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Zhi Ven Fong, B.S.  
*Thomas Jefferson University*

Harish Lavu, MD  
*Thomas Jefferson University*

Ernest L. Rosato, MD  
*Thomas Jefferson University*

Charles J. Yeo, MD  
*Thomas Jefferson University*

Scott W. Cowan, MD  
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## Surgical Leaders

# *Christian Albert Theodor Billroth, M.D., Founding Father of Abdominal Surgery (1829–1894)*

ZHI VEN FONG, B.S., HARISH LAVU, M.D., ERNEST L. ROSATO, M.D., CHARLES J. YEO, M.D., SCOTT W. COWAN, M.D.

*From the Department of Surgery, Thomas Jefferson University, Jefferson Medical College, Philadelphia, Pennsylvania*

IN THE 1800s, the field of surgery was in its infancy, somewhat primitive and embryonic. The technical nature of surgery was the basis for the dividing line between the disciplines of surgery and internal medicine. Sterilization was not a common practice. Radical surgical resections and experimentation in medicine were shunned. With his boldness equaled only by his innovation and resourcefulness, Theodor Billroth would become a pioneer not only in the development of modern surgery, but also in the advancement of its cultural and historical significance.

Born on April 26, 1829, to Carl Theodor Billroth and his wife, Johanna Christina, in Norway, Theodore Billroth was the oldest of five children. He went to medical school at the University of Griefswald, graduating at the age of 23 years. He then met Bernhard Von Laggenbeck, a prominent surgeon in Berlin, and was appointed his assistant in the surgical clinic at the Berlin University (1853–1860).<sup>1</sup> This appointment launched Billroth's surgical career. In Berlin, Billroth was considered to be one of medicine's great teachers. It was for his academic excellence that Billroth was promoted to the rank of Associate Professor of Surgery in 1856. Aside from his clinical responsibilities, Billroth spent a considerable amount of time in the laboratory, publishing 12 papers in the fields of pathology and histology. He eventually published one of his greatest works, *Allgemeine chirurgische Pathologie und Therapie* (General Surgical Pathology and Therapy in Fifty Lectures) in 1863. The book was translated into 10 languages and went through 16 editions, being referred to as the classic textbook of its time.

Billroth later accepted a position as Professor in Surgery at the University of Zurich (1860–1867) and became director of its surgical clinic. He was the first to report his total clinical experience, publishing his surgical outcomes in *The Surgical Clinic of Zurich (1860–1867)* and later followed by its sequel, *The Surgical*

*Clinic of Vienna (1871–1876)*. These articles were the first two publications introducing statistics to surgery, reporting complication and mortality rates as well as the concept of a 5-year follow-up, thus serving as the basis and foundation for much of the clinical research performed today.<sup>2</sup> Understanding the potential for publication bias and limits of statistics, he introduced the concept of audits, publishing both good and bad results, resulting in more honest discussions of surgical technique, morbidity, and mortality.

At just 38 years of age, Billroth was offered the Chair of the Department of Surgery at the University of Vienna (1867–1894). His classic textbook, *Lehren und Lernen* (Teaching and Learning in the Medical Sciences) was published during his tenure at Vienna. In this text, Billroth advocated for prolonged surgical apprenticeship on completion of medical school but such a practice was not supported by the government in Vienna and it was not instituted. It was not until 16 years later that a young William Stewart Halsted many of Billroth's principles and started the first formal surgical residency training program in the United States at The John Hopkins University School of Medicine.<sup>2</sup>

It was in Vienna that Billroth accomplished some of his greatest surgical achievements (Fig. 1). In 1872, together with his most prominent pupil, Vincenz Czerny, Billroth was the first to perform an esophagectomy. A year later, he performed the first successful total laryngectomy for cancer. His most significant contribution, however, did not come until 1881. Despite numerous failures in performing a successful gastrectomy throughout the century, Billroth remained certain that gastric resection was anatomically and technically possible. With the aid of his assistants, Billroth refined the technical details of the gastric resection in animals but could not find a suitable patient.

Five years later, Therese Heller, a 43-year-old frail woman with a 3-month history of emesis, presented to the Vienna surgical clinic. She reported weight loss and had a mobile epigastric mass on physical examination. She was diagnosed with a carcinoma of the pylorus. On January 29, 1881, at 9:00 AM, Theodor Billroth began his first successful partial gastrectomy. After induction

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Address correspondence and reprint requests to Scott W. Cowan, M.D., Department of Surgery, Thomas Jefferson University, 1100 Walnut Street, 5th Floor, Philadelphia, PA 19107. E-mail: Scott.Cowan@jefferson.edu.



FIG. 1. Billroth's surgical amphitheatre in the Allgemeines Krankenhaus as illustrated by Adalbert Seligmann (1862–1945). Reproduced from Theodor Billroth Operating by Adalbert Seligmann. Wikipedia, the free encyclopedia. Available at: [http://en.wikipedia.org/wiki/Theodor\\_Billroth](http://en.wikipedia.org/wiki/Theodor_Billroth). Accessed August 14, 2011.

using chloroform anesthesia and with aseptic precautions, a transverse abdominal incision was made. Billroth resected the distal stomach and pylorus and closed the greater curvature with 21 silk sutures. The lesser curvature was sutured to the duodenum using 33 silk sutures as a one-layer anastomoses. By 10:30 AM, the abdomen was closed with the surgery having been completed 1 and a half hours from the time of induction. Theresa Heller went on to recover postoperatively without complications and was a most celebrated patient until she died of metastatic disease 4 months later. The original gastrectomy and autopsy specimen now lie in the Josephinum Museum in Vienna.<sup>3</sup>

On February 6, 1894, 5 years after celebrating his 60th birthday, Billroth died of congestive heart disease. His remains can be found buried in Zentralfriedh (Central Cemetery) situated on the very outskirts of Austria. His legacy, however, did not die with him. Theodor Billroth was succeeded by his pupils, Vincenz Czerny (first open partial nephrectomy for renal cell carcinoma, established the first cancer institute in Germany), Anton Wölfler (first gastroenterostomy, described postthyroidectomy tetany), and Johann von Mikulicz (pioneered the esophagoscope and gastroscope).<sup>4</sup>

Theodor Billroth and his surgical school remain the cornerstone of modern-day surgery. The memorial



FIG. 2. The memorial to Theodor Billroth at the University of Vienna. Reproduced from Figure Theodor-Billroth 2. Wikimedia Commons. Available at [http://commons.wikimedia.org/wiki/File:Figur\\_Theodor-Billroth\\_2.jpg](http://commons.wikimedia.org/wiki/File:Figur_Theodor-Billroth_2.jpg). Accessed September 29, 2011.

erected in his honor in the arcade square at the University of Vienna (Fig. 2) could not sufficiently commemorate his contributions to the field of surgery. He always preached to students, “A human organization can endure only if it progresses as the total cultural development does. To keep our position means always to progress, always to create and advance more than others; everyone who stands still will be passed without mercy.”

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