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Epochs in Endourology

Philipp Bozzini—The Father of Endoscopy

RAINER M.E. ENGEL, M.D.

PHILIPP BOZZINI (Fig. 1), born in Frankfurt on May 25, 1773, was the son of Nicolaus Maria Bozzini de Bozza, who had to leave his native Italy when he was involved in a duel with a fatal outcome. Nicolaus moved to Mainz where he set up business and married.

Philipp went to school in Mainz, where he also began to study medicine, receiving his doctorate on July 12, 1796. He was admitted as an extraordinary "assessor" to the Faculty of Medicine and 2 months later received his license to open a medical practice in Mainz. He continued to travel, particularly to The Netherlands and France, to further his medical education. During the Napolenic wars between France and Austria, he served as a medical officer in the imperial field army of Austria in charge of a field hospital in Mainz with 120 beds. After the French conquest of Mainz at the end of 1797, Bozzini worked as a private physician and married, but the subsequent changes of the Luneville Peace Treaty, ceding Mainz to France, caused him to lose his extended practice. He did not want to take French citizenship and left for Frankfurt on the other side of the Rhine. The previous professors of the University of Mainz, which the French had dissolved in 1798, mostly settled in Frankfurt, and Bozzini therefore applied to Archduke Karl of Austria, who had been the field marshal of the army, to help him secure citizenship in the city of Frankfurt. He finally applied for citizenship to the city council in December 1802, but the council denied his request, stating that he did not meet the "constitutional requirements for citizenship." One of the reasons for the denial appears to have been Bozzini's calculated wealth, which he had stated as 500 guilders. But this did not include books, paintings, or inheritance, nor his portion of a family lawsuit in The Netherlands, which was coming to a conclusion, raising his total to more than 30,000 guilders.

In his repeat application, Bozzini stated that his maternal grandfather had been a citizen of Frankfurt, and he offered his services free of charge to a public institution in town. However, the city council again stated "the applicant is referred to the previous negative conclusion." He reapplied, referring this time to the expectations aroused by his high-level patron, the Archduke Karl of Austria. Bozzini then took a required medical examination in January 1803 and reported that the examination was purely theoretical and dealt with subjects, that after 7 years in practice, he no longer fully mastered. He was judged to have only "average medical knowledge" and again was rejected.

Bozzini persisted, however, complaining about the examination, which he judged inappropriate for a physician who had been in practice for a number of years, and indeed, he prevailed. The "imperial resident" of Frankfurt interceded with the Mayor of Frankfurt and advised that the council should show attention to the wishes of "his Royal Highness Archduke Karl." A new examination was ordered, which Bozzini passed, and in May 1803, the city council gave him both citizenship and the privilege of practicing physicians.

His practice grew only slowly, and Bozzini had time for scientific studies and papers, which he dove into with enthusiasm. These included an essay on diphtheria, material for the geographic and historical description of the suburbs of Frankfurt, and studies and drawings for a machine which he hoped would enable humans to fly. Unfortunately, all his works perished in subsequent wars.

The Lichtleiter or "Light Conductor" was an instrument the construction of which preoccupied Bozzini for quite some time. His idea was to create a way to allow a physician to look into the inner cavities of the human body. He first presented this instrument to the public in 1804 in Frankfurt but was ridiculed in one of the local newspapers. However, a number of other people realized that this might be the beginning of an important instrument and therefore praised him. He continued to improve the device and made a preliminary announcement of his instrument on February 7, 1805 in an Imperial paper, the *Reichsanzeiger* (Fig. 2). The announcement caused a sensation, and inquiries appeared over the next few months in several newspapers. In July of 1806, the instrument was demonstrated at a scientific session in Frankfurt, and it was noted that the application of his instrument for the inspection of the pharynx and the nasal cavities was indeed remarkable. The Lichtleiter had been used by Froriep of Halle (Germany), who was impressed with it, and in early 1806, Bozzini presented his first publication in Hufeland's *Journal of Practical Medicine*, Volume 24, under the title "Light Conductor, An Invention for the Viewing of Internal Parts and Diseases with Illustration." In 1807, Bozzini published a monograph, "The Light Conductor, or De-

Curator, William P. Didusch Center for Urologic History, Baltimore, Maryland.

FIG. 1. Portrait of Philipp Bozzini.

scription of a Simple Device and Its Use for Illumination of Inner Cavities and Spaces of the Living Animal Bodies."

The Lichtleiter consisted of a funnel-shaped, approximately 35-cm tall hollow sheet-metal tubulous covered by paper and leather. On the inside was a candle-holder which, by means of a spring device, kept the flame at a constant height. A concave mirror, situated behind the candle, projected the light through an opening in the front while a fenestra on the opposite side was fitted with an eyepiece to allow the observer to look through it. At the front end, connected to this funnel or chimney, several examination devices or specula could be attached through a connector consisting of two metal sleeves joined with a soft leather cuff (Fig. 3).

The publication caused quite a sensation, with numerous favorable and encouraging comments and an almost equal number of sarcastic or even violent critics. Bozzini then sent to his patron, Archduke Karl, a description of his device. The instrument, by order of the Emperor, was purchased from Bozzini and given to the Josephinum (the medical military academy of the Austrian empire) with the instruction to test its value in an unprejudiced fashion. Initially, the reports were quite favorable. Testing began in 1807, and the Academy made some improvements. The first experiments, conducted on corpses, "all turned out to the credit of the inventor, by proving the usefulness of his ingenious invention completely and fulfilling the expectations of all the experimenters to their most agreeable surprise." The next set of tests was conducted on actual patients by the Professor of Anatomy and Physiology at the University of Vienna under the leadership of Freiherr von Stifft. The results were not favorable. We do not know how Bozzini took this blow, especially as he had failed to refer to the article in Hufeland's *Journal* and further more sent only one straight examination tube with written instructions, again mentioning only this one attachment. The instrument was soon forgotten.

A

Der

Reichs-Anzeiger.

Oder

Allgemeines

Intelligenz-Blatt

zum Behuf

der Justiz, der Polizey und der bürgerlichen Gewerbe

im Teutschen Reiche

zur öffentlichen Unterhaltung der Leser

über

gemeinnützige Gegenstände

aller Art.

Mit Römisch-Kaiserl. allergnädigster Genehmigung und Freyheit.

Jahrgang 1805.

Erster Band.

Bey allen Post-Aemtern und Zeitungsexpeditionen postäglich und in allen Buchhandlungen monatlich zu haben.

B

Künste, Manufacturen und Fabriken.

Gewisse Ursachen bestimmen mich, die Anzeige von der Erfindung einer einfachen und leicht anwendbaren Vorrichtung zu machen, durch die man in alle innere Höhlen des lebenden animalischen Körpers, die nicht undurchsichtige Flüssigkeiten enthalten, durch physiologische oder pathologische Oeffnung genau sehen kann. Die in denselben vorgehenden Functionen erscheinen dem Auge eben so deutlich, als auf der Oberfläche, und es lassen sich Operationen in ihnen unter Anwendung des Gesichtssinnes vornehmen. Ich beschäftige mich gegenwärtig mit diesen Beobachtungen, und werde sie nebst der Vorrichtung in der Folge bekannt machen.

D. Bozzini,
Arzt und Geburtshelfer zu Frkft. a. M.

FIG. 2. Early documentation **(A)** Cover of *Reichsanzeiger*. **(B)** Bozzini's writing on the Lichtleiter.

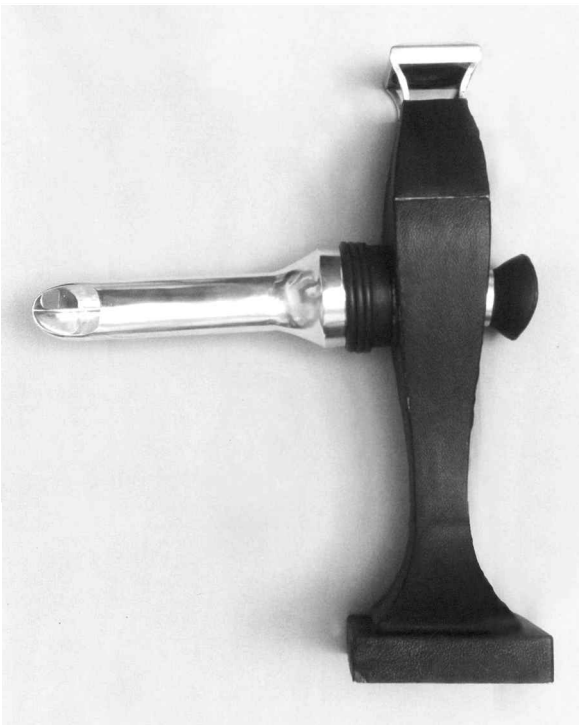

FIG. 3. The Lichtleiter.

In April 1808, the "Physicus Extraordinarious" of the City of Frankfurt died from typhoid fever, and Bozzini was chosen to succeed him. This position carried with it an annual payment of 75 guilders, together with some tax exemptions and the entitlement for scaled fees for certain medical services.

The typhoid fever that had claimed the life of his predecessor eventually claimed Bozzini's life as well. In succeeding in saving 42 of his patients suffering from typhoid fever, he himself succumbed to it on April 4 of 1809. His widow died 6 months later, and family friends took care of his three young children.

Decades later, Bozzini's invention was honored. It is mentioned in the publication "Allgemeine Deutche Biographie" from 1876 as the first laryngoscope. Cumbersome in design, dubious in efficacy, the ingenious Lichtleiter of Bozzini is the forerunner of all endoscopes.

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PEREGRINATIONS OF THE LICHTLEITER

Not often are we given the opportunity to correct a wrong of long standing. All too often, as time passes, evidence is lost, and the true story, as told by those who knew and retold by those who heard, changes subtly but persistently. And we know all too well that history is eventually written by the victors.

I first heard of the Lichtleiter when Ronnie and Irving Bush showed the instrument as part of an exhibit at the Annual Meeting of the American Urological Association in 1971 in Chicago. The frontispiece of their brochure depicts the original Lichtleiter with all the pieces. The second picture is very similar to one that Dr. Peter Paul Figdor published in his marvelous volumes on Philipp Bozzini's work. While he had to make do with the copy produced by Daimler Benz through the initiative of Hans Reuter, the Bushes could show a bird's-eye view of the original instrument in the brochure for their exhibit.

I next saw the Lichtleiter as it was displayed at the 1992 AUA Meeting. At that time, my previous chief at Johns Hopkins Hospital, Dr. W.W. Scott, was the Curator of the William P. Didusch Museum and had obtained the Lichtleiter on loan from the College of Surgeons. Dr. Scott had no idea how the instrument came into the hands of the College, and I remember at the time that I took over the museum 10 years ago, he exhorted me to do my utmost to rescue the Lichtleiter from the College of Surgeons and bring it to the William P. Didusch Museum, as he felt strongly that this was a urology instrument and properly belonged in a museum of urology. There are two stories I will share with you shortly, quite different but both telling the tale of this instrument's appearance in the collection of the College of Surgeons in Chicago.

In 1995, I was invited to attend the inauguration ceremony of the Nitze-Leiter Museum at the Josephinum. At that time, I met Dr. H.J. Reuter; we talked about cystoscopes, and inevitably, the conversation drifted to the Lichtleiter. Dr. Reuter heard what I wanted to do and convinced me that the Lichtleiter belonged to a different museum, namely the Josephinum, and not to the William P. Didusch Museum, even if it was the museum of the AUA. His eloquence did not fail to drive this point home.

I then contacted Dr. Bush, as I knew that he had pictures of the Lichtleiter, and he had told me once before that he was certain that the Lichtleiter in Chicago was the instrument that originally came from Vienna. He sent me a videotape that showed him and his son at their farm talking about Irv's urologic collections; it also showed a 1-minute sequence where he explains the Lichtleiter to his son. I showed this movie at the inauguration meeting of the Nitze-Leiter Museum in January 1996, and ever since have been working on returning the instrument to its rightful home, the Josephinum in Vienna. On my return, I wrote the curator of the collection of the College of Surgeons with a plea to initiate proceedings to return the instrument to Vienna. I received a very blunt reply indicating I was out of my head to even *suggest* such a preposterous idea. The refusal was absolute. Some time later, I contacted his secretary to see if there was any way we could change the good man's opinion, but she was very clear in interpreting his feelings and thought I would get the instrument only over his dead body. Subsequently, he died. I can assure you there was no causal relation.

Some time later, I contacted Mary McGrath, the Regent of the Board of the College of Surgeons responsible for the collection. Although she was very polite, the total lack of action clearly told me where I stood. I wrote her a couple of times again, and I was told the matter would be taken up at one of the next board meetings.

While the AUA was making a movie on the History of American Urology in which I was deeply involved, I met the Executive Editor of the College's publication, Ms. Wendy Husser. I told her of my problems; again, I wrote to the Regent, but nothing happened within the next couple of years, so we decided that I needed to contact somebody else. Ms. Husser recommended that I talk to Dr. Hanlon, who had been President of the College several years back. I made an appointment to see him when I was in town as Visiting Professor at the University of Chicago. We met in his small office, and Dr. Hanlon and I chatted for more than an hour about the city of Baltimore, where he grew up and went to medical school. We talked about mutual friends and colleagues, his time as an altar boy, and similar experiences that I had also had, though not in Baltimore. Eventually, he came back to the story of the Lichtleiter. His story of how the College got the Lichtleiter was quite different from that of Dr. Bush. Bush had found the Lichtleiter in a cardboard box with several other instruments; papers within the box strongly suggested that the instruments had been a gift from Sir Eric Richie, who, as President of the British College of Surgeons, visited the American College of Surgeons at some point in the 1960s. The instrument had been totally forgotten, and not only was it dusty, but the cover on the metal chimney was ripped. Dr. Hanlon, on the other hand, told me that the instrument was the gift of one of the major pharmaceutical companies, which, like so many others, had gone through a number of mergers and amalgamations. Trying to track down paperwork on the gift proved impossible, as all correspondence had been destroyed as "insignificant," both at the College of Surgeons and at the pharmaceutical company itself.

Dr. Bush had Fred Wallace from ACMI restore the instrument and kept it on his television set for quite some time thereafter. When he mentioned the instrument at the College on a couple of occasions, he was asked to return it. It wound up in one of the display cases, but somewhere during this transition, the pharyngoscope extension was lost.

I had written Dr. Hanlon before, and he was well versed in the instrument itself, having taken pains to examine it within the College's collection. I presented him with the European side of the story: the disappearance of the instrument in 1945 during the occupation by Allied forces and its reemergence a couple of decades later in Chicago. As there is no other instrument surviving the war, it was fairly clear that we were indeed looking at Bozzini's Lichtleiter from Vienna. At that time—the summer of 1999—Dr. Hanlon promised that he would do everything that he could to convince the Board of Regents to return the Lichtleiter to Vienna. He gradually convinced his colleagues that this instrument indeed should be returned to its rightful abode, but over and over again, the issue was tabled at meetings because time on the agenda ran out, and clearly, this was not a pressing issue for the College. However, Dr. Hanlon did not give up, and he and I stayed in touch via E-mail, simply talking about "our friend" but never mentioning the word "Lichtleiter."

Then in 2001, another member of the Board of Regents of the College came through Vienna and visited the Josephinum: Dr. Healy, representing the ear, nose, and throat physicians. By that time, I had convinced the urology member on the Board to press for the return of the instrument.

While vacationing in the Florida Keys early in 2002, I received an E-mail from Dr. Hanlon telling me "our friend will return to Vienna." You have no idea how elated I was; I felt like hugging everybody who ran across my path. It was hard for me to believe that we really had succeeded after 7 long years. In early May, Dr. Hanlon, on his way back from a meeting, drove by the headquarters of the AUA to deliver the original Lichtleiter personally into my hands. A couple of weeks later, the Lichtleiter was securely ensconced in a specially created case and was in my car on its way to Orlando, where it would be turned over to Dr. Skopec, curator of the collections of the Josephinum.

On May 28th, representatives from the College of Surgeons and the Board of Directors of the AUA met at our annual History Forum. The highlight of this meeting was the handing over of the Lichtleiter by the College of Surgeons through the AUA to Dr. Skopec.

Packed again in its wooden case, the instrument was trundled to the airport by Dr. Skopec, and together, they flew back to Vienna to return to the place where the Lichtleiter was first examined nearly 200 years ago. Welcome home.

Address reprint requests to:
Rainer M.E. Engel, M.D.
William P. Didusch Center for Urologic History
100 Corporate Blvd.
Linthicum, MD 21090