

Charles Gaine (1827–1914) – an orthodontic pioneer in Brighton and Bath

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Key points

Describes the life of Charles Gaine (1827–1914) and his role in the development of orthodontic techniques in the UK.

Relates how Gaine's simple screw appliances were demonstrated at the Great Exhibition of 1851.

Shows that Gaine was exchanging ideas with the American J. N. Farrar well before the latter produced his textbook in 1888.

Abstract

John Nutting Farrar (1839–1913) has been hailed as the 'father of American orthodontics' and his textbook, published in 1888, is often claimed to be the first devoted exclusively to orthodontics, while the American Emerson Angell is supposed to be the inventor of the orthodontic 'jackscrew'. However, the unknown Englishman Charles Gaine, identified by Lilian Lindsay in 1933 as the author of the first British orthodontic textbook, could be said to be the father of British orthodontics, as the publication of his book in 1858 and his demonstration of the screw appliance at the Great Exhibition of 1851 predated both these transatlantic events.

Early life

Charles Gaine (1827–1914) was born in Ludlow, Shropshire, the son of a commercial traveller. He was certainly well educated; there is little doubt that he knew Latin, maybe Greek and seems to have spoken French. By 1841, though his parents were still living, Gaine was lodging with his maternal grandmother Jane Thompson, a widow of 84 Old Street, Ludlow, who is described in the 1841 Census as a retired grocer.¹ According to his later fortnightly advertisements in Bath and Hereford newspapers, Gaine became a pupil of the remarkable Thomas Bell FRS,² dental surgeon to Guy's Hospital London, where the customary fee at this time was £500;³ it is a mystery how this son of a commercial traveller could have afforded this sum, equivalent today to £36,500. Given that such apprenticeships were of five years' duration and usually started when the dental

apprentice was 16 or 17 years old, this would have been between 1843 and 1849. Bell did much to raise dentistry to the rank of a profession.⁴ He was Secretary of the Royal Society from 1848 to 1853 and President of the Linnean Society. Bell had chaired the meeting on 1 July 1858 at which Darwin and Alfred Russel Wallace first presented their theories on natural selection.

Because the first Licence in Dental Surgery (LDS) examination of the Royal College of Surgeons of England was not held until 1860, Gaine completed his apprenticeship without gaining any qualification – not unusual in those times. He then worked as an assistant to William Robert Wood (1807–1893), a surgeon-dentist of 7 German Place, Brighton. There were good reasons for Gaine choosing to go to Brighton: the arrival of the railway in 1839 had improved its connections with London, enhancing the resort's popularity among the leisured class and increasing the demand for professional services. Similar changes would follow the coming of the railway to Bexhill seven years later.⁵

By 1865, Brighton was being described as the 'Queen of watering places'.⁶ Boarding schools were increasing in number at this time and Brighton would soon be known as a 'school town'.⁷ It was not surprising therefore that Gaine would become interested

in 'regulation of the teeth' and he was soon treating orthodontic patients successfully using screws for the first time in the UK. The Woods were a well-known and well-connected dental family and William Wood, Gaine's employer, who was also a Brighton alderman, was clearly impressed with his assistant's orthodontic invention. According to Gaine, he 'considered the process and the results sufficiently novel and important to be illustrated by models and plates which were accepted for, and their merits acknowledged at the exhibition of 1851'.⁸ This was the Great International Exhibition, probably the most successful and influential cultural event of the nineteenth century. It contained 13,000 exhibits from Britain, its colonies and other countries from across the globe, and was held at the Crystal Palace in London's Hyde Park from 1 May until 15 October 1851, during which time there were six million visitors.

Gaine's orthodontic screw

It should be appreciated that, at this time, what orthodontic treatment there was involved fitting buccal arch bars and the placing of ligatures, of gold or silk, around misaligned teeth which were regularly tightened every few days by the dentist to effect tooth movement. Although Gaine's

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textbook gives no description of the screw device, it describes how the gold baseplate of his appliances had to be doubled 'to make it thick and strong to bear the pressure of a screw over each misdirected tooth'.⁸ Fortunately, in a letter to J. N. Farrar in December 1886, which Weinberger reprints in full, Gaine gives rather more detail. He states that he first used his screw in 1851 when he was 18 years old. This cannot be right as he was 18 in 1845 and must then have still been a pupil of Bell. However, he included with his letter a copy of his book and a sketch of one of his appliances which Weinberger also reproduces as his Figure 173 entitled: 'After Gaine (1858) showing use of the screw'.⁹ This shows that Gaine used two types of screw in this appliance (Fig. 1). Both are very simple and quite different from the more complex 'jackscrew' described by Angell in 1860.¹⁰ It is important to realise that Gaine's 1886 letter was written in response to Farrar's earlier letter, which was in reply to a letter from Gaine published in *Dental Cosmos* in October 1877. In this second letter, Gaine states that he is now using vulcanite as a baseplate material. Further, he hopes to produce a second edition of his book 'when he has a little more leisure'. Farrar, in the earlier letter, had clearly expressed the hope that Gaine might soon visit him in America, perhaps because he was already preparing his own influential textbook, the first volume of which would appear in 1888.¹¹

Gaine did not suggest that he was inventor of the orthodontic screw; his only claim was that it was more effective than contemporary methods of treatment in use at that time. Orthodontic screws had already been described by J. M. Alexis Schange, whose textbook was published in France in 1842.¹² As there were beginning to be significant French and German communities in Brighton at the time,¹³ this may be how Gaine heard of this method.

It is generally agreed that the orthodontic 'jackscrew' was invented simultaneously in Britain and the United States,¹⁴ but while the American Emerson C. Angell's jackscrew was first described in 1860, this was two years after Gaine's book was published. Moreover, Gaine's screw appliances had been exhibited in London nine years earlier at the six-month long Great International Exhibition of 1851. Because there had been a large American contingent at the exhibition, it is quite possible that news of Gaine's use of the simpler screw could have reached Angell via this route.

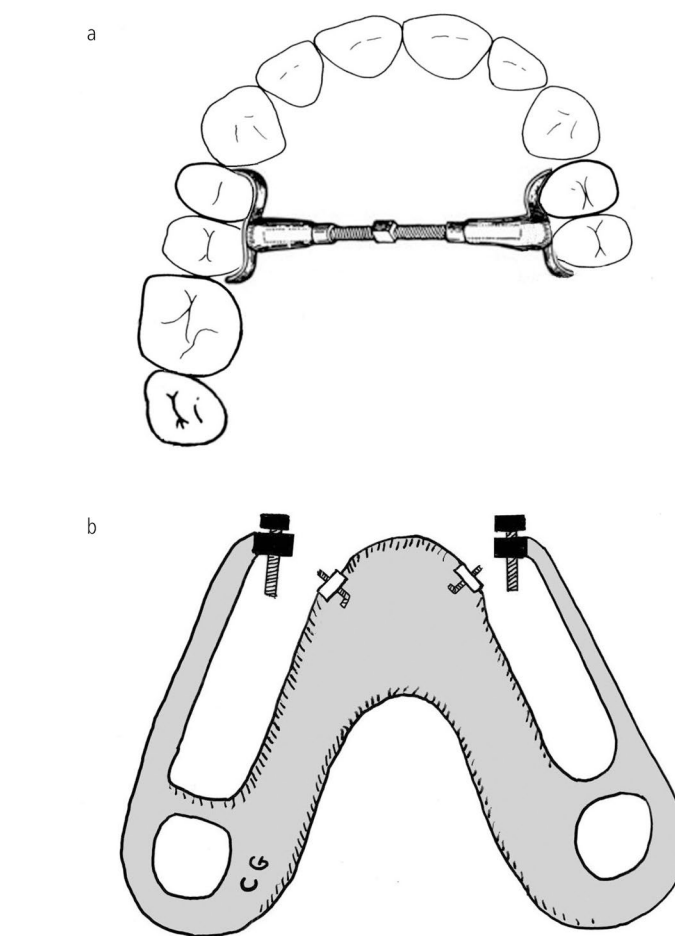


Fig. 1 a) Diagram of Angell's jackscrew, redrawn from E. H. Angell, *Treatment of irregularity of the permanent or adult teeth*, *Dental Cosmos*, 1860.¹⁰ b) One of Gaine's appliances, redrawn from his sketch reproduced in 1926⁹

As luck would have it, Gaine's device received favourable attention in the UK, while Angell's account of what would be the first recorded example of rapid maxillary expansion was derided and his work censured by the American dental establishment, with the result that the jackscrew was little used in the United States until the 1930s.¹⁵ Sadly for Gaine, at the insistence of his influential employer, the examples of the cases were exhibited in Class 10 ('Philosophical, musical, horological and surgical instruments') of the *Official catalogue of the Great Exhibition* in 1851, but appeared under Wood's name: 'Wood, W. R. German Pl. Brighton, Manu. – A series of mechanical adaptations for regulating and preventing the irregularities of the permanent teeth'. This led to Gaine leaving the practice and setting up on his own – 'Mine was the invention, his the kudos'⁸ – and so, in late 1851, Gaine was back in Ludlow living with his grandmother

Jane Thompson at 84 Old Street and was now practising there.

His practice advertisements, which first appeared in the *Hereford Times* on 20 December 1851 and continued every fortnight thereafter until 28 October 1858, recorded that Gaine was 'late principal assistant to W. B. Wood Esquire of Brighton [...] former Pupil of Thomas Bell FRS Surgeon of Guy's Hospital London'. Soon, he was practising at 33 Broad Street, Ludlow; curiously, this was next door to another Ludlow dental practice, that of Appleby King at 32 Broad Street, which is now a Grade II listed building.

Gaine's move to Bath and the publication of his textbook

Quite why Gaine chose to move to Bath in the summer of 1856 is unknown, but by the 1850s, although its days as the spa of choice

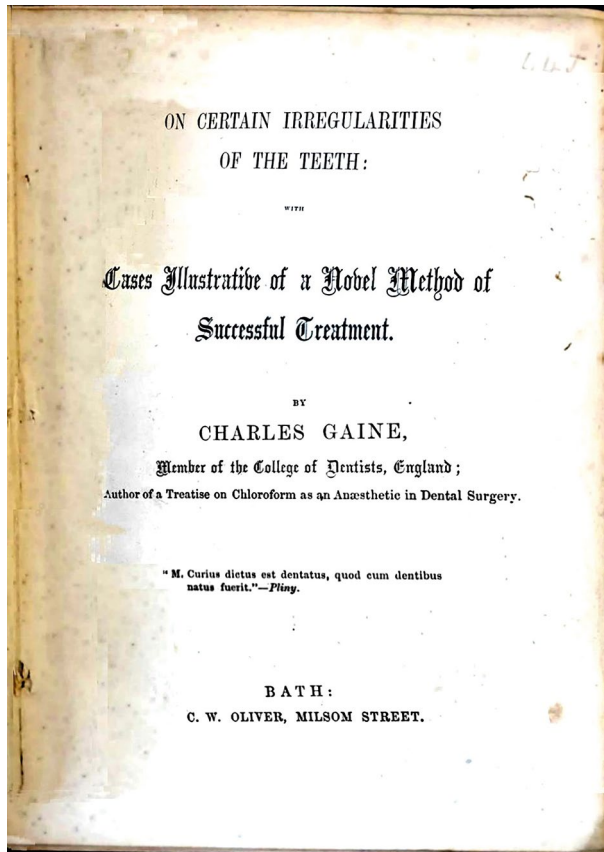


Fig. 2 The frontispiece of Gainé's textbook from 1858, image courtesy of University of Bristol Library Special Collections



Fig. 3 The Bristol Medical School in 1860 as Charles Gainé would have known it, image courtesy of University of Bristol Library Special Collections

for the social elite were over, Bath had become a city of residence for retired merchants and civil servants.¹⁶ Moreover, the arrival of the Hereford, Gloucester and Ross Railway in 1855 had made it possible for Gainé to travel by train to Bath while still maintaining his practice in Ludlow.¹⁷ This he did until 1868.

Gainé's fortnightly advertisements in the *Bath Chronicle and Weekly Gazette* first appeared in August 1856, announcing his arrival at 10 Bladud Buildings as the successor to the dentist Robert Shew who had practised there since 1836. Gainé's sessions in Ludlow were now reduced to Monday and Tuesday only, and six months later, to just the first Monday and Tuesday in each month. Over the next ten years, Gainé moved his practice first to number 13 and then to 3 Bladud Buildings, Bath.¹⁸ These were all located in a Georgian terrace, which at the time housed a variety of small shops on the ground floor with living accommodation above.

In April 1858, two years after he arrived in Bath, Gainé's textbook, entirely devoted to orthodontics, was published by the Bath entrepreneur and bookseller Charles Oliver of 24 Milsom Street (Fig. 2). After a year in which no advertisements appeared in either Hereford or Bath, Gainé's fortnightly entry resumed in the *Bath Chronicle* in April 1858 and now included mention of his book (price: one shilling). These continued to appear fortnightly until January 1859.

The book consisted of 32 octavo pages, of which the first 25 were devoted to general principles of orthodontic treatment adopted by the author. Within these, Gainé paid tribute to those who had gone before him, notably Joseph Fox,¹⁹ Delabarre,²⁰ Harris,²¹ Imrie,²² Goodsir,²³ as well as John Tomes and his teacher Thomas Bell, from whom he seems to have adopted the idea of a palatal baseplate rather than the use of arch bars.²⁴ In the last seven pages, he describes four cases which he had treated by means of orthodontic screws to justify his claims of their effectiveness. According to a footnote, at least one of these was treated while Gainé was employed by Woods and so is likely to be one of the cases shown at the Great Exhibition. It is regrettable that although plaster pre- and post-treatment models were displayed at the Great Exhibition, no engravings are included in the book. Maybe Gainé could not afford for these to be made or, more likely, the models of these cases had been retained by his principal William Wood.

Medical studies in Bristol

The fact that Gaine called himself a surgeon-dentist at this time was of no significance as the use of this title by unqualified UK practitioners was not outlawed until the passing of the Dentists Act of 1878. Nevertheless, changes were coming and dentists, many of whom were medically qualified, urged that regulation be introduced for dentistry. The Medical Act of 1858, which regulated the practice of medicine, had empowered the Royal College of Surgeons of England to award an LDS by examination, and the first LDS examination took place in 1860 with Bell and Tomes acting as examiners. It is perhaps strange that Gaine did not take the opportunity to travel to London and obtain his LDS RCS, but by this time, he was fully committed as a part-time medical student at the Bristol Medical School 13 miles from Bath as well as running his two practices (Fig. 3).

The proportion of time that Gaine was required to attend the Medical School is not clear. Medical training in Bristol, in the era before there was even a University College, was carried out by an independent school run by members of the clinical staffs of the Bristol Royal Infirmary ('Church of England and Tory') and the Bristol General Hospital ('Non-conformist and Whig').²⁵ Each student paid to be attached to a surgeon or physician, and as Gaine's grandfather was a Huntingdon Methodist, it is quite likely that Gaine was attached to a surgeon at the General Hospital for which the fees would have been £10 per year in addition to the £33 and three shillings required by the Medical School.²⁶

Gaine's practice in Bath

There is no record of Gaine carrying out orthodontic treatment in Bath apart from the suggestion in his letter to Farrar of December 1883 mentioned above. In the second half of the nineteenth century, the wealthy formed a mere 14% of Bath's population, of whom a high proportion were the elderly retired. For the remainder, wages were barely above subsistence and would not have extended to dental treatment of any kind apart from extraction.²⁷ What little we know of Gaine's private practice at this time comes from the incomplete diaries of the Reverend Francis Kilvert (1840–1879).²⁸ He was educated in Bath by his uncle before going up to Oxford and entering the church. He became a rural

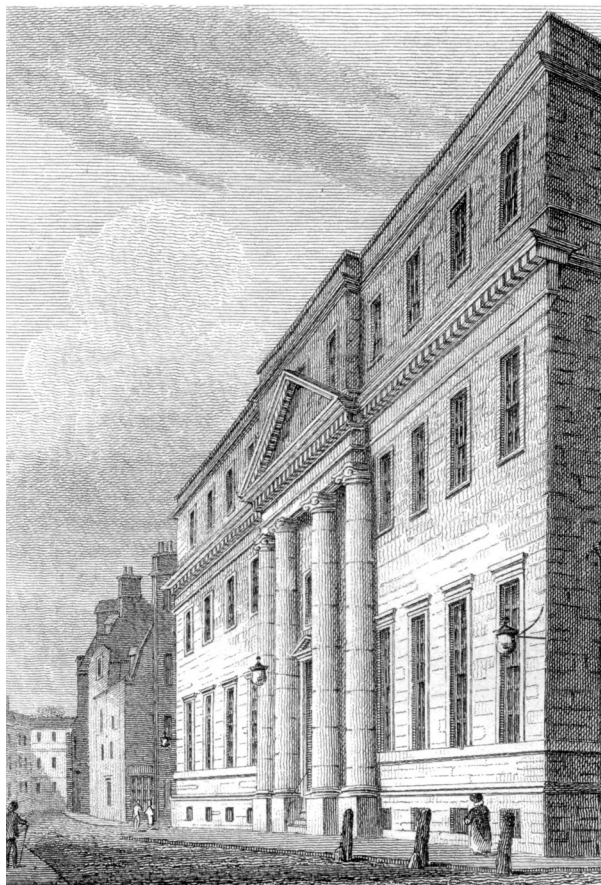


Fig. 4 The General Hospital, Beau Street, Bath, which opened in 1742, now the Gainsborough hotel. An additional floor was added in 1891. Reproduced from P. Egan, *Walks through Bath: a complete guide to the visitor*, 1819³¹

curate, first for his father near Chippenham and then as a curate and later a vicar in Radnorshire, but he clearly made visits back to his family in Wiltshire during this time. His diary recorded his visits to Gaine from 1871–1878.²⁸ For example, in October 1878, he mentions: 'Went to Bath by the 9.45 train. Had two teeth stopped by Gaine and bought 6 pairs of gloves at Harmer's for 1/6d.'²⁸

Gaine achieved his Membership of the Royal College of Surgeons (MRCS) in 1862 and was then able to apply for the advantageous post of Assistant Surgeon at the General Hospital Bath (which later became the Royal United Hospital), an appointment which he gained three years later and held until 1899. The General Hospital by this time had 133 beds. It had been established in Beau Street in 1742 in a purpose-built, three-storey building, now occupied by the Gainsborough Hotel and Spa (Fig. 4).²⁹ Gaine clearly undertook significant oral surgery there and, in 1862, described a successful closure of a large oroantral fistula which other surgeons had failed to achieve.³⁰

He had also become Assistant Surgeon to the Second Somerset Militia, then based in Bath, which had close links with the General Hospital. This is explained in Section IV of the hospital's 'Conditions of admission'.³¹ However, little is known of Gaine's duties in connection with this appointment. The only indication of these again comes from the Reverend Kilvert's diary entry for May 1871: 'Then I went to Gaine's and had two teeth stopped. He had just come in from ball practice with the militia to whom he is attached. A surgeon is always required to be on the ground during ball practice. He was still in his uniform, black tunic braided, and black trousers with a narrow red stripe, and looked very soldier like'. Whether the 'ball practice' was for musket or cannon shot or in preparation for social events in the assembly rooms is not made clear!

In the same year, Gaine joined the Odontological Society,³² which by this time had merged with the College of Dentists to become the Odontological Society of Great Britain.³³ Here, Gaine was following the example of his younger colleague, George



Fig. 5 The Gaine family memorial, Bath

Christopher McAdam of Hereford,³⁴ who had also treated the Reverend Kilvert while the latter was curate to the vicar of Clyro 20 miles from Hereford. Both Gaine and McAdam were interested in the new nitrous oxide anaesthetic. In July 1871, Kilvert reported: 'I went to see the dentist McAdam in Hereford. He took out a temporary tooth stopping and put another temporary tooth stopping in, and have to go and see him in a fortnight He showed me the apparatus for giving people the new anaesthetic Laughing Gas which he thinks is much safer than chloroform, indeed quite safe'.²⁸ There were good reasons for McAdam saying this, as Gaine had reported an unexplained death from chloroform to his local British Medical Association (BMA) branch meeting in 1864.³⁵ This had occurred while he had been acting as anaesthetist for a colleague who was undertaking a foot amputation for a 15-year-old at the Bath General Hospital.

In 1868, Gaine married Adele Bridges Smith (1846–1877) in St Swithin's Church, Walcot, Bath and was soon living and working from 8 Edgar Buildings, only a few yards from Bladud Buildings. In this move, he had taken over the practice of James Robertson. Ten years later, he moved his practice to 30 Gay Street where

he remained until his retirement in 1909. By now, he was clearly making a good living and had bought an imposing residence in Weston Park, Bath, which was close to the Grove Boarding School with its 50 teenage pupils. Did he perhaps undertake orthodontic treatment for some of these? Gaine could now afford to send his younger son to Marlborough School and thence to Emmanuel College Cambridge to study medicine before he joined the army as his elder brother had done.

The BDA, BMA and dental reform

Medically qualified dental colleagues who Gaine met at Bristol during his medical training at this time must have included Thomas Cook Parsons and Samuel Hayman, both of whom had joined the Odontological Society of London in 1863 and would play key roles in developing dental education in Bristol.³⁶ The Western Counties Dental Association, of which they and Gaine were early members, had been created in 1879, but in 1880, it had voted to merge with the newly formed British Dental Association (BDA), thereby becoming its first branch. Cook Parsons was the first President of the Western Counties Branch and Gaine became its third President in 1883.

Gaine's continuing concern with the place of dentistry within the medical and surgical professions is reflected in his publications at this time.^{37,38} He was also actively involved in the BMA, of which he became Branch President in 1886. It would appear that through his publications,^{39,40} and his membership of the Odontological Society and the Association of Surgeons Practising Dental Surgery, Gaine was now well known and had become a member of the Dental Reform Committee whose efforts would eventually lead to the passing of the Dentists Act of 1878. Gaine was always of the view, as had been that of his former teacher Thomas Bell, that dentistry should remain a speciality of surgery and not become a separate profession. It followed that when in April 1877, the exclusive rights of the Fellows and Members of the College of Surgeons to practise dentistry were denied, he and a number of others would resign from the Committee.⁴¹

Gaine spent the last years of his life in pleasant lodgings at 1 Norfolk Crescent, Bath. By the time of his death on 19 December 1914, his wife and children had all predeceased him and, as far as can be determined, he had no grandchildren. Although he had been Assistant Surgeon to the Second Somerset Militia, his former regiment had sailed for India in 1913 and so the long-retired Charles Gaine had no published obituary apart from a few lines in the weekly *Bath Chronicle*. His ashes were scattered near the memorial he had built for his wife and children in Lansdown cemetery (Fig. 5).

Conflict of interest

The authors declare no conflicts of interest.

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