

# Medicine in Stamps

## Theodor Billroth (1829-1894): pioneer of modern surgery

Tan S Y, MD, JD and Davis C A\*

Professor of Medicine, University of Hawaii

\* Research carried out during senior medical student elective, John A Burns School of Medicine, University of Hawaii

**T**heodor Billroth's first love was music. He never wanted to be a doctor and was considered a poor student with an inability to focus on anything other than music. It was his mother and family friends who finally persuaded him to enter medical school instead of becoming a musician. How ironic then that he would later write: *"The pleasure of a physician is little, the gratitude of patients is rare, and even rarer is material reward, but these things will never deter the student who feels the call with him."*

### CAREER

Theodor Billroth was born on April 26, 1829 in Prussia to a Lutheran priest father and German mother. His father died when Billroth was five, forcing the family to move to his grandfather's home in Greifswald, Germany. Starting out at Greifswald, Billroth later moved to the University of Gottingen and the University of Berlin, where he received his doctorate of medicine in 1852. He initially worked in the clinic of the esteemed ophthalmologist, Albrecht von Graefe, and shortly thereafter, he moved to Vienna, intending to study dermatology, pathology and internal medicine. He also attempted to start his own general practice, but found no patients for months.

This sent him back to the University of Berlin, where for the next seven years, from 1853 to 1860, he studied pathological anatomy while lecturing and demonstrating surgical techniques. It was in Berlin that he met and married his wife Christine in 1858 and subsequently, had five children—four daughters and a son. Soon thereafter, Billroth moved to Zurich as professor of surgery, and eventually headed the Zurich surgical hospital and clinic. In 1863, he published a series of lecture notes on surgical pathology and therapeutics, followed by a handbook covering general

and specialty surgery. In 1867, he returned to the University of Vienna as a professor of surgery, where he worked until his death. It was at this institution that he fully developed his extraordinary talents and innovations in surgery.

### SURGICAL CONTRIBUTIONS

During his time in Zurich, he worked on various surgical procedures and became interested in postoperative healing. Through rigorous studies of pathology, he correctly posited that "wound fever" was due to a chemical poison by a living organism. He therefore insisted on sterility in the operating room to decrease postoperative infection, and instituted daily charting of body temperature in the

postoperative period, a routine that remains the standard of care today.

In Vienna, Billroth continued his work on postoperative fever and techniques for sterility and antisepsis in the operating theatre. His procedures led to decreased mortality and morbidity in his surgical patients. With improved survival statistics, he was emboldened to attempt more complicated surgeries. Described as intuitive and inventive, Billroth performed in 1872, the first known partial oesophagectomy, followed by the first complete

laryngeal resection. Around the same time, he began excising rectal cancers and re-anastomosing the sigmoid colon to the remaining rectum or anus. This was an extension of earlier work he had done.

As far back as 1855, some twenty years prior, he had published a paper on polypoid masses in the large intestine, where he correctly emphasised that benign and malignant polyps of the colon were related and that both should be surgically excised. All of his surgical cases, successes and failures alike, found print in a four-volume collection, *Chirurgische Klinik*. Confident and unafraid, Billroth believed that *"Criticism is the principal need of our day, and for this, knowledge, experience, and calm are requisite."*



## BILLROTH I AND II

Billroth continued with his surgical innovations, which included mastectomy with axillary dissection, a novel approach at the time. However, Billroth is best known for two abdominal surgeries that bear his name—the Billroth I and II procedures. He introduced Billroth I in 1881 when he operated on a 43-year-old woman with gastric cancer of the pylorus and antrum. Billroth removed a 14-cm segment of distal stomach and anastomosed the remaining stomach directly to the duodenum with an end-to-end connection, i.e., a gastroduodenostomy.

Three years later, he performed the more dramatic Billroth II, where a larger portion of the stomach was removed and attached to the jejunum—downstream from the duodenum—a gastrojejunostomy. This was a side-to-side anastomosis of the remaining stomach to the jejunum with the proximal duodenal stump closed off as a redundant loop. These procedures, as modified, are still used today in treating gastric cancers and selected cases of peptic ulcer disease.

## OTHER CONTRIBUTIONS

Billroth was as much a teacher as an innovative surgeon. At the University of Vienna, he advocated longer post medical school rotations in surgery. He suggested and implemented extended “apprenticeships” in surgery that consisted of a year of hospital work in general medicine, followed by a year of dissection on cadavers and animals, and finally finishing with a two to three year assistantship in surgery under a senior surgeon. This was the beginning of modern day residency training in surgery.

Billroth also helped to change the face of nursing in Germany. In 1882, he cofounded a school of nursing named Rudolfinerhaus. Young women from “good families” were recruited to learn about medicine and nursing prior to being exposed to patients. Before this, nurses in large city hospitals were often untrained and overworked, sometimes for 24-hour shifts. Many of them did not have the benefit of proper education, being former washerwomen or parlour maids. He elevated the training of nurses and therefore elevated the standard of nursing by improving nursing education and clinical training, recognising full well that good nursing care was critical to patient recovery.

## EVER THE MUSICIAN

Even after he became famous as a surgeon, Billroth continued to be passionate about classical music. While living with his grandparents who were both professional

opera singers, he had learnt to play the piano, and became familiar with the works of classical composers. He subsequently became a close friend of composer Johannes Brahms, who allowed Billroth to review his piano concerto number two, and to whom Brahms dedicated two of his string quartet compositions.

Billroth became interested in string instruments as an adult and took up the viola, playing in a popular string quartet. He was frequently out into the late hours, enjoying the company of Brahms and other musicians of the city. Indeed, he enjoyed the opportunity of being a guest conductor of the Zurich Symphony Orchestra on two separate occasions during the 1863-64 season. Billroth even found time to work on a book entitled, *Wer ist musikalisch?* (What does it mean to be musical?), calling it a “*small physiological-psychological work on music.*” The book, published after his death, was intended to be an organised approach on how music related to our physiological and psychological nature.

## DEATH AT 65

The noted medical historian Henry Sigerist has described Billroth as a charismatic hero and one of the most congenial characters in the history of surgery. A member of the Academy of Sciences of Vienna, and an honorary member of 32 scientific societies, he received some 16 “high decorations” during his career. However, like many medical luminaries before him, Billroth failed to care for himself the way he cared for his patients. He drank and smoked black cigars. In 1887, he sustained a severe bout of pneumonia which left him with permanent lung damage. On February 6, 1894, this great German-Austrian surgeon died from pulmonary and heart failure. He was buried with princely honours in Vienna, and a memorial was erected in an arcade square of the University of Vienna.

## BIBLIOGRAPHY

- Enerson OD. Christian Albert Theodor Billroth, 1829-1894. Available at: [www.whonamedit.com/doctor.cfm/2343.html](http://www.whonamedit.com/doctor.cfm/2343.html). Accessed April 3, 2006.
- Kazi RA, Peter RE. Christian Albert Theodor Billroth: master of surgery. *J Postgrad Med* 2004; 50:82-83.
- Kwan H, McLaren R, Peterson T. The life and times of a great surgeon: Theodor Billroth (1829-1894). *J Invest Surgery* 2001; 14:191-4.
- McLaren N, Thorbeck, RV. Little-known aspect of Theodor Billroth's work: his contribution to musical theory. *World J Surg* 1997; 21:569-71.
- Simmons JG. *Doctors and Discoveries: Lives That Created Today's Medicine*. Boston: Houghton Mifflin, 2002.
- Sunderman FW. Theodor Billroth as musician. *Bull Med Lib Assoc* 1937; 25:209-20.