

# a history of medicine in pictures

*by George A. Bender*

*painting by Robert A. Thom*

## **Laennec and the Stethoscope**

DURING the past century, perhaps the most characteristic symbol associated with physicians has been the stethoscope. It replaced the urine glass, the symbol which had prevailed since medieval times. Today's physician acquires his first stethoscope during his second year in medical school. From then on, employment of percussion and auscultation in his study of patients becomes as automatic as counting pulse or taking temperature. Yet it required three generations of medical men and lifelong efforts of two physicians dedicated to research to introduce these methods to medicine, to instruct physicians in their use, and to overcome resistance and prejudice of contemporaries to whom change was offensive.

Percussion was introduced to medicine by an Austrian, Leopold Auenbrugger (1722-1809). Appointed physician to the Spanish Military Hospital, then Vienna's finest, in 1751, Auenbrugger had exceptional opportunity to observe the processes of disease, especially disease of the chest. He noted that, when the thorax of a healthy person is struck lightly, a sound resembling that of a drum muffled with a thick woolen cloth is produced. In sick persons, such sounds vary in accordance with the nature of underlying change, its location, and its extent. Auenbrugger spent seven years testing his idea, especially checking opinions formed



ROBERT THOM

while examining moribund patients with conditions found at autopsy. In 1761, he published his epochal contribution, *On Percussion of the Chest*, in a small volume of 95 pages. Auenbrugger's preface was prophetic. Therein he wrote:

"I here present the reader with a new sign which I have discovered for detecting diseases of the chest. This consists in the percussion of the human thorax, whereby, according to the character of the particular sounds thence elicited, an opinion is formed of the internal state of that cavity. In making public my discoveries... I have not been unconscious of the dangers I must encounter; since it has always been the fate of those who have illustrated or improved the arts and sciences by their discoveries to be beset by envy, malice, hatred, detraction, and calumny. This, the common lot, I have chosen to undergo..."

Though a second edition appeared in 1775, Auenbrugger's work was unappreciated until 1808, when Jean Nicolas Corvisart, physician to Napoleon I and leader of medical thought in France, translated *On Percussion of the Chest* into French and gave unstinted praise to the discoverer of percussion, 47 years after Auenbrugger's little volume first appeared in Austria. Corvisart became one of Laennec's teachers, providing the link between Auenbrugger and percussion, and Laennec and indirect auscultation. As the career of the Austrian physician was drawing to a close, that of the young Frenchman was just beginning.

Laennec's embarkation upon a career in medicine closely coincided with recognition of Paris as world capital of medicine between 1800 and 1850. The foundations had been well laid. Morgagni of Padua and Bichat of Paris had established the importance of anatomic pathology and of autopsy. Pinel had proved the value of statistical compilations from patients' records. Corvisart the clinician emphasized need for adequate physical examination, including employment of Auenbrugger's methods of percussion. To these advances, Laennec was to add mediate (indirect) auscultation. This combination of clinical and diagnostic procedures revealed basic characteristics of diseases prevalent at the time, such as tuberculosis, typhoid fever, and diphtheria.

René Théophile Hyacinthe Laennec was born at Quimper, Lower Brittany, France, February 17, 1781. He was not quite 5 years of age when his mother died of pulmonary tuberculosis, a disease prevalent in the area. His father, an advocate with considerable education, preferred literature to law, and accepted practically no responsibility for his children. Early in life Théophile Laennec went to live with an uncle, Guillaume François Laennec, a professor on the faculty of medicine at Nantes, who had studied at Montpellier, and under Hunter, in London. This uncle saw to it that young Théophile received a sound basic and classical education, despite the turbulent times. The French Revolution was under way, with its rioting and political brutalities. In his fifteenth year, Théophile was given the title of military surgeon, third class, and set to work as an apprentice, assisting his uncle in military hospitals at Nantes.

After preliminary studies in local educational institutions, Laennec, at 19 years of age, was able to go to Paris to complete his medical education. Shortage of funds and poor living conditions did not improve his already delicate health. He immediately enrolled in the Ecole de Médecine, and attended clinics at l'Hôpital de la Charité under Corvisart and his assistant, Bayle. Corvisart stressed bedside instruction, and trained his students thoroughly in autopsy

**the picture** Théophile Laennec (1781-1826), young French physician, while at Necker Hospital, Paris, in 1816, devised foot-long hollow wooden cylinders for listening to sounds in patients' chests. These he called "stethoscopes." Comparing opinions formed during stethoscopic examinations with later findings at autopsy, Laennec learned to accurately diagnose many pathologic heart and lung conditions. His instrument and his published reports on its use were among the greater contributions to nineteenth century medicine, helping physicians to understand pulmonary diseases—especially tuberculosis, the malady that ended Laennec's own short life.

examinations. Laennec studied carefully and methodically; during his first three years at La Charité he wrote up careful histories of more than 400 patients whom he had seen. Driven by his inborn intensity, Laennec won two governmentally sponsored first prizes in surgery and in medicine by competitive examinations and while still an undergraduate student published papers on heart disease and on the capsule of the liver. His memoir in 1802 on peritonitis was particularly valuable in clarifying this age-old problem.

Théophile Laennec received his doctorate, June 11, 1804, at age 23. For five years after graduation he was editor-in-chief of the *Journal de Médecine*. At the same time he lectured on pathologic anatomy. Paper after paper flowed from his pen. Tuberculosis in particular attracted his attention, and percussion was one of his favorite diagnostic methods. Among his prominent patients were Chateaubriand and Madame de Staël. During this period he held posts at the Hôpital Beaujon and at the Salpêtrière.

By 1814, Laennec was badly in need of a vacation. He returned to an estate inherited from his grandfather at Kerlouarnec, near Quimper, seeking to throw off exhaustion from his busy life, as well as persistent attacks of asthma, and to indulge his lively interests in natural history and in roots of the Celtic language spoken in his home area.

Returning to practice in Paris in 1816, at 35 years of age, Laennec was appointed visiting physician to l'Hôpital Necker. This provided him the opportunity of his lifetime. Likely his name would have found its place in history because of his publications on pathology and methods of correlating clinical observations with post-mortem findings; but the clinic at Necker Hospital, in his first year there, presented Laennec the challenge that led to his greatest discovery.

Laennec was familiar with palpation and percussion; and from his friend and former teacher, Bayle, he had learned of immediate, or direct, auscultation (listening to sounds in the thorax by placing the physician's ear directly on the patient's chest wall). Many patients were not accustomed to bathing and some even were verminous, so many physicians were reluctant to use this diagnostic method. Layers of fat that sometimes obstructed trans-

mission of sounds, and modesty of women patients were further deterrents.

One day, in 1816, while walking through a littered yard pondering the problem of a very obese young woman suspected to be suffering from heart disease, Laennec noted a group of children at play about a pile of beams. One would put his ear against the end of a beam, while another would scratch or tap the opposite end. To their childish amazement the sounds were conveyed from one end to the other. Laennec, grasping the physical principle involved, hurried back to Necker and his overweight patient.

"I rolled a quire of paper into a kind of cylinder," says Laennec in the introduction to his great book, "and applied one end of it to the region of the heart and the other to my ear, and was not a little surprised and pleased to find that I could thereby perceive the action of the heart in a manner much more clear and distinct than I had ever been able to by immediate application of the ear. From this moment I imagined that the circumstance might furnish means for enabling us to ascertain the character, not only of the action of the heart, but of every species of sound produced by the motion of all the thoracic viscera and consequently for the exploration of the respiration, the voice, the rhoncus (râle), and perhaps even the fluctuation of fluid extravasated in the pleura or the pericardium. With this conviction I forthwith commenced at the Hospital Necker a series of observations from which I have been able to deduce a set of new signs of diseases of the chest... to render the diagnosis of the diseases of the lungs, heart, and pleura, as decided and circumstantial as the indications furnished to the surgeon by the introduction of the finger or the sound, in the complaints wherein these are used."

Laennec then set about experimenting with various forms of the instrument, which he named *stethoscope*. First he tried a compact roll of paper, then a wand with no aperture. This he found would convey heart sounds, but a cylinder with a central aperture and a funnel-shaped opening at the applied end proved best suited for chest examinations. He finally settled on a cylindrical instrument made of light wood, about an inch and a half in diameter and a foot long, perforated longitudinally.

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dinally by a quarter-inch bore, hollowed out to funnel shape at the end for application. He fitted this end with an insertable perforated plug that would convert the device to a simple cylinder. The instrument was divided into two portions of about equal length that would slip or screw together. This had the double advantage of being more convenient for carrying in a pocket, and, when desired, of providing a shorter instrument by use of only one segment. Various adaptations of this form of instrument continued in use by physicians until the binaural stethoscope was developed by Dr. George Philip Cammann, of New York, in 1855. Cammann's instrument, which in essence was similar to those used today, afforded convenience and freedom of movement to the physician by providing aural ends which fitted into the ear, instead of just against it.

For the next three years, 1816 to 1819, Laennec intensively studied sounds heard through his stethoscopes, and like Auenbrugger, checked his impressions with autopsy findings. He presented reports to the Société de l'Ecole, and to the Academy of Sciences, describing use of his instrument in diagnosis and sounds encountered in patients with such conditions as pneumothorax, bronchial dilatation, pulmonary emphysema, edema, gangrene, and tuberculosis. He also described significant attributes of voice transmission through the chest wall, which he termed "pectoriloquy" and which he interpreted as indicative of serious tuberculous lesions. So closely did he apply himself to this work that his health broke down and he was forced to take another holiday at Quimper. He returned to Paris thereafter and set about publication of his findings in book form. In 1819, *A Treatise on the Diseases of the Chest and on Mediate Auscultation* appeared in two thick volumes.

Laennec's treatise met with cool reception and harsh criticism. However, some prominent physicians began using the stethoscope; and translations of his book were made in other languages. Laennec's ideas had better reception in other European countries and in North America than in his own country.

Laennec's health again broke down (likely he was already suffering from tuberculosis) and he retired to his farms at Kerlouarnec for two years. He returned to Paris in November, 1821, this time to be welcomed with many honors. He was appointed personal physician to the Duchess of Berry; and in 1822 he was

appointed professor of practical medicine at the Collège de France, to succeed Corvisart as clinical professor one year later. Physicians from all over Europe and America came to hear lectures by the discoverer of auscultation, who had resigned his position at Necker and had taken over a clinic at La Charité. In 1824 he was made a Knight of the Legion of Honor. The emaciated, asthmatic little physician plunged again into an intensive work schedule, which included preparation of the second, enlarged edition of his treatise on auscultation. Again he was defeated by poor health. He contracted a cold, and his dry cough became more severe. At the end of May, 1826, Laennec returned once more to Brittany, hopeful for relief. One of his pupils, called to care for him, on examining him heard the telltale pectoriloquy, harbinger of death from tuberculosis. Laennec's condition worsened, and on August 13, 1826, the dread consumption that had claimed his mother and many of his patients took the life of the little physician in his forty-fifth year.

Tribute to Laennec as a man of medicine may be found in Sigerist's writings: "Laennec was something much more than the discoverer of auscultation. He was a distinguished anatomist and a great clinician. The invention of the stethoscope was remarkable, but even more remarkable was what he himself did with the instrument." As a man among men, Ackerknecht described Laennec as: "Incredibly many-sided: a good philologist, musician, hunter, draftsman, woodcarver, and administrator, besides being a medical genius and a good man. But he exhibited a façade of coldness and few persons recognized his true value during his short life—so full of tribulations, so poor in joys, yet so rich in accomplishments."

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