

## Chevalier Jackson: pioneer and protector of children

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### Abstract

Chevalier Jackson was one of the greatest pioneers of otolaryngology. He was a pioneer of oesophagoscopy, bronchoscopy and the removal of foreign bodies. He changed the mortality rate for an airway foreign body from 98 per cent to a survival rate of 98 per cent. He became distressed by the number of preventable injuries in children from the ingestion of caustic substances, most commonly household lye. His experiences of children with oesophageal stricturing secondary to caustic ingestion moved him to start a campaign to force manufacturers to label all poisonous substances as such. This took him from the American Senate to the House of Representatives and back again; the Federal Caustic Poisons Act (1927) is still enforced today. In a career with over 400 publications, written during exacerbations of his pulmonary tuberculosis, his life story is a remarkable one, only part of which is widely known.

**Key words:** Chevalier Jackson; History; Laryngology; Bronchoscopy; Esophagoscopy; Tracheostomy

### Introduction

This paper describes the story of one man who, arguably, has done more for children's services than any other otolaryngologist. Chevalier Jackson, who was the son of a livestock farmer, was born into poverty in 1865 (the year that saw the end of the American Civil War) in a mining town six miles from Pittsburgh (Pennsylvania, USA). He had a difficult childhood: he was frail, and tales of torment from the local school bullies dominated many of his memories of this time. On one occasion he was blindfolded, bound and led down a disused mineshaft where he was abandoned. A miner's dog found him and he was rescued, only to suffer from pneumonia.

His family struggled for many years to make ends meet and their childhood home was turned into a summer hotel where he worked in the evenings. His childhood was influenced by 'an insatiable urge to make things' using woodwork, turning, carpentry and painting; these skills were to become invaluable in his future career. During this time he contracted smallpox but survived. After graduating from Greentree Township Public School, he enrolled at the Western University of Pennsylvania (now the University of Pittsburgh) to study pre-medical education.<sup>1</sup>

In 1882 he entered formal medical school, but was obliged to work evenings and weekends painting

china vases and lampshades. His parents were unable to provide him with much financial support, as they had recently re-mortgaged the family home to avoid bankruptcy. At Jefferson Medical College he studied under William H Pancoast, a professor of anatomy, who was infamous for holding a scalpel in his mouth when ligating vessels.

Medical school was divided into two winter semesters, each lasting six months from October to March, leaving six months of the year for vacation. Chevalier Jackson spent his vacations working, initially as a travelling book salesman. That job took him on a journey of over 300 miles, and he finally managed to fill his order book on reaching Gloucester, Massachusetts. In order to return home, he took a job on a fishing schooner as the ship's cook.

### A career in laryngology

In 1886 Chevalier Jackson obtained his doctorate in medicine and decided on a career in laryngology. He was fascinated by the writings of Sir Morell Mackenzie and decided to further his post-graduate education by visiting him in person. By decorating more glass and china, and through the generosity of a family friend, he was able to save just over 100 dollars to travel to London. His passage was booked on the *Leerdam*, whose other occupants were 'dirty

and frequently unwell' due to a rough crossing. Almost as soon as the boat left port, there was an outbreak of smallpox. Chevalier Jackson volunteered his services in the lazarette with the suspected carriers for the entire 17-day voyage (having already had smallpox as a child); this brought welcome isolation below decks.<sup>1</sup>

Little is written of his time in London, a fact that has not gone unnoticed. His obituary in the *British Medical Journal* remarked that 'British laryngologists would particularly have liked a more expanded account of his visit to the Golden Square Throat Hospital in 1886'.<sup>2</sup>

He had to return home when his funds ran low, and in 1887 he set up a clinic in Pittsburgh, which he described as a dismal town 'shrouded by smog and ruined by poverty'. He began developing his skills, mostly through charitable work with the poor. A better understanding of these times is made possible by reviewing the case histories that Chevalier Jackson meticulously recorded. One was of a child who had been strangled by her father because she had kept money back for food, depriving him of whiskey. Chevalier Jackson performed a tracheostomy on the floor of their squalid house and the girl's life was saved. This case was not unusual, and along with outbreaks of diphtheria, he was kept busy.<sup>1</sup>

Laryngology as a subspecialty received much publicity during the time that Chevalier Jackson was in Pittsburgh, most notably from the case of the Crown Prince (later Emperor) Frederick of Germany. Queen Victoria had knighted Sir Morell Mackenzie for his treatment of the Crown Prince's laryngeal cancer, probably in part because the wife of the Crown Prince was Queen Victoria's daughter. This case was in the public eye for almost a year, and the publicity resumed after personal attacks on Sir Morell Mackenzie following the death of the Emperor.<sup>3</sup>

Chevalier Jackson continued his work with the poor people of Pittsburgh in what was called the 'bloody third', which was a part of the town inhabited by hard-drinking, hard-fighting men and their families. No patients were ever turned away, and most of his work was unpaid. He personally paid manufacturers to develop better instruments, but he would also make his own.<sup>4</sup> Whilst working with Sir Morell Mackenzie he had been shown an early version of the oesophagoscope, but thought it was impractical. Around this time, advances in the cystoscope light source were made, which allowed for better illumination.<sup>5</sup> He adapted the cystoscope light carrier and developed his own rigid oesophagoscope, which he used with much success to remove foreign bodies such as a dental plate and a coin.<sup>6</sup> Unfortunately, widespread untrained uptake of his technique resulted in a series of complications and the oesophagoscope was condemned. Even when he tried to explain the correct technique and inherent dangers to the Medical Society, the consensus of opinion was against the procedure.<sup>1</sup>

Just prior to the turn of the century, Chevalier Jackson observed a number of paediatric lower oesophageal injuries and strictures caused by the ingestion of lye, which was a household cleaning product. Household lye has the same dry consistency as sugar but, as a caustic agent, would ulcerate and scar the oesophagus such that children would die from starvation and dehydration. He began documenting the conditions of these patients and collecting the bottles of lye, none of which had any warning labels. Chevalier Jackson approached the manufacturers to request that warning labels be used, but his request was refused on the grounds that it might be damaging to sales. He felt that a law needed to be passed and so he approached local politicians. He was disappointed by the lack of political support for his campaign, but his case reporting and data collecting continued. During this time he married Alice White, the sister of one of his patients. In 1900 a son was born, Chevalier Lawrence; he grew up to follow his father into laryngology.<sup>1</sup>

At the turn of the century, diphtheria was very prevalent and virulent. As a result, his reputation as a skilled operator and tracheostomist spread. Diphtheria carried a 70 per cent mortality rate prior to the introduction of the anti-toxin, which was first used in the US in 1895.<sup>7</sup> If the patient survived, they were often left with a scarred and poorly functioning larynx. This led Chevalier Jackson to develop an interest in the treatment of laryngeal strictures.

He was also impressed by Killian's removal of a foreign body using a bronchoscope, and in 1905 he started construction on one of his own design.<sup>8</sup> Chevalier Jackson began by practising on cadavers and then proceeded to refine his technique on anaesthetised dogs. At this time, an untreated foreign body in the airway carried a 98 per cent mortality rate associated with suppurative lung disease. The risk that accompanied removal, via cardiothoracic intervention, was not much better. In his first report of 17 individuals treated for inhaled foreign bodies, the mortality was zero.<sup>9</sup> His earliest book describing his endoscopic techniques, '*Tracheo-bronchoscopy, Endoscopy and Gastroscopy*', was dedicated to Killian.<sup>10</sup> To further publicise the procedure, he set up a bronchoscopic course, initially in Pittsburgh, then Philadelphia and later in Paris. Unfortunately the course was unable to run in London using anaesthetised dogs, as it would have contravened vivisection laws.<sup>1</sup> The technique was well taught, and the mortality rate fell to a mere 2 per cent.<sup>11</sup> [Figure 1](#) shows Chevalier Jackson with a bronchoscope and just some of the foreign bodies he removed.

In 1911 Chevalier Jackson was diagnosed as suffering from pulmonary tuberculosis (TB), just as his international career was taking off. His treatment was a strict diet and 12 hours of bed rest per day. After six months, the disease was judged to be 'arrested' and he was allowed back to normal activity. This approach



FIG. 1

Chevalier Jackson with a bronchoscope and a collection of retrieved foreign bodies. Reproduced with permission from Chevalier Jackson Papers, Archives Center, National Museum of American History, Smithsonian Institution.

appeared to work, until two years later he suffered a pulmonary haemorrhage associated with an exacerbation. His physician ordered further bed rest combined with a year of contemporary anti-tuberculous therapy. He was not idle during this time. He wrote '*Peroral Endoscopy and Laryngeal Surgery*', which comprised over 400 pages of information regarding the skills required to perform rigid endoscopy.<sup>12</sup> He also wrote a smaller practical manual, '*Bronchoscopy and Esophagoscopy. A Manual of Peroral Endoscopy and Laryngeal Surgery*', which was translated into many languages and was used as the endoscopist's 'bible' for many years.<sup>13</sup> The second edition of this manual was much improved, with comprehensive descriptions and illustrations of how to remove foreign bodies. A book review declared that 'the book is an absolute necessity to the endoscopist, and should be of the greatest interest to the general practitioner'.<sup>14</sup>

Despite his poor health, Chevalier Jackson became Professor of Laryngology at the University of Pittsburgh in 1912. In 1916 he returned to his own medical school, Jefferson Medical College, as

Professor of Laryngology; in 1924 they created a new chair in bronchoscopy and oesophagoscopy especially for him.<sup>15</sup> He retired from this post in 1930, but remained Professor of Bronchoscopy and Esophagoscopy at Temple University School of Medicine, Philadelphia where his specialised bronchoscopic clinic was founded. His son, CL Jackson, succeeded him in both the chair and the clinic on his eventual retirement from clinical practice.<sup>2</sup> During his working life, Chevalier Jackson also held the chairs of Laryngology at the University of Pennsylvania and the Women's Medical College of Pennsylvania; he was also the first Professor of Bronchoscopy and Esophagoscopy at the former.<sup>16</sup>

### Fighting for legislation

In 1917, Chevalier Jackson was once again unwell following a third exacerbation of TB. It took three years for him to fully recover, but he was not idle. Much of that time and the following few years were devoted to his belief that legislation was needed to protect children and prevent lye injuries by labelling packaging. A

politician had previously discouraged him from trying to influence legislation, as it would be a long and expensive journey. Undeterred, he started his campaign and took the matter before the Section of Laryngology and Otolaryngology of the American Medical Association. He was duly elected chairman of their newly formed Committee on Lye Legislation, and began presenting 15 years of case histories to anyone who would listen. On his first attempt at introducing the legislation, the bill failed, and two years elapsed before the process was re-started.

The American Constitution is complex; the passing of a bill is time-consuming, especially if it is contested. It is hard to believe that some parties contested the bill, which caused significant delay. Most of the opposition came from the 'Druggists' who sadly interpreted the bill as a 'harbinger of ruinous competition'.<sup>1</sup> Over 90 senators and nearly 400 representatives needed to be reached via their constituents. Chevalier Jackson went before committees of the US Senate and the House of Representatives. The same presentation was given again before the Committee on Foreign and Interstate Commerce of the House of Representatives. This process took almost a year, and Chevalier Jackson himself paid all the expenses for the campaign. Eventually, consent was obtained from the Presidents of the Senate, the Rules Committee and the Committee of Foreign and Interstate Commerce. The bill was duly presented for action and was passed. After two years' work, the Federal Caustic Poisons Act, which necessitated the requirement of a poison symbol and antidote label, was passed by Congress and signed by President Coolidge on 2 March 1927.<sup>17</sup> This is still enforced today as the Federal Hazardous Substances Act, which is a lasting tribute to a man who spent so much of his life campaigning for it.<sup>18</sup>

He continued to write, often during times of ill health. In 1936, his book '*Diseases of the Air and Food Passages of Foreign Body Origin*' was published, which contained over 900 pages of drawings, paintings and X-rays illustrating techniques.<sup>19</sup> In it he reported his series of over 3000 cases of foreign bodies removed from the aerodigestive tract. A book review praised it, stating that 'it represents one of the most carefully collected and accurately recorded series of cases on any medical subject that has ever been published, and the world of medicine is indeed fortunate that this vast experience has been recorded in such detail'.<sup>20</sup>

Chevalier Jackson died on 16 August 1958 at the age of 93 years, having received many awards and honours during his life (Table I). His legacy remains in the Mütter Museum, situated within the College of Physicians, Philadelphia, where there is a display of Jackson's instruments and a well catalogued, extensive collection of foreign bodies that were retrieved by him. His obituary in the *American Medical Association Archives of Otolaryngology* described him as 'one of

TABLE I  
MEDALS AND DECORATIONS RECEIVED BY  
CHEVALIER JACKSON<sup>16</sup>

Year	Award
1924	Kiwanis Service Medal
1925	American Medical Association Certificate of Honor for Exhibit of Bronchoscopic Work
1927	Philadelphia (Bok) Award Chevalier de la Légion d'Honneur (France) Chevalier de l'Ordre de Leopold (Belgium)
1928	De Roaldes Award in Laryngology, American Laryngological Association (first recipient) Henry Bigelow Medal, awarded by Boston Surgical Society
1929	Officier de la Légion d'Honneur (promotion from Chevalier) Cresson Medal, Franklin Institute
1932	I P Strittmatter Award (for year 1927) Gold Medal, Radiological Society of North America
1933	Commandatore del Ordine della Corona d'Italia
1935	Grao Mestre da Ordem Nacional do Sul (Southern Cross of Brazil) Medal of Honor, Academia Nacional de Medicina Rio de Janeiro
1936	Lauréat de l'Académie de Médecine (Prix Panneton) Paris
1937	Lauréat de l'Académie des Sciences (Prix Bellion) Paris
1939	Meritorious Service Medal, State of Pennsylvania
1940	Distinguished Service Medal, American Medical Association
1943	John Scott Award, City of Philadelphia, for Devising Instruments and Methods Useful in Bronchoscopy
1949	Medallion of Honor, Interstate Postgraduate Medical Association of North America
1952	Medallion, American College of Chest Physicians Russell H Conwell Award, Temple University

the greatest, if not the greatest, laryngologists of all time'.<sup>16</sup>

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