical research about the circumstances of Henry IV's burial, the arguments as they are presented in the book, still seem to be as lacking in substance as they were in the original documentary.

Let us reconsider the evidence.

Doctor Philippe Charlier is a university lecturer and researcher at the Laboratory of medical ethics at Paris V University. Until September 2013, he was an hospital practitioner in the department of forensic medicine at Raymond Poincaré university hospital in Garches, France. Today, he manages a multidisciplinary team working on anthropology, paleopathology, and pathography. He also manages the 'Pathographies' Collection at the De Boccard Editions. He received an award from the French Academy and the National Academy of Medicine for two of his books. He has worked on several major historical projects, particularly on the alleged remains of Agnès Sorel, Fulk III of Anjou, Diane de Poitiers, the false relics of Joan of Arc and, of course, on the alleged head of Henry IV.

His co-author, on the Henry IV case, Stéphane Gabet is the former editor-in-chief of the programme 'Secrets d'Histoire'. He is currently editor-in-chief at Galaxie Presse. He has published several important articles with Dr Charlier on this matter in addition to his contribution to the documentary on Henry IV's remains which appeared on *France 5*.

These are:

CHARLIER P. & AL. (2010) — « Multidisciplinary medical identification of a French king's head (Henri IV) », in *British Medical Journal*, 341: c6805.

CHARLIER P. & AL. (2013) — « Genetic comparison of the head of Henri IV and the presumptive blood from Louis XVI (both Kings of France) », in *Forensic Science International*, Vol. 226, Issue 1, pp. 38-40.

CHARLIER P. & AL. (2011) — « La tête momifiée d'Henri IV. Une identification médico-légale », in *La Revue du praticien*, vol. 60, pp. 1474-1477.

CHARLIER P. & GABET S. (2013) — *Henri IV, l'énigme du roi sans tête*, Vuibert (éd.), 156 p. and many other less significant articles [CHARLIER & GABET, 2013]...

Historical rationale

The authors present twenty-three pieces of evidence to support the positive identification of the skull (twenty-four if the entire provenance of the relic is considered). According to the writers, each piece of evidence has a probability 'above 99.9%' of being correct. [CHARLIER & GABET, 2013].

However, which of these facts have been historically verified? After his assassination in 1610, Henry IV's body was confined and interred in the crypt of Saint-Denis Basilica. The tomb was desecrated in 1793, during the French Revolution. More than one hundred years later, in 1919, one Joseph Emile Bourdais, bought an anonymous mummified head at an auction for 3 francs; Bourdais was convinced that it was Henry IV's. When he died in 1946, his sister, a Mrs Gaillard, inherited the relic and it was apparently delivered to her by a man called Jacques Bellanger, from Châteaudun. Bellanger later wrote to the historian Jean-Pierre Babelonto on the subject but unfortunately the head then seems to have disappeared without trace until 2010, when Bellanger told the journalists Stéphane Gabet and Pierre Belet that he knew the whereabouts of the mysterious head, and agreed to make his 'relic' available for analysis.

A few necessary notes

Although there is no direct, single source testifying to the disappearance or the removal of the head of Henry IV's cadaver during the attack on the tomb at Saint-Denis in the 18th century, many people were present when the King's body was exhumed. They all certify that the whole body was thrown into a mass grave on October 14th 1793 together with the remains of other members of the Bourbon family, which were then covered with soil and quicklime. Nevertheless, Charlier and Gabet (2013) present it as a certainty that the King's head was detached from his body by a revolutionary in 1793 as an act of deliberate mutilation. They even insist: "Eventually, we can say with near-certainty that the head was separated from the rest of the body using a bladed weapon, presumably a knife or a sabre, at least a well-sharpened tool. We see quite clearly that the section plane is at the lower extremity of the neck, between two vertebrae."

No historical evidence

Where are the testimonies and historical documents which confirm reports of this mutilation of Henry IV's remains? There are none. Only one testimony says that a soldier used his sabre to cut the king's moustache. Since they are unaware of when and how the King's head could have been stolen, having no historical evidence, both authors simply assert that Alexandre Lenoir, the founder of the museum of French Monuments, would most likely have stolen this skull. What evidence is there for this? It is conceded that there was indeed, a genuine trafficking operation of relics from various exhumations which occurred during the Reign of Terror. Turenne's, Voltaire's, and even Molière's teeth were part of this macabre trade and, to be fair, Alexandre Lenoir could have removed a few royal relics during exhumations; they are in a box which was returned to Saint-Denis in 1898. Here is a list of skeletal remains; but identification is still doubtful:

Hugh Capet's scapula;
Charles V's femur;
Charles VI's shin bone;
Charles VII's vertebra;
Charles IX's vertebra;
Philip IV's rib;
Louis XII's rib;
Catherine de Medici's lower jaw;
Cardinal de Retz's shin bone.

It is also true that Lenoir's collections are well known and documented; they do not include a skull. [ANONYMOUS, 2012]. In any case, how could Lenoir have stolen the King's skull, risking his life under the very noses of the vigilant revolutionaries during this very troubled period? And above all, why didn't he return this noteworthy relic to Louis XVIII, after the Restoration, which would have made him a courageous royalist hero? Even for the sake of argument, if Lenoir did steal Henry IV's head from Saint-Denis, what became of it between 1793 and 1919, bearing in mind that there is no report of the detaching of the head from the body, or of what became of it afterwards?

Scientific rationale

Out of twenty-three separate lines of argument [CHARLIER & GABET, 2013] in favour of a positive identification of the head, four are very doubtful indeed; none of them are really good evidence of identification. Only six rely on points which might conceivably link the skull with Henry IV but are even these points very reliable?

Arguments 1, 3, and 4 state: The skull is male, leucoderm (white skin) and anthropologically Caucasian. [CHARLIER & GABET, 2013].

Obviously, these are very common physical characteristics. This is not sound evidence in favour of the argument that this is the head of the King. The authors of the article, as well as several billions of persons throughout the ages, share these characteristics - without having royal blood.

Argument 2: The skull is that of a mature adult who died at the age of 57 years. [CHARLIER & GABET, 2013].

Again, there are flaws with this. The age has not been clearly defined. The adjective 'mature' does not give any indication about the *exact* age of the relic. Neither is there a standard deviation. This is just a vague observation not evidence. No tooth remains on the skull which could be used to date it effectively. (Ex: Ramesses II's mummy (+/- 80 years old using Gustafson's method)).

Argument 5: Very poor bucco-dental status. Several teeth were lost ante-mortem [CHARLIER & GABET, 2013].

Henry IV's poor dentition and repeated episodes

of acute dental infection are well known but dental health was generally poor in the period; so much so, that Cardinal Richelieu had found it necessary to insist that only well blunted knives should be used at banquets since he was revolted watching diners picking the cavities in their teeth with the tips of their sharpened daggers during meals. The fact that Richelieu had to order this table etiquette reveals the poor oral health of a great many of his contemporaries. Henry IV therefore cannot be said to be an isolated case. Sugar had been introduced to the French court by Marie de Medici's pastry cooks. Louis XIII loved baking cakes and also had serious dental problems. [HÉROARD, 1989].

In his television documentary, Philippe Charlier presented a tooth held at Tavet-Delacour Museum (Pontoise, France) claiming that it belonged to Henry IV. The head purchased by Bourdais had lost the 28 (upper left 8) and 38 (lower left 8) after death. This tooth is an 18 (upper right 8) and has a gold wire attached. This prosthetic artefact could be dated to the first half of the XXth century, according to Charlier himself [DELORME, 23/04/2013; DELORME, June 2013], nevertheless, it is presented as being one of Henry IV's teeth in the documentary. Some contemporaries of Henry IV (Henry III, Diane de Poitiers) were known to wear dental prostheses (gold wires + tooth) and for this reason, are often mocked in satirical poems and chronicles [RIAUD, 2011]. Jean-Pierre Babelon, for example, in his *Henry IV* (1982), mentions a financial account dated 1576 which lists 20 sols per month for toothpicks in lentisk wood for the Navareese King's use. In 1581, the register of the Accounting Chamber of Pau, France, reports that the Finance Minister received 15 sols for 'gold to plumb the King's teeth.' Similarly, a surgeon named Mr Pierre received a cauter of gold which is worth 5 crowns and the making, 15 sols. In 1576, Henry was at the castle of Nérac, with his first wife, Margaret de Valois. In order to please him, [Pierre] 'stocks up on gold powder to make his teeth brighter and his smiles more irresistible' [BABELON, 1982].

From 1579 to 1582, purchases of gold to fill teeth prove the future Henry IV had received dental care. These purchases slowed down a little after Margaret de Valois' departure, around 1582. [ARCHIVES FROM THE ATLANTIC PYRENEES (no date)]. If Jean-Pierre Babelon could find such archives, how did he find nothing on a dental prosthesis?

Besides, Pontoise's tooth does not correspond to any of the tooth sockets on the mummified head bought by Bourdais. The authenticity of this tooth remains highly questionable.

Argument 6: Red hair with canities (partial white hair) histological confirmation. Additional red pigment after death is thought to be related to the lead from the coffin.

Argument 7: Hair cut short / broken [CHARLIER & GABET, 2013]. Bourdais's head is almost bald and hairless. Even if hair samples were taken by Alexandre Lenoir or by other revolutionaries, they do not explain why the skull is so completely hairless. The drawing of the mummy made by Lenoir in 1793, around the time that the tomb was desecrated shows clearly that the head had abundant hair and a beard. Besides, according to Lenoir, the samples he removed were 'small'. Young Henry IV had red-blond hair. As an older man, all the portraits represent him with grey or white hair. Not red. [RIAUD, 2011].

Argument 8: Presence of lead residues on the head reveal that it lay for many years in a lead container and thus is suggestive that it is part of the remains of Henry IV. [CHARLIER & GABET, 2013]. Can this be considered a valid argument? Indeed, was Henry IV's body the only one to be buried in a lead coffin? The answer seems obvious to me: it was a common practice for princes but also for many important people [RIAUD, 2011].

Argument 9: Isotopic homogeneity between Pontoise's sample and samples of the head tissue. [CHARLIER & GABET, 2013].

Throughout the documentary, Doctor Joël Poupon, a toxicologist biologist at Lariboisière Hospital in Paris, France, explains to Doctor Charlier that the samples of the head and of various relics from Tabet-Delacour museum attributed to Henry IV 'have all the same isotopic profile, and most likely the same source and the same lead origin.' The results of those experiments are strangely absent from *The British Medical Journal's* article and, in the Supplementary material, Doctor Charlier seriously moderates his enthusiasm on the television, saying:

"Elementary analyses have been performed on samples of the skull and of Henry IV's relics from Pontoise. They revealed the presence of significant quantities of lead in most samples, probably coming from a leaden

coffin used in the 17th century to bury aristocrats. The fact that lead compounds produced by the coffin's degradation are deposited on the remains is a well-known osteo-archeological phenomenon. Isotopic ratios for lead were highly similar within and between both groups (the head and Pontoise's samples), with the margin of error overlapping (two standard deviations). That is why we can only conclude both lead sources have a similar isotopic composition [CHARLIER, 2010; DELORME, 23/04/2013]."

After having examined the Supplementary material mentioned above, Professor Eric Marcoux from the Institute of Earth Sciences at Orléans University shows a certain caution. He is the author of *Lead isotopes and metallic parageneses, tracking history of mineral deposits* [...] Orléans, Editions of the Bureau of Mines and Geological Researches, 1987 [DELORME, June 2013].

Marcoux says:

"There is actually no result mentioned about Pb isotopic geochemistry, only the conclusion that 'both sources of lead are identical', but no data supports this statement. In these conditions, you have to take the author's word for it. Unless, in this type of historical article, with which I am unfamiliar, it is unnecessary to state all the highly technical results. Nevertheless, I can list the following procedures. Isotopic levels were calculated by an ICP/MS quadrupole, a very powerful device but (for now) less accurate than the TIMS (mass spectrometry) regarding isotopic measurement. The uncertainty given by the authors for the ICP/MS is of 0.19 at 0.50%, which is very good for this type of method, but for isotopic measurement, it is 5 to 10 times better with the TIMS. The authors report an isotopic similarity by 2 SDs (i.e. 0.38 by 1%). Due to slight isotopic differences in France between the different mines (the usual $^{206}\text{Pb}/^{204}\text{Pb}$ ratio varies from 18.20 to 18.60), this uncertainty is too important to establish reliable relationships between two or several samples. To conclude, the absence of published isotopic ratios is highly detrimental and does not provide a clear opinion on the reliability of the authors' conclusions. Personally, I am very sceptical since the method of lead isotopic geochemistry seems ill-suited to establish the very subtle relationship they expected. First, the isotopic signature of lead is absolutely not specific to one person, and if it were, the analytical method is not accurate enough to strongly support other more relevant methods revealed in the article, but which I cannot assess [DELORME, 23/04/2013; DELORME, June 2013]."

Argument 10: Hyperpigmented skin lesion on the right nostril. (nevus) This lesion is certified on many portraits, sculptures, and examples of funerary masks of the King. [CHARLIER & GABET; 2013].

Some portraits do indeed show a nevus (seven according to Charlier), but many others do not. Of the thirty-eight portraits on the *Gallica* website, a numerical library of the Bnf (French library), only one shows a nevus. Besides, the funerary mask of Sainte-Geneviève's library, moulded from the king's cadaver the day after his death, does not show any nevus, despite the fact that other very accurate details of the King's physiognomy are represented [DELORME, 23/04/2013; DELORME, June 2013].

Argument 11: Scar on the maxillary bone from a former attempt on the King's life. This trauma is related to the attack on Henry IV using an edged weapon by Jean Châtel on December 27th, 1594? [CHARLIER & GABET, 2013]

Regarding the palatine bone scar, no text which mentions Jean Châtel's attack on December 27th, 1594 mentions that the blade of attack weapon penetrated to bone. For example, Pierre de l'Estoile reports: '*The stab concerned [involved] the upper lip on the right and cut a tooth* [DE L'ESTOILE P., 1741].' Similarly, in the official letters which were sent out on the day of the attack to reassure his subjects that all was well, Henry IV himself reported:

"... A young boy, named Jean Châtel, (...) walked up almost without being noticed and thought he could stab us with his blade; the stab reached only the upper lip on the right and cut one of our teeth since we had bent down to lift up Mr de Ragny and Mr de Montigny who were bowing [BABELON J.-P., 1982]..."

To sum up, although Chatel had intended to stab Henry IV in the neck, Henry IV had bent down unexpectedly and, as the aggressor had no time to correct his aim, he stabbed the King on the lip rather than the neck; only the upper lip is cut. On January 5th, 1595, according to Jean-Pierre Babelon, Henry IV is observed to still have a plaster dressing on his mouth. However, the stab was violent enough to shatter an incisor. It is nowhere mentioned that the blade penetrated the bone, which would have resulted in a more serious wound - in which case, would the King have been well enough to write official letters to his subjects the same day or even in the days immediately following? Besides, where on the bone of the mummified head, is the socket with the root of the fractured incisor, which would more than likely still be in situ in the maxilla? [RIAUD, 2011] Charlier himself wonders about this:

"First, does the scar on the lip really exist on this mummy? [...] What Henry IV does not say but what one of his counsellors Pierre de l'Estoile reports, is that his surgeon tried to place two sutures in the wound. But the first was so painful that he refused the second with the result that he bore an ugly scar until his death. [...]"

Again according to Charlier:

"Joseph Emile Bourdais, the antique dealer, thought he was seeing the mark of this wound on the right upper lip. But with a binocular magnifier at this place, there is nothing, except a small fold and a large section of the skin at the lateral face of the neck. It has nothing to do with a wound, Bourdais was mistaken: this feature is simply a remnant of the decapitation, carried out well after the person's death" [CHARLIER, 2010]."

Since there was nothing on the right, Charlier looks at the other side of the face. He sees a lesion on the left hemi-maxillary bone (reported in *The British Medical Journal*) [DELORME, 23/04/2013; DELORME, June 2013]. However, as we have seen, Henry IV himself testifies he has been wounded on the right upper lip [DE L'ESTOILE P., 1741].

Argument 12: Pierced right ear lobe. The King wore an earring in his right ear, confirmed by at least at least by one portrait preserved in Chantilly museum [CHARLIER & GABET, 2013].

In the broadcast documentary, Jean-Pierre Babelon himself, who knows more about Henry IV than anyone, acknowledges that this pierced ear puzzles him, then he says: '*I think no portrait, unless I am mistaken, no portrait represents him with earrings*'. Indeed, almost all the known paintings, carvings, and statues of Henry IV do not portray the King wearing an earring. [RIAUD, 2011].

Thus, *Gallica* website presents sixteen carved portraits of Henry IV from the XVIth century and twenty-two from the XVIIth century [DELORME, 23/04/2013; DELORME, June 2013] but not one of them shows the king with an earring. Even during his semi-captivity at the French court, between 1572 and 1576, the young Navareese King did not seem to follow this fashion although it is conceded that King Henry III certainly had an earring [RIAUD, 2011]. Charlier and Gabet exhibit a carving from the collection of the Condé museum of Chantilly [CHARLIER & GABET, 2013] in support of their case for an earring-wearing king yet this imaginative work by the carver Jean Ganière (ca. 1615-1666) was clearly produced after Henry IV's murder.

This particular carving belongs to the same series as those of King Charles I of England and to his wife Queen Henrietta Maria, dating from 1635-1640 and marked, 'Ganiere excudit' [Ganière made it] [DELORME, 23/04/2013; DELORME, June 2013].

Mrs Nicole Garnier-Pelle, general heritage curator in charge of Condé museum, says:

"Of all our collections with several tens of Henry IV's portraits, pictures as well as drawings or sculptures, and 59 carvings (...), I only know of one carving where he wears an earring, it is the one I showed [in Belet and Gabet's documentary], the engraving P-352, published by Ganière, but it was most likely not made according to the model and is not an evidence that the king wore an earring; this trend may have been reproduced by the carver on his own [DELORME, 23/04/2013; DELORME, June 2013].

Thus, although many, many portraits show Henry IV without any earring, research in the alcove of a museum which turned up a unique lithography of our King with an earring, was claimed right away as evidence that he habitually wore an earring. If this is the case, there should have been an equivalent proportion of portraits representing him with and without this ornament. Yet, it is not so. Could the portrait showing the King wearing this jewellery be no more than an extravagant addition by the artist who wanted his work to stand out? [RIAUD, 2011]

Argument 13: Corresponding C14 dating. Interval between 1450 and 1640, for a death which occurred in 1610 [CHARLIER & GABET, 2013].

Carbon 14 dating takes into account a standard deviation of 200 years. It is important from an historical point of view and even from a scientific point of view. This interval cannot date the head accurately enough. In 1450, Charles VII was ruling and in 1640, it was Louis XIII. Two very different periods which cannot be compared. Can this argument be taken seriously? [RIAUD, 2011]

Points of Anatomical Comparison

Argument 14: Satisfying anatomical superposition over the funerary mask. Model from Sainte-Geneviève's library;

Argument 15: Satisfying superposition over a portrait by Barthélémy Tremblay (Pau). Sculpture [CHARLIER & GABET, 2013].

Regarding the funerary mask, this reproduces only the central lines of the face, as Jacques Guillemeau, the surgeon who was in charge of the autopsy on Henry IV on May 15th, 1610 and then of the embalming, explains. Guillemeau says:

"The face is well shaped, [the sculptor] makes and adds the rest of the head, which remains proportional to the actual model [...]. (Les œuvres de chirurgie (1612))."

In his article published in *La revue du praticien*, Charlier does not report this superposition, nor since the positive identification was announced in 2010 [CHARLIER, 2011]. Why? The marble statue of Henry IV, to which our researcher refers, was made by Barthélémy du Tremblay and finished, after his death in 1629, by his son-in-law, Germain Gissey. Since Henry IV died in 1610, it was finished more than 20 years later [DELORME, 23/04/2013; DELORME, June 2013]. Besides, a composite drawing established by Mr Jean-Noël Vignal, police officer, seems very inaccurate. During the documentary Vignal asserts it is at best "a *doppelgänger*" [RIAUD, 2011]. A simple comparison between the composite drawing obtained from Bourdais's head and a painting representing Henry IV, young and beardless, underlines the differences. The eyes on Bourdais's head are too close, the upper lip too full, the jaw too large, whereas the King had a delicate chin - which cannot be seen behind the rounded beard of the old King. Finally, the nose is too short, whereas the King's was almost touching the upper lip, as confirmed by the 1610 mask [DELORME, 23/04/2013; DELORME, June 2013]. In his articles published in *La revue du praticien* Charlier admits that there are limits to facial superposition and mentions Professor Franco Ugo Rollo, Professor of Anthropology at the University of Camerino (Italy), a world-expert in this technique [CHARLIER, 2011].

According to Charlier:

"Limits to facial superposition. Since the mouth of the mummified head is open, the comparison of facial superposition could not be completed, as Franco Rollo reported. In practice, we took into account not the 12 regulatory points, but only those of the upper hemiface: shape of the forehead, glabella, roots of the nose's bones, base of the nose, median maxillary position, upper inter-incisor point. Out of these 6 points, the important information in our study was to exclude (or not) the suggested identity. A disagreement (out of 6 and out of 12) would have dismissed this identification [CHARLIER, 2011].

Speaking in 2011, Franco Ugo Rollo reports on this reconstitution:

"Comparison between the skull and the funerary mask of the king. The method (Austin-Smith and Maples work, 1994) requires examining 12 anatomical points of the skull (and the head of the person) on its side (norma lateralis) and another 12 points when facing the skull (norma frontalis). Charlier and his colleagues observed the skull only on its side. It would usually mean we have 12 points of comparison [DELORME, 23/04/2013; DELORME, June 2013]."

According to Professor Rollo:

"Here, unfortunately, we do not have the mould of the whole head but only of the face. Besides, the lower jaw of the skull is open, whereas the mask's is tight. All of this means we no longer have 12 points available, but only 3 or 4 between the forehead and the nose. Here, the skin and soft tissues are very thin, thus the skull's profile should follow exactly the mask's profile. Anyone can see this is not the case. The forehead and the nose of the skull do not follow the forehead and the nose of the mask. We can only conclude the skull and the mask belong to two different men [DELORME, 23/04/2013; DELORME, June 2013]."

Professor Rollo continues:

"We cannot use a statue or a painting to establish the identity of an old skull, since the statue or the painting always results, to a certain extent, from an artist's imagination. Thus, comparing (accurately, of course!) a skull and a statue or a painting always gives a negative result. This is exactly the case with the statue at the Castle of Pau. However, if we have the skull of an historical person whose identity we are 100% sure of, we can use the skull to check if a portrait (drawing, painting, carving) looks alike or not [DELORME, 23/04/2013; DELORME, June 2013]."

After several experiments superposing the head and the mask, Professor Rollo (January 16th and February 27th, 2011) asserts with certainty:

"I have already done a few superposition experiments which confirmed that mummified skull and mask cannot belong to the same person [DELORME, 23/04/2013; DELORME, June 2013]."

Argument 16: Satisfying craniofacial reconstruction [CHARLIER & GABET, 2013].

When Henry IV's mummy was removed from the coffin, in 1793, the drawing done by Alexandre Lenoir shows that the mouth was closed. Yet, Philippe Charlier presents a skull with a wide-open mouth and adds it would have been opened during the desecration, 'to remove some teeth'.

"Regarding the open mouth, it falsifies the computed reconstruction and invalidates everything, since the

head would have been embalmed with the mouth open. Who can think it is possible to open a dry cadaver's mouth after 183 years? Besides, who has ever seen a plaster funerary mask made on a cadaver with the mouth wide open [RIAUD, 2011; DELORME, 23/04/2013, DELORME, June 2013]?"

The craniofacial reconstruction was performed by the graphic designer Philippe Froesch, expert in 3D reconstruction, director of Visual Forensic Studio, near Barcelona, Spain. Doctor Jean-Pol Beauthier at the Free University of Brussels (Belgium) underlines the limits of this technique:

"All these techniques [craniofacial reconstructive identification] are complex and reserved to specialised laboratories. In fact, the soft tissues' thickness in some anthropological points is not the only difficulty of these methods, for the most important part is the relationship and the balance between the noble parts of the face. Besides, the face shows subtle variations, which make its personality. It is impossible for all skin points to be correctly determined or estimated thanks to anthropological bone points. Finally, we must underline we desperately lack of scientific validations in all these fields: only facial superposition has been studied through elaborate scientific projects. The isolated successes published after facial reconstruction do not prejudice the origin of the success (similarity, opportunity, chance...) and the scientific research must absolutely continue in this field [BEAUTHIER, 2008; DELORME, 23/04/2013; DELORME, June 2013]."

If the result is impressive and cannot leave anyone indifferent, can we consider this computed craniofacial reconstruction as scientific evidence?

Argument 17: Presence of bone-black at the base of the neck (pigmentation respecting the face). Charcoal put on the skin of the dead, to absorb cadaverous humours, according to the procedure described by Pierre Pigray, embalmer of Henry IV [CHARLIER & GABET, 2013].

The surgeon Pierre Pigray does not recommend using 'bone-black on the skin except the face, to absorb the cadaverous humours.' And certainly not in his major work, *Epitome præceptorum medicinæ chirurgiæ*, published two years after the king's death [PIGRAY, 1612]. He never talks about 'bone-black', which is obtained through carbonizing animals' bones. However, it seems that 'the filtered and sieved ashes' he reports come from plants. But, using wood ashes in the embalming procedure is not specific to Pigray. As in all the written reports of the time, most surgeons, and especially

Jacques Guillemeau, Pigray recommends sprinkling "a balm made of myrrh, aloe, birthworts, orris, etc., 'inside and out' before wrapping the cadaver in oil-cloth. No surgeon ever recommends using animal ashes. On the contrary, it is always recommended to use herbs or spices in addition to minerals like lime, sand, plaster, alum, or salt. Thus, this black trace at the base of the neck seems to exclude a royal origin for this relic. Pigray is never said to be the only embalmer who attended to Henry IV. But he was certainly present during the autopsy and the embalming of Henry IV, and so was Jacques Guillemeau, the student of Ambroise Paré who advocated using 'slaked lime, and common or oak ashes.' [MALGAIGNE J.-F., 1841; DELORME, 23/04/2013, DELORME, June 2013].

Argument 18: Absence of sawing at the calvaria [CHARLIER & GABET, 2013].

The king's autopsy took place on May 16th, 1610, in the presence of eighteen physicians and twelve surgeons. Among them, Pigray and Guillemeau. The embalming was performed at the same time. As already mentioned, both men were students of Ambroise Paré. Guillemeau recommends two embalming techniques, both requiring a craniectomy [GUILLEMEAU, 1612]. In the 4th volume of his *Epitome præceptorum medicinae chirurgiæ (1612)*, Pigray recommends a craniectomy as well: 'But the only way is to open the body, empty the venters (upper, lower, and median), and preserve the internal parts aside.' The 'upper venter' means skull [PIGRAY, 1612]. According to the procedures of Ambroise Paré, embalming techniques, including craniectomy, were used over the last three centuries of the Old Regime. They were almost systematically applied for descendants or relatives of Henry IV. The last to be embalmed by the same technique was Louis XVIII in 1824. Regarding the potential use of the 'art of the Italians', that is embalming without craniectomy, which is referred to in this case by Charlier, - it does not exist. Opening the skull was widely practised even in Italy [DELORME, 23/04/2013, DELORME, June 2013]. Only one book speaks of the 'art of the Italians', by Reynar Solenander (1524-?), German architect, who wrote

Consiliorum medicinalium. But craniectomy is universally recommended.

Yet, Alexandre Lenoir testifies, about the 1793 ransacking of St Denis:

"The body of this prince [Henry IV] was so well preserved that the lines of his face were unchanged. He was interred in the passage of low chapels, wrapped in his shroud, which was also preserved. Everybody could see him until the morning of Monday 14th; he was brought into the choir, at the bottom of the sanctuary's steps, where he remained until 2pm, then he was taken to the cemetery of de Valois, then into a deep grave dug on the right, on the North side. This cadaver, considered as a dry mummy, had a sawn [opened] skull, and contained, instead of the brain which had been removed, tow, [spongy filaments] oiled with a liquor made of herbs, which spread a strong smell, no one could stand [LENOIR, 1803; DELORME, 23/04/2013; DELORME, June 2013]."

Another witness of the exhumation was the playwright Georges Duval who published *Souvenirs de la Terreur de 1788 à 1793* in 1841-1842. He was 16 during the Revolutionary activities of Saint-Denis. In his memoirs, he especially recalls:

"... Besides, the body had been perfectly preserved: the beard spread-out, oiled with perfumes, formed a compact unit, and the lines were so easily recognisable that if the skin had not been the colour of a dry parchment, we could have imagined Henry IV was just asleep. Since the upper part of the skull had been removed, we found a sponge soaked with herbs where the brain should have been and which spread a rather sweet smell [DUVAL, 1841-1842; DELORME, 23/04/2013; DELORME, June 2013]..."

One should bear in mind that Bourdais's skull did not undergo any craniectomy and that it still has its brain.

Argument 19: Deposits of plants in the mouth and in the nasal cavities. Embalming using fragrant products [CHARLIER & GABET, 2013].

For two centuries, Henry IV's mummy remained deposited in a double leaden and wooden sarcophagus, wrapped in a shroud, stuffed with fragrant products. When his coffin was opened, Alexandre Lenoir asserts: 'A very strong odour of herbs was released.' During the television documentary, two famous perfumiers, Mrs Sylvaine Delacourte from Guerlain, and Mr Jean-Michel Duriez from Jean Patou/Rochas were sent to smell the skull. The results were not convincing because the head simply smelled of leather, with no, 'odour of spices, herbs, or balms.' The IFF society - International Flavours & Fragrances Inc. - which has laboratories in Neuilly-sur-Seine,

France, performed an organic molecular analysis of the mummified head. After passing it through a particle detector, the chemist Dominique Favier, expert in fragrances and flavours, confirmed the absence of the herbal substances which are evidence of embalming. In the documentary, Charlier concludes: 'So, a priori, this head has not been embalmed or this is a natural, spontaneous mummification. It complicates the identification, since this is not a classic reference.' Further, Charlier adds: 'When we examine with a fiberscope [endoscope] through both nasal cavities, we realize there is no grain of pepper for instance, there is no metallic residues, and there is no herbal residues or whatever.' [DELORME, 23/04/2013; DELORME, June 2013]

Argument 20: Imprint of bandages [CHARLIER & GABET, 2013].

Alexandre Lenoir had painted Henry IV, 'once rid of his *bandages*.' Does the fact that the King was wrapped in some way add to the evidence in favour of the identification of Bourdais's skull as Henry IV's? Many mummies have bandages; besides, the existence of any 'imprint' should be confirmed. [RIAUD, 2011].

Argument 21: Presence of residues from a former mould [funerary mask] on the face, evidence of a funerary mask [CHARLIER & GABET, 2013].

A funerary mask is traditional for [French] royal burials. Several masks were made in wax or plaster for Henry IV's mask. The oldest seems to be the one from Saint-Geneviève's library. These moulds or masks should not be confused with the different wax representations made by sculptors, which represented the model of the deceased king on his coffin during its public exhibition before he was transferred and buried at Saint-Denis. In the XXth century, Joseph Emile Bourdais would have made a mask from the mummified head to try to obtain a likeness of Henry IV which may of course have left residues and before this, the mummified skull would have been used as an anatomical model for the sculptor Emma Nallet-Poussin. This argument concerning the presence of mask residues has therefore lost all credibility.

[DELORME, 23/04/2013; DELORME, June 2013.]

Argument 22: Section at the neck using a blade (beheading in 1793) [CHARLIER & GABET, 2013].

The testimonies brought together here show that everything that happened to the remains of Henry IV between the opening of his coffin (October 12th, 1793) until he was placed in a common grave (October 14th, 1793) occurred in the presence of a large number of onlookers. In such conditions, at what point could the body be decapitated? Where and when was it taken and by whom? No testimony exists. [LENOIR, 1803; DELORME, 23/04/2013; DELORME, June 2013.]

Argument 23: Genetic profile related to Louis XVI's blood (STR, Y chromosome, 6 loci). Direct patrilineal relationship between Henry IV and Louis XVI over 7 generations. [CHARLIER & GABET, 2013.]

Philippe Charlier conducted the first genetic study in 2010. He cut a fragment of muscle at the extremity of the mummy's neck, as well as fibres of the dry finger preserved at Tavet-Delacour museum in Pontoise, France. In addition, he took samples of epithelial appendages on the relic of Vivant-Denon in Châteauroux, France, and others preserved in Pau's museum, whose origins are more uncertain. Three control elements with no relation to Henry IV are included: hair from an Egyptian mummy, pleura from a 13th-century anatomical preparation, and a piece of cotton stained with blood used to wipe off a guillotine's blade in the 19th century. Two genetic analyses follow: first by the Forensic Institute of the Medicine [medical faculty] University of Strasbourg, and again by the Centre of Geogenetic at the Natural History Museum of Denmark at the University of Copenhagen. The result is disappointing. The geneticists did not find any exploitable DNA. [DELORME, 23/04/2013; DELORME, June 2013.]

For his second study in 2012, Charlier removed a sample from 'the depth of the person's throat to compare it to the dried blood of Louis XVI which would have been collected at the base of the King's scaffold, on January 21st, 1793. This time, the analysis was performed by the Catalan team of Professor Carles Lalueza-Fox from Barcelona, Spain. On December 31st, 2012, an article published in *Forensic Science* asserting that a correspondence had been made between the Y chromosome of Bourdais's skull and the Y chromosome of the blood assumed to be that of Louis XVI. [CHARLIER P. & AL., 2013.]

Doctor Olivier Pascal, expert in genetic profile,

licensed by the Cour de Cassation and president of the French Institute of Genetic Profile, and Professor Jean-Jacques Cassiman, professor emeritus from the Catholic University of Louvain, Belgium, replied to this news as follows: [DELORME, 23/04/2013; DELORME, June 2013.]

First, Professor Cassiman's conclusions:

"A recent publication showed a resemblance between the Y chromosome from the mummified head and the Y chromosome from the blood sampled from the flask. The immediate conclusion was to authenticate, with this result, both the head and the blood. The first difficulty comes from the absence of a completely reliable reference. Neither the head, nor the blood can be authenticated. The evidences coming from historical researches cannot constitute alone reliable evidence. So it is very surprising that from two unknown factors, the researchers could find two certainties only because coincidentally one genetic profile matched. In mathematics, solving a 2-unknown equation requires to have at least two equations containing both unknowns, which is not the case here. The second difficulty comes from the scientific results themselves. First of all, because of the support used for comparison, Y chromosome. The reliability of forensic identification relies on the characterisation of non-sexual chromosomes, the identification through Y chromosome being reserved for special cases. Y chromosome's characteristics are shared by everyone from a same paternal line, but also by persons who have to familial lineage. Y chromosome is not specific for a person but for a group of persons. It means the correspondence, if it is asserted, could reveal a relationship through the paternal line or be due to chance. Besides, the results published in the international journal are surprising. The tables show that Y chromosome could only be partially characterised for the head and that there are two differences between the Y chromosome from the head and the Y chromosome from the blood, which scientifically mean there is no correspondence between these two chromosomes Y. If it was in a criminal file, such results would not prove the involvement of a person. Given all these arguments, it would be presumptuous to assert the head belongs to Henry IV and the blood to Louis XVI [DELORME, 23/04/2013; DELORME, June 2013]."

Doctor Pascal adds:

"The DNA used for comparison could have been from variable regions of the Y chromosome. Yet, several persons in the general population can have the same Y chromosome without being related. Besides, the study determined only 7 alleles (alternate forms of a gene), among which 2 are different from the blood alleged to belong to the descendant of Henry IV. In our daily practice for criminal cases, these two differences are enough to exclude any family relationship through the

paternal line. Even if the identity would be perfect between the DNA from the blood's Y chromosome and the DNA from the skull's Y chromosome, it would be impossible to assert the blood belongs to Louis XVI and the skull to Henry IV, without reference element. [DELORME, 23/04/2013; DELORME, June 2013,]"

The mitochondrial DNA from Bourdais's head was thus determined. If it is Henry IV, it should correspond to the mitochondrial DNA of his feminine relatives. After an in-depth genealogy study, a matrilinear line was determined, ending with the Empress Maria Theresa and to the current Queen Anne of Romania. Her mtDNA has been established for a study on the false dauphin Naundorff (1998). After comparing both mtDNA, Professor Cassiman concluded: '*Those carrying this DNA cannot be relatives.*' [DELORME, 23/04/2013; DELORME, June 2013.]

To check the validity of the conclusions in the 2012 article, Philippe Delorme and Jean-Jacques Cassiman decided to perform complementary analyses. In order to establish the true Y chromosome of Bourbons, and more generally of the agnatic line coming from Hugh Capet, they contacted three princes directly descended from Henry IV. In order to have the best possible result, those selected belonged to branches remote from one another, in the complex Capetian family tree. Thus, they obtained the participation of princes Sixtus-Henry and Axel of Bourbon-Parma descended from Louis XIV through Philip V of Spain on one hand and of the prince João Henrique of Orléans-Braganza on the other hand, descended from the younger brother of Louis XIV, Philippe d'Orléans, and thus from King Louis-Philippe I. The analyses performed on these three princes conclude that their Y chromosomes correspond and that they share a relatively close ancestor. If we look at the official family tree of the Bourbons, we see the first common ancestor to our three princes in the paternal line is King Louis XIII who died in 1643. This analysis does not confirm with absolute certainty they are heirs of Louis XIII but that their respective ancestors: Louis XIV and Philippe d'Orléans had the same father. Thus, that their mother, Anne of Austria, conceived them with the same father, King Louis XIII. Yet, the DNA signature established from the alleged blood of Louis XVI is completely different from the one found by Professor Cassiman's team. Thus, the blood does not belong to Louis XVI, who had necessarily the same Y chromosome as the other male persons

of his lineage. Then, comparing this blood to the alleged head of Henry IV makes no sense. [LARMUSEAU, October 2013].

Research hypotheses

According to Mrs Evelyne Peyre from the Musée de l'Homme, the identification, or not, of this head should involve several anthropologists gathered as a commission, to compare their results. Studying the lumps on a skull, when fights were frequent, can provide certain answers. Could examining the texts relating to Henry IV's life, be a line of research into furthering our knowledge of wounds the King suffered to his head during military campaigns? This topographic study would archive the potential traumas and then a comparison could be performed with the marks on the alleged head of Henry IV [PEYRE, 2013].

To keep the relevance of Capetians' Y chromosome in perspective, it may be useful to perform a new analysis on Louis XVII's heart, preserved in Saint-Denis, on which only mitochondrial DNA was sampled. Still in Saint-Denis, we could also consider a DNA analysis of the alleged heart of Louis XIII (probably saved by a painter during the Revolution), as well as of the remains of Louis XVIII, brother of Louis XVI, of the Duke of Berry his nephew, the little Louis d'Artois, stillborn in 1818, or of the last princes of Condé, of Louis VII the Young, or even of the indistinct remains of the Capetian lineage, placed into two large coffins inside the Bourbons' crypt.

Conclusion

The identification of the mummified head was presented as *formal*, from the so-called *undeniable* evidence; this engendering a media frenzy. But in the end, we can in no way talk of conclusive evidence. What has been presented is mere presumptions or mere elements of evidence, all of which, in my belief is questionable, especially regarding historical texts, the perusal of which have clearly been neglected by Philippe Charlier and Stéphane Gabet. There has been no water-tight identification. This topic must be treated with considerable caution, especially as many experts writing on the subject consider the head to be that of a *natural mummy*. [DELORME, 23/04/2013; DELORME, June 2013] However, although the author of this article contends that the skull in question is very unlikely to be that of Henry IV', further investigations should be pursued, especially since there seem to

be more lines of research which may settle the matter one way or the other.

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Xavier Riaud, France



'Thanks For The Memories'

A Retirement Poem By Arthur Craig, Prosthetics Instructor, Glasgow Dental Hospital And School, September 1986. Mr Craig's colleagues presented him with a set of bowling balls and a television showing him giving a 'Demo' to students on steel dentures.

Pictured Left to Right: Robert Paul, Michael Broad, Arthur Craig, Pat Lilly, John Graham, Grant Miller, John Brown.

Thanks For The Memories
Of All That's Gone Before
Of Duties In The Store
Of Castings, Face Bows, Hyclars
But Don't Give Me Any More
Thank You So Much.

Thanks For The Memories
Of Balancing Occlusion
Superior Protrusion
Porosity And Miscasts
And Centre Line Confusion
Thank You So Much.

Thanks For Carving Teeth In Wax
No Thanks For All The Dirty Cracks
And All The Blinkin' Students
Who Were Never Off Our Backs
Not You Rosie! *
Thank You So Much.

Thanks For The Memories
Of Many A Happy Season
The Laughter And The Teasin'
Dentures Always Break For A Variety
Of Reasons
Thank You So Much.

Thanks For The Memories
Of Swing Locks That Wouldn't Open
The Difficulty In Copin'
Cahoochy And Other Funnies
Like Gilmour And His Bunnies
Thank You So Much.

Thanks For The Memories
For Conferences And Exams
Though C. & G. Examiners Were Hams*
And Let Us All Remember
Mike's Honeymoon Telegram....
Thank You So Much.

Thanks For The Memories
Of Meeting After Meeting
And All The Blinkin' Bleatin'
With Some Of Us All Het' Up
And Some Of Us Half Sleepin'
Thank You So Much.

Thanks For The Memories
Of Meetings We Have Called
When We've Ranted, Raved And Bawled
And I Remember Bobby Being
Thoroughly 'Appauled'
Thank You So Much.

Thanks John, For Lying On The Bench
When In Came The Cleaning Wench
She Just Passed Thro' No, 'How D'Ye Do?'
She Didn't Even Mench
Thank You So Much.

Thanks For The Memories
When Drawer Landed On Bobby's Fut
He Fairly Did His Nut -
And Calum's Apoplectics When
John Graham Shouted, 'Cut'
Thank You So Much.

Thanks For The Last Memory
Of Many A Conundrum
When Days Were Rather Humdrum
And Don't Forget The Motto:
Nil Illegitimus Carborundum
Thank You So Much.

Arthur Craig

* City and Guilds Examiners.

* Rosie Broad.

Thank you so much too, to Mike and Rosie Broad who supplied a copy of the poem, to Brian Shields and to Mr Craig's daughters, Sheila and Carolyn for their permission to print and to Pat Lilly, HNHDRG Executive, who brought the poem to our attention. **JMC, Editor.**

Reminiscences

**Parliamo Glasgow*

A Brief Project By Two Dentists Bites The Dust

Bill Smith Recalls a Project in Drumchapel, Glasgow which he and Dr John Thomson of The Prosthetics Department, Glasgow Dental Hospital and School undertook in the late 1960s. In places, the author uses Glaswegian patois which is translated in brackets for our general readers.

One day, early in my career at the Glasgow Dental Hospital, I received an internal phone call from Dr John Thomson in which he invited me to visit him in the Prosthetics Department on D Floor. I owed a considerable debt to John for his splendid teaching, his understanding and instructive, clinical tutorials and his sympathetic and intuitive ability to identify problems and to explain and demonstrate how these could be solved. My old friend and colleague, Archie Whitelaw and I had already been involved with prosthetic projects initiated by John and since these had always been stimulating and instructive, I was naturally intrigued about the reason for my latest invitation to the Prosthetics Floor.

To my surprise, John's new idea had nothing to do with dentistry but concerned a social project in Drumchapel. He was living, at the time, in a large sandstone house in Old Drumchapel but the vast concrete jungle, housing schemes which comprised New Drumchapel were nearby. These 'schemes' were seen by the powers of the time as the answer to the problem of where to put people who needed to be re-homed after the demolition of the dilapidated Glasgow tenements. Unfortunately the designers of the new housing schemes had not thought to build shops, restaurants and public houses in the area, thereby failing to create an infrastructure for a social community. Many of the tenants, had been torn away from their extended families and the streets where they had grown up and thus became isolated and lacked any sense of belonging to their new environment.

In time, this situation changed for the better but during the period of which I am writing, one particular group of New Drumchapel residents felt particularly left out - these were the teen-agers. The youngsters were full of energy but as the song says, they had 'nothing to do and nowhere to go.' There were of course a few youth organisations in the area but all of these expected some kind of solid commitment from their members. The idea of signing up for *The Boys Brigade*, *The Scouts* or a church-based fellowship was not attractive to the alienated young people that John Thomson had in mind. Rather than complaining about the increasing vandalism and other anti-social behaviour in the area, John typically sought a solution: I left that meeting on D Floor having signed up to help run a youth club.

John had already acquired the use of a hall, gym and offices from a local school. The Council provided a pool table and cues and some other indoor games. He recruited two extra helpers: a young lecturer and a streetwise member of Glasgow's police who was also a talented amateur boxer. Some adverts were placed in a local newspaper and initially out of curiosity, a few local youngsters, boys and girls, turned up on the opening night and we were off!

The numbers were small at first, but word got around and we soon had enough members to plan our activities. This was when our local police constable came to the fore. I was aware that many Glasgow kids would avoid anyone wearing a 'check-bunnet' [policeman's cap], so I had wondered what the reaction to his presence at our club would be? But David was a beat cop and well liked in the district. He used to smile when he recalled that, when he appeared in their street, the kids would shout, 'Watch out; 'er a cop' but when they recognised him this became, 'Sawright; it's no the polis; it's Davy.' [Be on your guard there's a policeman about... It's alright it's not the police, it's Davy.] When picking teams for football, Davy knew how to use psychology to his advantage. One sullen lad he had just allocated to a team, said, 'Forget it, 'am no playin'.' Without blinking, David replied, 'That's okay son, Can ye no play fitba?' [That's quite alright my boy, Don't you know how to play football?] As our constable well knew, the boy's pride was stung prompting him to change his mind and try to persuade David to include him in the team. The same boy later proved to be quite an adept at indoor soccer and went on to captain the club team.

On another occasion, two lads came up to me with a complaint. 'We cannae play snooker and darts the night!' I asked why, and was told, 'Someone's nicked a' the darts and cues.' 'That' I said, 'Is a pity.' The boys asked what I was going to do about it. At this point John Thomson joined us and explained to the lads, 'You see, these [darts and cues] aren't mine - they're yours. They belong to the club so they belong to you.' The two envoys departed looking thoughtful and by the next week all the gear had been returned.

As the weeks passed, I gave a couple of short talks, at the request of the club members, on the democracy of running a club like theirs. As a result, a committee was elected and its notices were pinned to a large board which the Council had donated. At one point a city councillor nearly had a heart attack when she saw it, thinking that she had missed the local council elections!

The highlight of the club's year was a Grand Dance. Most of the music was provided by a group which the members had formed. They were really quite talented in their guitar playing and vocalising - in my opinion, they were at least as good as *The Monkees*, a group which had recently been specifically manufactured as the American answer to The Beatles.

The dance was a great success and from that time on the members started to referring to 'OUR' club.

Time passed and one evening we had a visit from a lady councillor who had heard about the club and came to see for herself. John gave her a conducted tour and she seemed impressed, remarking, 'You and your team are doing a splendid job Dr Thomson. You are to be congratulated. I have been watching the boys at their football and boxing and I was wondering if the girls could have a little choir?' Polite as always, John responded, 'That would be delightful but who's to do it?' With a shy smile, the lady volunteered, 'Well as a matter of fact, I would. I have organised choirs before. Just let me give some of the girls a short talk and you will have a choir in no time.' At John's suggestion, I gathered about a dozen young ladies and escorted them and the councillor to one of our rooms. On the way there, I mentioned that these youngsters didn't like to be told what to do but I was assured that everything would be fine. In retrospect, it might have been better if the councillor had not emphasised the discipline and hard work being a choir member entailed; the chance to sing on the radio and even perhaps television would have been more attractive. Suffice to relate, the door of the classroom in which the girls were being interviewed soon banged on its hinges and a group of very angry females flew out, muttering, 'Ah'm no dae'n that carry oan. Naw, youse can keep that!' [I'm not having anything to do with that nonsense. No, you people will never persuade me to take part.]

William Congreve said in his play, *The Mourning Bride* that, 'Hell hath no fury like a woman scorned.' We were soon to learn the probable truth of this with regard to this particular lady politician. She rounded on John, informing him along the lines of, 'You have a bunch of ingrats here, Dr Thomson. It will be very hard to get any concessions for this club in the future. Good night!'

Not long after that, we received notice that the school was no longer available for our activities. The club disbanded and that was the end of our social project. I look back on those days with a warm memory of a kind gentleman who tried to make a difference, John Thomson was a great friend and teacher.

Bill Smith, Executive Committee, HNHDRG.

References

**Parliamo Glasgow* refers to a series of sketches written by the Scottish actor and comedian Stanley Baxter in collaboration with the comedian and journalist Alex Mitchell which lampoon a popular educational programme of the time, called: *Parliamo Italiano*. The Baxter sketches portray a somewhat earnest, English scholar on a visit to Glasgow, who translates the local patois for a supposed audience south of the border. Thus, the remark, 'Sanoffy caul day.' is translated into received English as, 'It's an awfully cold day.'

Letter To The Editor From Rufus M. Ross

Dear Madam,

Dr Lucy Worsley: 'The Fascination of Dentistry and the History of the House', (*DHM* Vol. 8. 1).

Dr Worsley's informal but entertaining commentary gives a popular potted history of dentistry, albeit suitable for a TV commentary, admittedly, not aimed at an academic audience, but contains a controversial statement.

A passing reference to John Hunter (1728 – 1793) is the only reference to the many important Scottish contributions to the development of dentistry. The omission of the Scottish dimension is illustrated by the absence of any mention of the outstanding achievement in the development of the dental profession by the Scot, Dr Peter Lowe, founder of the Faculty of Physicians and Surgeons of Glasgow, (Royal Charter granted 29th November 1599).

Dr Worsley's claim, one which is often repeated by dental historians, is that, *The Operator for the Teeth* by Charles Allan, published in York in 1685 was the earliest dental treatise in English, ignoring the fact that Peter Lowe had several textbooks printed in English, four in all, one of which was *The Whole Art of Surgery*. The third in 1634 embodied some twelve chapters dealing comprehensively with the teeth, gums, throat and associated areas discussing causes and treatments with some thirty pages including a page of illustrations of dental instruments, probably copied from earlier dental books. By contrast, *Operator for the Teeth* contains twenty pages of text compared to Lowe's thirty published fifty-one years earlier, thus establishing that Lowe's corpus on dental treatment was the first original treatise published in the English language.

Rufus M. Ross, Former Chairman HNHDRG.

'Villains Do Not Suffer And This Face Is Full Of Pain' (A Bottled Spider...Born Not Untoothed or Richard Of Blessed Memory?)

***Word of Mouth: Jo Cummins Reviews The Search For Richard III: The King's Grave
By Philippa Langley and Michael Jones. John Murray, 2013, ISBN: 978-184854-890-9***

In 2012, the remains of King Richard III (1452-1485), were found under the tarmac of a council car park in Leicester. The team of archaeologists who unearthed the grave were not searching for the King - their primary goal was to excavate a medieval Franciscan Priory which was known to have stood on the site. The project was a joint effort between the University of Leicester, Leicester City Council and the Richard III Society whose Secretary, Philippa Langley, was the driving force behind the undertaking. Langley and the Society believed that King Richard had been interred in the Priory Chapel after his defeat at the Battle of Bosworth in 1485. Alas, according to rumour, the royal grave had been desecrated and its contents cast into the River Soar a generation after Bosworth by Henry VIII's officers during the Reformation. Quite remarkably, before any excavation had taken place, Langley made a private visit to the site and while exploring an area adjacent to the main dig, she had a strange intuition which seems to have astounded even experienced Archaeologists.

Where ground penetrating radar had failed, Langley sensed that Richard lay in a particular spot beneath the tarmac; her blood may have chilled when she saw that a white 'R' had been roughly painted on the ground nearby (indicating a reserved parking space for social workers).

The bones of Richard III, the last King of England to die in battle, were later found under this spot on the very first day of the dig. In order to identify the

skeleton, four of the lower molar teeth were extracted and pulverised; the resulting powder was used to match the mitochondrial DNA obtained from it with one of the last surviving members of Richard Plantagenet's maternal bloodline, thus confirming the royal identity.

The book, *The Search For Richard III: The King's Grave*, by Philippa Langley and the noted medieval historian Michael Jones, is a book of two halves. Langley writes well in a journalistic style and tells the story of the struggle to

initiate and fund the Leicester excavation, the period of the dig itself and the media-ridden aftershock of the find, while her co-author, Michael Jones, contributes an eloquent, fair-minded disquisition on Richard's reputation. It is well known that the King's character was blackened after his death by hostile Tudor polemics, notably *The Rous Roll*, and a biography attributed to Sir Thomas More.¹ In his play, *Richard III*, William Shakespeare relied on these critical sources which portray the King as a hunchbacked, poisonous manipulator, who, notably, had been born with teeth. (The people of the Middle Ages believed that neo-natal teeth indicated the likelihood of a vicious temperament.) Shakespeare's drama has done much to obfuscate the true colours of Richard's reign. However, new information provided by the osteological examination of the King's skeleton may go some way to restoring his character, because the anatomical evidence obtained, supports several texts which indicate that, far from being a clandestine villain, the King was a compassionate, just overlord.

The writer of one document regrets his death referring to him as 'Richard of Blessed Memory'.²

The skeleton in the car park proves that Shakespeare's image of a king who was deformed in body and soul is untrue. His bones reveal that Richard suffered from adolescent scoliosis, which did not much hamper activity or result in a 'humped' back and although Richard was said to have had a withered arm, the bones of both arms were found to be normal. His scoliosis would have been practically unnoticeable, except to intimates when his

back was uncovered. However, since the King's body was stripped naked by the Tudor victors at Bosworth for all to see - still unwashed and bloodied from war wounds and the insult mutilations to his posterior inflicted by his slayers, thrown face down over the back of a horse, then paraded through the countryside prior to full public exposure in Leicester, he must indeed have presented a monstrous image which open-mouthed Tudor chroniclers in the pay of the new dynasty were not slow to use to its advantage.



Fig.1 Richard III. The First Known Portrait



Fig.2 Skull in situ. © University of Leicester. With Permission

Dentition

Although the King's teeth or perhaps more specifically, the DNA and chemical samples obtained from them, appear to have been vital in a successful identification, *The Search For Richard: The King's Grave*, is disappointingly thin on covering the subject. Perhaps this is unfair since the book was written for a general audience but there appears to be only a brief mention of the King's dentition where Philippa Langley reveals that the third molars were erupted, the rest of the teeth were in relatively good condition with some calculus and a few cavities. Photographs of his teeth indicate surface loss possibly due to stress related bruxism and a coarse diet. The missing upper left 1 was thought to have been lost in the grave rather than in battle or an ante-mortem extraction. Fig. 4 shows that on the right of the mandible, running down from the mental foramen, there is a slash mark, not very deep or long; this is probably an attack wound made from behind or the result of a gash as the King struggled to avoid leaving his head unprotected by the severing of his helmet strap. There is another single stab wound on the right of the maxilla, (Fig.3) potentially from a four-sided dagger such as a rondel. There were no other injuries to the face, perhaps on Henry Tudor's orders. If Tudor was to secure the throne, it was vital to expose the recognisable body of the late King in order to convince Richard's many loyal vassals that their overlord was truly dead.²

Writing in 2012 or 2013, Langley writes that more would be known about the King's dentition when the project's scientists had completed a dental report. This has now been published.³ The scientists recovered isotope signatures of strontium and oxygen present in Richard's tooth enamel; both elements are permanently incorporated into the body via food and drink. Since environmental levels vary at different geographical locations, they provided information about the diet and whereabouts of the King during his life. Analysis of an intact, second premolar (measuring also bioapatite, phosphate and collagen), yielded information on Richard's childhood. Strontium levels showed that around the age of seven, Richard moved west which confirms written sources which say that he was living in Ludlow at the time. During the last two years of his life, tests showed that his diet reflected his new royal duties. He made a royal progress, visiting cities where he was entertained and feasted by his hosts. Conspicuous consumption was expected of a king in these circumstances. If he had refused hospitality it would have been taken as a dangerous act of contempt. He was therefore obliged to consume more food and wine than before his accession. The inference that Richard became 'dissolute' in this period is risible.⁴

In reading *The Search For Richard III*, one is struck by the degree of proprietorial behaviour surrounding his remains. On the day of the exhumation, Langley insisted that the window blinds of the social work offices overlooking his grave should be drawn as a mark of respect and perhaps less commendably, after the identification of the bones, there was an unseemly dispute between the parties who were intent on keeping the King in Leicester for re-burial in the Anglican Cathedral, and those who supported the City of York or Fotheringhay, Northamptonshire. The latter was Richard's birthplace and had been his own choice for the



Fig.3. © University of Leicester. With Permission



Fig.4. © University of Leicester. With Permission

re-interment of his father. A subsequent court case ruled for Leicester, the place of his humiliation, which proves that possession is indeed 'nine tenths of the Law.'

Langley and Jones take somewhat different attitudes to Richard's character. Jones disagrees with Langley on the King's involvement in the death of his young nephews Edward and Richard, who were his main rivals to the throne. Jones sees King Richard as a player in the realpolitik of his time and most probably the prime suspect but it is unlikely that the truth will ever be known. Readers may find it interesting to consider Josephine Tey's classic novel, *Truth Is The Daughter of Time*, in which a fictional 20th century police inspector investigates the case for and against the King's innocence. On contemplating Richard's portrait, the inspector remarks: 'Villains do not suffer and this face is full of pain.' (See Fig.1, p. 24.)

References

1. Langley and Jones, pp. 37, 39. [The hostile biography attributed to Thomas More was found among his papers after his execution. It is very possibly the work of More's childhood patron, the Bishop of Ely.]
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Reviewer : Jo Cummins

Web News

The Worm That Never Dies

by

Carol Parry, Library And Heritage Manager, RCPSG



Fig.1. Magnified Image Of Plaque-Forming Bacteria
SPL Barcroft Media

Toothworm stories never go away.

The Mail Online has recently (August, 2014) published images from a scanning electronic microscope (SEM) of plaque and decay on teeth (see: <http://rcp.sg/iQAvQ>) [Fig.1]. Looking at the images, it is small wonder that dental decay was once thought to have been produced by a worm in a similar manner to woodworm or bookworm.

The toothworm theory goes back to ancient times, its origin being either in the Near East or Ancient Egypt. The concept of the toothworm lived on throughout the Middle Ages and continued into the early modern period.

The great 18th century French dentist Fauchard in his groundbreaking work *Le Chirurgien Dentiste, ou Traité des Dents* first published in 1728 is much more circumspect about this ancient story. An 1786 edition of Fauchard's work is available online on the Internet Archive at <http://rcp.sg/3sAJU>.

However, for those who would rather not read the original French text, the College library has a

translation by Lilian Lindsay published in 1946. Of worms Fauchard writes:

“Sometimes worms are found in the caries of the teeth, among the slime or tartar, these are called tooth worms. . . As I have not seen any I do not deny or admit of them. However, I imagine that the thing is not physically impossible but I believe at the same time that it is not the worms which gnaw and decay the teeth, that they are only found there when transported by some food or vitiated saliva which takes with it the eggs of certain insects which may be mixed in the food and the eggs thus deposited have hatched and made themselves evident.” (Lindsay, 1946, p.48).

As recently as August 2013 the Vietnamese newspaper *Tuoi Tre* (<http://rcp.sg/TEAZ2>) published a story about a woman who treats dental worms with a mixture of boiling cooking oil and a traditional Chinese herb. The patient (in this case a boy) was asked to breath in the smoke from the mixture through a plastic bottle and a minute later several white threads, which the woman called worms appeared inside the bottle. This treatment for toothworm is very similar to that described by the medieval author Gilbertus Anglicus in his *Compedium of Medicine* c. 1240. Gilbert suggests severe toothache could be overcome by inhaling the smoke from hot henbane. The burnt henbane seeds would resemble small worms which would have suggested that the worms had fallen out of the teeth.

The toothworm, rather like woodworm, seems very hard to eradicate.

Please contact the Library at the Royal College of Physicians and Surgeons of Glasgow if you wish to see any of our books on dental history email: library@rcpsg.ac.uk. The library catalogue is available online at <http://www.shelcat.org/prcp>

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**The Skull Of King Richard III (1452-1485)
From Remains Found At The Greyfriars Excavation, Leicester**

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The large oval-shaped section of bone hacked from the occipital area was probably made by a halberd (a pole-handled, battle axe. See illustration below.) The blade would have sliced into the King's brain and caused instant loss of consciousness and death. The smaller but still substantial area of bone loss, (above to the left) was probably caused by a sword penetrating the bone, piercing the brain and re-emerging on the opposite side of the skull. The loss of tissue on the occlusal surfaces of the teeth can clearly be seen. The Upper left incisor was lost post-mortem, most likely after burial.



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