200TH ANNIVERSARY OF THE BEGINNING OF CLINICAL APPLICATION OF THE LAENNEC'S STETHOSCOPE IN 1819

UZ 200. OBLJETNICU POČETKA KLINIČKE UPORABE LAËNNECOVA STETOSKOPA 1819. GODINE

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Summary

Although stethoscope was invented by French physician René-Théophile-Hyacinthe Laennec (1781-1826) in 1816, its wider clinical application started only after the publication of his book entitled De l'Auscultation Médiate ou Traité, du Diagnostic des Maladies des Poumons et du Coeur *in 1819. Its invention coincided with the development of the 'hospital medicine' in the post-revolutionary Paris during the first quarter of the 19th century. It has enabled then contemporary physicians to explain the correlation between the patient symptoms and the clinical findings and thus has helped the shift from the humoral pathology towards the solitary pathology.*

Keywords: *René-Théophile-Hyacinthe Laennec, history of medicine, 19th century, stethoscope, scientific revolution, clinic, hospital medicine, Paris*

René-Théophile-Hyacinthe Laennec was born in Quimper in Brittany in France on the 17th February 1781. He finished his grammar school in Nantes, and despite his father's wishes, who wanted him to become a lawyer like himself, he went to study medicine at the University of Paris. During his studies he became acquainted with famous clinician Jean Nicolas Corvisart Desmarets

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(1755-1821) who reintroduced the percussion, discovered by Austrian physician Leopold Auenbrugger (1722-1809) half a century before, into a regular clinical examination. These were turbulent years in the French and the world history, which had started with the French Revolution in 1789, which led to the abolishment of the French Monarchy and the proclamation of the French Republic. It then continued with the Napoleonic era (1798-1815) which had seen changes from the Directory Period, through the Consulate Era, to the Empire Period, and finally ending with the Bourbon Restoration under king Louis the XVIII, continuing with king Charles the X. The turbulent years ended with king-citizen Louis-Philippe, who was overthrown in the Revolution of 1848. These major political changes have influenced all aspects of life including medicine as well.[1]

Figure 1. René-Théophile-Hyacinthe Laennec (1781 – 1826).

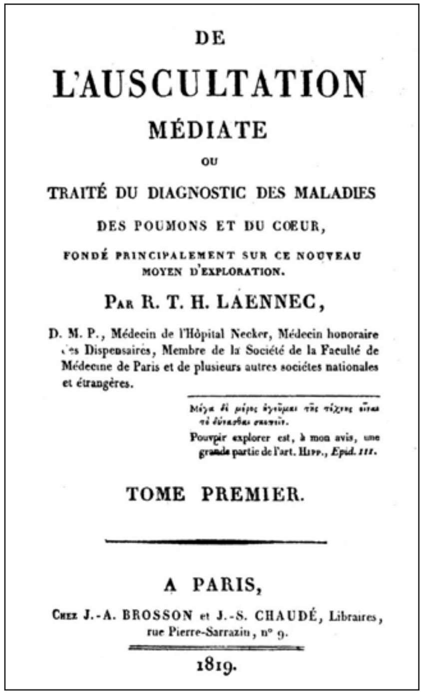
In his book *Medicine at the Paris Hospital, 1794-1848* American historian of medicine Erwin Ackerknecht introduces a term 'hospital medicine' in order to describe the medical reform which has developed in Paris during the mentioned years. He talks of succession of reformers such as Philippe Pinel (1745-1826) who established modern psychiatry and Marie Francois Xavier Bichat (1771-1802) who founded modern histology.[2]

Together with the above-mentioned Corvisart, and although working at different hospitals (Pitié-Salpêtrière, The Hôtel-Dieu and Hôpital de la Charité), they have managed to switch medicine from the then prevalent humoral pathology, which perceived diseases through the humoral imbalance, towards the still current solitary pathology, which connected diseases with the particular organs, and thus according to American philosopher of science Thomas Kuhn have caused a 'scientific revolution' of paradigm

1 Roguin, Ariel. (2006), René-Théophile-Hyacinthe Laennec (1781–1826): The Man Behind the Stethoscope, Clinical Medicine & Research, 4(3), 230–235.

2 Ackerknecht, Erwin H (1967). Medicine at the Paris Hospital 1794-1848, Baltimore; The John Hopkins Press, 6.

shifts.[3] In his book *The Birth of the Clinic – An archaeology of medical perception*, French philosopher of science Michel Foucault uses for it a term 'clinical revolution' and talks of the epistemological transformation in which the discoveries of pathological medicine served in the foundation of clinical medicine, based on learning and seeing, which was in the contrast with proto-clinic, based on teaching and saying, and which has finally led to the correlation of the patient symptoms with the clinical findings.[4] He uses the same term 'clinic' to describe both the clinical method of the examination of the patients and the teaching institution for the future physicians, founded by the French Revolutionaries as the 'new age hospitals' which as such were part of a wider cognitive revolution, which has included changes in the organisation of schools, prisons, workshops and barracks as well.[5, 6, 7, 8]


DE

L'AUSCULTATION

MÉDIATE

OU

TRAITÉ DU DIAGNOSTIC DES MALADIES

DES POUMONS ET DU CŒUR,

FONDÉ PRINCIPALEMENT SUR CE NOUVEAU MOYEN D'EXPLORATION.

PAR R. T. H. LAENNEC,

D. M. P., Médecin de l'Hôpital Necker, Médecin honoraire des Dispensaires, Membre de la Société de la Faculté de Médecine de Paris et de plusieurs autres sociétés nationales et étrangères.

Μέγα δὲ μέρος ἡγεῦμαι τῆς τέχνης εἶναι τὸ δύνασθαι σκοπεῖν.

Pouvoir explorer est, à mon avis, une grande partie de l'art. HIPP., *Epid. III*.

TOME PREMIER.

A PARIS,

CHEZ J.-A. BROSSON et J.-S. CHAUDÉ, Libraires, rue Pierre-Sarrazin, n° 9.

1819.

Figure 2. *De l'auscultation médiate, ou Traité des diagnostics des maladies des poumons et du coeur*

On Mediate Auscultation or Treatise on the Diagnosis of the Diseases of the Lungs and Heart, Paris: Chez J.-A. Brosson et J. S. Chaudé.

In the above described milieu came Laennec with his invention of stethoscope (Greek stéthos - chest and skopé - examination) in 1816 as an acoustic medical device for auscultation, or listening, to internal sounds

3 Kuhn, Thomas S (1996). The structure of scientific revolutions, Chicago and London; University of Chicago Press, 8.

4 Foucault, Michel (2005). The Birth of the Clinic – An archaeology of medical perception, London and New York; Routledge Classics, 9.

5 Jones, Colin; Porter, Roy (1994). Reassessing Foucault: Power, Medicine and the Body, London; Routledge, 25.

6 Danaher, Geoff; Schirato, Tony; Webb, Jen (2000). Understanding Foucault, London; Sage publications, 16.

7 Goldstein, Jan (1994). Foucault and the writing of history, Oxford, UK/Cambridge, USA; Blackwell; 19.

8 Dean, Mitchell (1994). Critical and effective histories – Foucault's methods and historical sociology, London and New York; Routledge, 28.

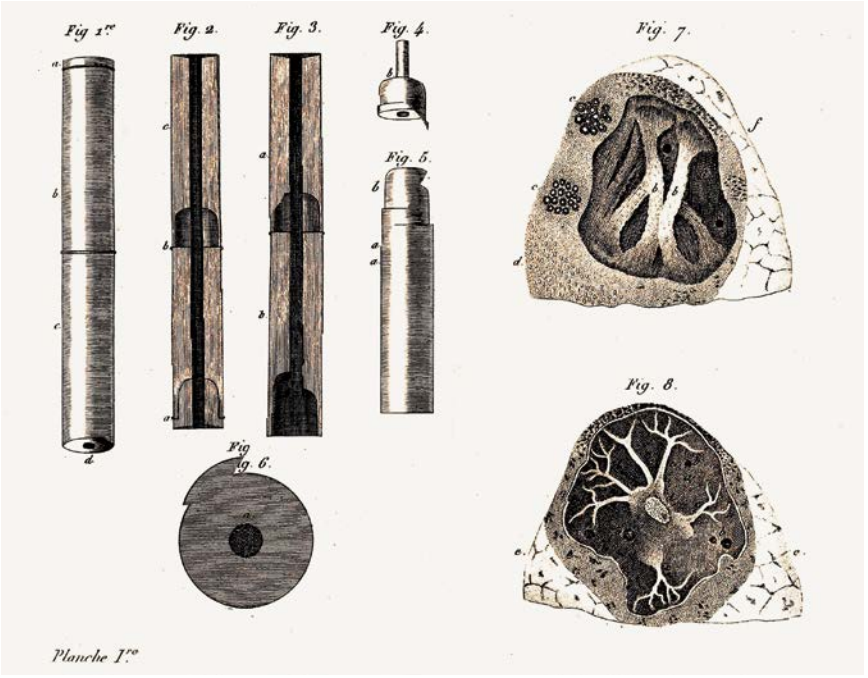


Figure 3. *"De l'auscultation médiate...."*.
Drawings of a stethoscope and lung structure.

in a human or animal body. It came at the right moment and at the right place to enable physicians to make the above described correlation between the patient symptoms and the clinical findings, and thus has made the skip from the humoral pathology towards the solitary pathology easier and faster, which without it would be far harder and far slower. Stethoscope thus represents according to John Webster an exemplary revolutionary instrument described as the one that either solves a totally new problem or uses a new principle or concept to solve an old problem in a better way that displaces the old methods.[9] Invention of stethoscope occurred while Laennec was working at the Hôpital Necker - Enfants Malades in central Paris. The mentioned hospital was founded in 1778 by Madame Necker, wife of Jacques Necker, minister of Louis XVI, by remodelling of an old monastery Hospice de Charite into the hospital, and as such represents the oldest paediatric hospital in the world. Prior to the French Revolution it was a Catholic institution known as the Hôpital de l'Enfant Jesus, run by the Catholic Sisters of Charity, where a baptism certificate and a confession were requirements for

[9] Webster, John G (1998). Medical Instrumentation: Application and Design, Hoboken; John Wiley and Sons, 17.

Figure 4. The oldest examples of Laennec's stethoscopes made according to the drawings published in the first edition of the work "*De l'auscultation médiate ...*"

the admission. Today it is a teaching hospital affiliated with the University of Paris Descartes. Laennec described his invention in his book entitled *De l'Auscultation Médiate ou Traité, du Diagnostic des Maladies des Poumons et du Coeur.*[10]

According to his words he was approached by a young obese pregnant woman with the general symptoms of a diseased heart. Due to her condition and her figure, a direct auscultation by placing his head directly on her chest was out of question, so instead he used a tightly rolled up piece of paper to press against her chest. His inspiration for it came from seeing the school children playing with the long hollow sticks by holding their ears to one end of the stick while the opposite end was scratched with a pin, with the stick transmitting and amplifying the scratch. His first stethoscope was a monoaural wooden tube with dimensions 25 cm by 2.5 cm resembling an ear trumpet, which was probably influenced by his experience in flute playing. Further experimentation has enabled him to refine his design by constructing a stethoscope composed from the three detachable parts, which was far more

[10] Laennec, René TH (1819). De l'Auscultation Médiate ou Traité, du Diagnostic des Maladies des Poumons et du Coeur (On Mediate Auscultation or Treatise on the Diagnosis of the Diseases of the Lungs and Heart), Paris; Brosson and Chaude, 20.

superior in the transmittance of the thoracic chest sounds.[11]

Figure 5. Théobald Chartran (1849–1907): Laennec at the Necker Hospital in Paris auscultates a tuberculosis patient in front of his students, 1819. (Paris, Péristyle en Sorbonne. Toile marouflée)

In accordance with the above described practice of the connecting the patient symptoms with the clinical findings, Laennec followed his dying patients with chest ailments from their bedsides to the autopsy tables, which has enabled him to correlate the sounds captured by the stethoscope with the specific pathological changes. He thus studied peritonitis, described pulmonary phthisis today known as pulmonary tuberculosis, and coined the terms rhonchi, rales or crepitations, and egophony. He presented his findings in his above-mentioned book, published in two volumes in 1819, which already in 1820 was translated into English, Italian and German. He also described metastases of melanoma to the lungs and subsequently coined the term melanoma. His research interests were wide so he subsequently gave his name

Figure 6. The first examples of the phonendoscopes from the late 19th century.

[11] Duffin, Jacalyn (1998). To See with a Better Eye: The Life of R.T.H. Laennec, Princeton; Princeton University Press, 42.

Figure 7. Robert A. Thom, 1960. A newer picture of Laennec as he auscultates a boy.

to Laennec's cirrhosis for the appearance of regenerated liver comprised of the small lobules separated by the fibrous tissue, Laennec's thrombus for an antenatal thrombus in the heart, Laennec's pearls for a sputum produced by the asthmatics, and Laennec–Mueller–von Bergmann–Hamman symptom

Figure 8. Necker-Enfants Malades Hospital in Paris in De Sèvres Street with a Laennec memorial.

Figure 9. The selection of the stethoscopes and phonendoscopes from the late 19th century and the beginning of the 20th century.

Figure 10. Postage stamps and a Spanish memorial medal.

for a crunching sound occurring over the precordium area in the cases of the spontaneous mediastinal emphysema.[12, 13, 14]

Laennec's career flourished after the invention of stethoscope. In 1822 he became a lecturer and in 1823 a professor at the College de France which was followed by a position of a head of the medical clinic at the Hôpital de la Charité. He was a devout Catholic all his life, known for his charity to the poor, and thus proving that the scientific research is compatible with the religious faith. Before his death he bequeathed his own stethoscope to his nephew as the 'greatest legacy of his life'. He died of tuberculosis at the age of 45 on the 13th August 1826 in Ploare in Brittany in France.[15]

12 Risse, Guenter B (1999). Mending Bodies, Saving Souls, Oxford; Oxford University Press, 24.
13 Scherer, John R (2007). Before cardiac MRI: Rene Laennec (1781–1826) and the invention of the stethoscope, Cardiology Journal, 14(5), 518–519.
14 Bynum, William F (1994). Science and the Practice of Medicine in the Nineteenth Century, Cambridge; Cambridge University Press, 25.
15 René Theophile Hyacinth Laennec, in: Catholic Encyclopaedia, http://www.newadvent.org/cathen/08737b.htm (accessed; 9 February 2019).

References

1. Ackernecht, Erwin H (1967). Medicine at the Paris Hospital 1794-1848, Baltimore; The John Hopkins Press.
2. Bynum, William F (1994). Science and the Practice of Medicine in the Nineteenth Century, Cambridge; Cambridge University Press.
3. Danaher, Geoff; Schirato, Tony; Webb, Jen (2000). Understanding Foucault, London; Sage publications.
4. Dean, Mitchell (1994). Critical and effective histories – Foucault's methods and historical sociology, London and New York; Routledge.
5. Duffin, Jacalyn (1998). To See with a Better Eye: The Life of R.T.H. Laennec, Princeton; Princeton University Press.
6. Foucault, Michel (2005). The Birth of the Clinic – An archaeology of medical perception, London and New York; Routledge Classics.
7. Goldstein, Jan (1994). Foucault and the writing of history, Oxford, UK/ Cambridge, USA; Blackwell.
8. Jones, Colin; Porter, Roy (1994). Reassessing Foucault: Power, Medicine and the Body, London; Routledge.
9. Kuhn, Thomas S (1996). The structure of scientific revolutions, Chicago and London; University of Chicago Press.
10. Laennec, Rene TH (1819). De l'Auscultation Médiate ou Traité, du Diagnostic des Maladies des Poumons et du Coeur (On Mediate Auscultation or Treatise on the Diagnosis of the Diseases of the Lungs and Heart), Paris; Brosson and Chaude.
11. NA (NY). René-Théophile-Hyacinthe Laennec, in: Catholic Encyclopaedia, http://www.newadvent.org/cathen/08737b.htm (accessed; 9 February 2019)
12. Risse, Guenter B (1999). Mending Bodies, Saving Souls, Oxford; Oxford University Press.
13. Roguin, Ariel. (2006), Rene Theophile Hyacinthe Laennec (1781–1826): The Man Behind the Stethoscope, Clinical Medicine & Research, 4(3), 230–235.
14. Scherer, John R (2007). Before cardiac MRI: Rene Laennec (1781–1826) and the invention of the stethoscope, Cardiology Journal, 14(5), 518–519.
15. Webster, John G (1998). Medical Instrumentation: Application and Design, Hoboken; John Wiley and Sons, 17.

Sažetak

Iako je francuski liječnik René-Théophile-Hyacinthe Laënnec (1781. – 1826.) izumio stetoskop 1816., njegova šira klinička uporaba započela je tek nakon objavljivanja njegove knjige De l'Auscultation Médiate ou Traité, du Diagnostic des Maladies des Poumons et du Coeur *1819. Njegov izum koincidirao je s razvojem 'bolničke medicine' u postrevolucionarnom Parizu u prvoj četvrtini 19. stoljeća. Uporaba stetoskopa omogućila je tadašnjim liječnicima razjašnjavanje poveznice između pacijentovih simptoma i kliničkih nalaza te time pomogla prijelaz s humoralne na solitarnu patologiju.*

Ključne riječi: *René-Théophile-Hyacinthe Laënnec; povijest medicine; 19. stoljeće; stetoskop; znanstvena revolucija; klinika; bolnička medicina; Pariz*