

THE PRELUDE TO STETHOSCOPY – SOME PIONEER STETHOSCOPISTS OF THE NINETEENTH CENTURY

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This paper was inspired by the Presidential Address for the Liverpool Medical Institution given by Dr John Earis in October 2001.¹ He mentioned that he had discovered in the London office of the British Thoracic Society, whose emblem it became, a very early stethoscope that had been presented to the Thoracic Society by Dr Robert Coope in the early 1950s. The strange story of how Robert Coope came to acquire this was recorded by Dr Earis, who also discussed the whimsical article by Drs A. John Robertson and Coope that appeared in the *Lancet* in 1957.² This prompted me to look up my copy of Robert Coope's first edition (1944) of his classical *Diseases of the Chest*. Chapter five commences:

Auenbrugger played on the thorax as though it were a set of percussion instruments;
Laennec added to the thoracic orchestra by using its wind instruments.

Coope and his colleagues in Liverpool were able to use the binaural stethoscope. He continued his musical analogy by separating normal and pathological breath sounds by their variations in pitch and loudness. However, as Coope said, 'they are noises and not musical sounds'.³

René Théophile Hyacinthe Laënnec (1781-1826) was born in Quimper,

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1 J. Earis, "'The Quiet Art", being the inaugural address of the 163rd session of the Liverpool Medical Institution on Thursday, 25th October 2001', in *Liverpool Medical Institution Transactions and Report, 2001-2002*, pp.7-20 (pp.17-18). **IS THIS PUBLISHED (IF SO, NEED PUBLISHER AND PLACE OF PUB.) OR JUST HELD AT THE LMI?**

2 A.J. Robertson and R. Coope, 'Before our time: Râles, Rhonchi and Laënnec', *Lancet*, 2 (1957), 417-22.

3 Robert Coope, *Diseases of the Chest for Students and Practitioners* (Edinburgh: E.&S. Livingstone, 1944), p.66.

southern Brittany, on 17 February 1781. He qualified as a doctor at Paris in 1804, where he developed an interest in chest diseases. In 1816, at the age of thirty-five, he succeeded Gaspard-Laurent Bayle (1774-1816) – famous for his studies on the morbid anatomy of tuberculosis – as Chef de Service at Hôpital Necker in Paris.⁴ In the same year, Laënnec had the original idea of rolling up a sheet of paper and listening to a female patient's chest.⁵ Thus began the new diagnostic technique of mediate auscultation. By using his own design of a soft-wood monaural instrument, the French physician was able to link the stethoscopic sounds to the postmortem findings; in this way he gained wider experience in diseases of the heart and lungs. He published his results in his classical treatise *De L'Auscultation Médiante* in 1819.⁶

This book, and his skill as a teacher of the new art of stethoscopy, resulted in large numbers of foreign postgraduate students attending his lectures and demonstrations in Paris. Amongst these was the Scottish physician James (later Sir James, Bart.) Clark, who had graduated MD from Edinburgh in 1817. After spending some time as a naval surgeon, Clark was invited to accompany an ailing English gentleman on a visit to France and Italy for health reasons. In Paris, Clark took the opportunity of visiting the Necker Hospital. Although he missed meeting Laënnec, he did witness a demonstration of the stethoscope and acquired an early model.⁷

James Clark was a friend of Dr John (later Sir John) Forbes, with whom he had attended school in their native Banffshire. They had remained in touch, and Forbes graduated MD at Edinburgh in the same year as Clark. In that year, Forbes was appointed physician to a dispensary practice in Penzance.⁸ Clark may well have given a stethoscope to Forbes to use in his hospital and general practice in Cornwall; he certainly prompted his fellow Scot to write an English translation of Laënnec's first edition of *De L'Auscultation Médiante* (1819), which was published in 1821.⁹

4 A. Sakula, 'R.T.H. Laënnec (1781-1826). His life and work: a bicentenary appreciation', *Thorax*, 36 (1981), 84.

5 Coope, pp. 56-57

6 R.T.H. Laënnec, *De L'Auscultation Médiante ou Traité Du Diagnostic Des Maladies Des Poumons Et Du Coeur* (Paris: Brosson et Chaudé, 1819).

7 A. Sakula, 'Laënnec's influence on some British physicians in the nineteenth century', *J. R. Soc. Med.*, 74 (1981), 761.

8 R.A.L. Agnew, 'John Forbes (1781-1861), in memoriam: from Cuttlebrae to Whitchurch', *J. Med. Biog.*, 2 (1994), 188.

9 J. Forbes, *A Treatise on the Diseases of the Chest in which they are described according to their Anatomical Characters, and their Diagnosis established on a new principle by means of*

Forbes was criticized by some for shortening the French master's text and for altering some of Laënnec's original descriptions of the lung sounds, but others regarded it as an improvement into a concise compendium more suitable for British readers. This was Forbes' own view, expressed in a personal letter to Laënnec in which he apologized for the 'great liberties' he had taken in his translation.¹⁰ Although Forbes was initially dubious as to whether the newly discovered stethoscope would have any future as a general diagnostic tool, there is no doubt that his 1821 translation (or 'abridgement' as he called it) and his subsequent translations of further editions of Laënnec's work were vital contributions to the art of auscultation.

Forbes' Original Cases

In 1761, Leopold Auenbrugger (1722-1809) had published in Vienna a small volume on an *Inventum novum*, which was the first description of percussion as a diagnostic tool.¹¹ The Austrian physician's work was largely ignored until it was translated by the French physician Jean Nicholas Corvisart (1775-1821) in 1808. This was just prior to Auenbrugger's death, in the following year, at the age of eight-seventeen.¹² Dr John Forbes had moved to Chichester in 1822 as physician to the Infirmary. He set about combining the techniques of stethoscopy and percussion on a series of patients, examined by him personally, in his extensive practice involving West Sussex and East Hampshire. He published his results in 1824.¹³

The first part of his work is devoted to a translation of Auenbrugger's original treatise, with a selection of Corvisart's comments on it. The preface includes a short biography of Auenbrugger, and mentions the initial cool reception of the *Inventum novum* until Corvisart's translation and its use by the 'Parisian School'. Forbes was cautious about the interpretation of the sounds heard by the stethoscope, and excluded from consideration most cases of acute pneumonias; he omitted entirely cases of pulmonary TB. The section on

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Acoustic Instruments (London: T.&G. Underwood, 1821).

- 10 Sakula, 'Laënnec's influence on some British physicians in the nineteenth century', p. 763.
- 11 L. Auenbrugger, *Inventum novum ex percussione thoracis humani ut signo abstrusos interni pectoris morbus detegendi*, trans. by J. Forbes (London: T.&G. Underwood, 1824).
- 12 R.H. Major, *Classic Descriptions of Diseases, with Biographical Sketches of the Authors* (Springfield, IL: Charles C. Thomas, 1932), pp. 525-56.
- 13 J. Forbes, *Original Cases with Dissections, and Observations illustrating the use of the Stethoscope and Percussion in the diagnosis of Diseases of the Chest; also commentaries on the same subjects translated from Auenbrugger, Corvisart, Laënnec and others* (London: T.&G. Underwood, 1824).

Mediate Auscultation starts with a description of Laënnec's stethoscope. He next outlines the different sounds heard in health and disease of the heart and lungs. The main section gives the medical histories and physical signs of thirty-nine patients seen by Forbes at Chichester. In those who died, the vital signs were verified at autopsy. Forbes' *Original Cases* was well received in London and Edinburgh, as it fulfilled the need for a factual guide to the practice of both percussion and auscultation, and to their relationship with the underlying pathology as a means of diagnosis of diseases of the chest and heart.

The French School

It is evident from the flurry of publications on stethoscopy and the interpretation of the strange sounds conveyed to the physician's ears that Laënnec's invention was a landmark in scientific medicine. John Forbes was well aware of the importance of the 'French School' in Paris. He ended his own *Original Cases* with an outline of an essay by a young Parisian physician, Victor Collin (born 1796) entitled, *The different modes of Exploring the Chest, and their Application to the Diagnosis of Its Diseases*.¹⁴ Forbes translated and abridged this work and made some additions of his own. It is obvious that both authors followed the seminal discoveries of Laënnec, a fact that the Scottish physician acknowledged by his Latin dedication of *Original Cases* to the great French innovator.

Collin's pamphlet, which had just been published in Paris, was in two parts. The first describes the classical methods of examination by 'Inspection', 'Percussion' and 'Auscultation'. The second part consists of the application of these clinical methods to the diagnosis of various chest disorders. Forbes was impressed with the second part, which he felt would be valuable in teaching students. Collin's name should certainly be included in the pantheon of stethoscopic pioneers. He died in the early 1830s.

Gabriel Andral and Richard Townsend

The principle of trying to correlate the vital signs with postmortem findings was new in Britain, and spread the teachings of Laënnec. The other outstanding Parisian physician of that time was Gabriel Andral (1797-1876). René Laënnec left the Hôpital Necker in 1823 in order to join the staff of the Hôpital de la Charité, where he was Professor of Medicine until May 1826. The twenty-six year old Andral was also working at the 'Charité', and had just published the first volume of his classical *Clinique Médicale*.¹⁵ This appeared

14 V. Collin, *Des Diverses Methodes D' Exploration De La Poitrine, Et De Leur Application Au Diagnostic De Ses Maladies* (Paris: [n. pub.], 1824).

15 G. Andral, *Clinique médicale ou choix d'observations recueillies a la clinique de M. Lermnier* (Paris: Chez Gabon, 1823), I.

in four volumes between 1823 and 1827, and was essentially concerned with recording and collating Andral's clinical observations on the wards with his findings at autopsy. He enthusiastically continued Laënnec's teachings on stethoscopy to foreign students, including Richard Townsend of Dublin who was later to work with Robert Graves (1796-1853) and William Stokes (1804-78) on the wards of the Meath Hospital there.¹⁶ In the meantime, Andral was developing his interest in morbid anatomy, which was to lead to his appointment as Professeur Titulaire de la Chaire d'Hygiene at Paris in 1828.¹⁷ In the following year, he published a major work on pathological anatomy in three volumes.¹⁸ Almost at once, Andral's first volume was translated into English by Richard Townsend and another graduate of Dublin University, William West.¹⁹ According to the preface, this was at the personal request of Andral.

William Stokes and the Dublin School

William Stokes qualified MD in Edinburgh in 1825. His inaugural thesis was entitled *De Ascite*. He was the son of Whitley Stokes (1763-1845), Professor of Medicine at the Royal College of Surgeons in Ireland, who held high hopes for his son's future career in medicine. The fame of the 'Scottish School' was such that, in the early part of the nineteenth century, Scotland produced ninety-five per cent of British doctors.²⁰ It was a wise decision of Whitley Stokes to send his son to Edinburgh to take advantage of such excellent teachers as Drs William Cullen, Andrew Duncan and Professor William Alison in bedside clinical medicine and related subjects. While still a final-year medical student at Edinburgh, young Stokes showed a precocious understanding of the importance of stethoscopy. In 1825, when only twenty-one-years-old, he published a work entitled *An Introduction to the use of the Stethoscope*. He dedicated it to Cullen, who was then his lecturer on Anatomy and Physiology and his 'sincere friend'.²¹

16 R.A.L. Agnew, 'Richard Townsend (1800-1843): an underestimated Irish physician?', *J. Ir. Coll. Phys. Surg.*, 23 (1994), 131.

17 L. Doyle, 'Gabriel Andral (1797-1876) and the first reports of lymphangitis carcinomatosa', *J. R. Soc. Med.*, 82 (1989), 491.

18 G. Andral, *Précis d'anatomie pathologique* (Paris: Chez Gabon, 1829).

19 R. Townsend and W. West, *A Treatise on Pathological Anatomy by G. Andral* (Dublin: Hodges and Smith, 1829), I.

20 S. Gibbs, 'History of Cardiology: who was William Stokes?', *Cardiology in Practice*, 5 (1987), 30.

21 W. Stokes, 'Dedication to William Cullen', in *An Introduction to the Use of the Stethoscope*

In his preface, Stokes acknowledged the previous translation of Laënnec by Forbes, including the practical application of stethoscopy, by the Scottish physician in his 1824 publication in Chichester on *Original Cases*. However, it appeared to Stokes that,²²

Neither in the works of Laënnec nor of Forbes, have the accounts of the different signs obtained by the stethoscope, been properly connected with that of the pathological state of the viscera to which they owe their origin.

It is clear that all three authors were trying to correlate the auscultatory signs with the underlying pathology in order that future generations would become expert in the use of this new diagnostic aid.

Stokes excelled by giving a detailed account of common conditions such as pneumonia, emphysema and pulmonary TB, as well as descriptions of diseases of the heart, including valvular disorders, pericarditis and aortic aneurysm. This slim volume, for which he received the sum of seventy pounds (approximately £3,050 today), was said later to have been ‘the first systematic treatise in the English language’ on stethoscopy.²³ Not all comments were as favourable, however. Under the heading *Review from the West*, it was ridiculed in the *Lancet*, which castigated ‘a young Hibernian, who lately graduated in Edinburgh’ for writing a pastiche of the work of ‘two or three previous authors’.²⁴ The writer of this caustic review was probably Dr P.H. Greene, who wrote under the pseudonym *Erinensis*. He grudgingly conceded that Stokes’ arrangement of the work was superior to the methods used by other writers on the subject of stethoscopy, but advised him to consider shortening it in order to present it in a tabular form. This suggestion was accepted by Richard Townsend of Dublin in his book entitled *A Chart of the Physical Signs of Diseases of the Lungs*, published in 1832.²⁵ This was favourably reviewed in the *Lancet*, which commented that it was the best textbook for medical students

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with its Application to the Diagnosis of the Thoracic Viscera (Edinburgh: Maclachlan and Stewart; London: Baldwin, Cradock and Joy; Dublin: Hodges and McArthur, 1825).

22 *Ibid*, p. vi.

23 W. Stokes, *William Stokes, his life and work (1804-1878)* (London: T. Fisher Unwin, 1898), pp.33, 34 (footnote).

24 ‘Review from the West’, *Lancet*, 9 (1825-26), 471-75.

25 R. Townsend, *Chart of the Physical Signs of Diseases of the Lungs. A Tabular View of the Principal Signs furnished by Auscultation and Percussion, and their Application to the Diagnosis of the Diseases of the Lungs* (London: John Taylor, 1832).

and young doctors that had been written up to that date.²⁶ A later ‘Tabular View’ by Dr James Turnbull (1818-97) of the Liverpool Royal Northern Hospital was criticized on the grounds that it was incomplete, and included only diseases of the lungs but omitted those of the heart.²⁷

An Introduction to the use of the Stethoscope was based upon Stokes’ experience on the hospital wards and domiciliary visits to the impoverished citizens of Edinburgh; for these, he accompanied his renowned and respected teacher, Professor William Alison (1790-1859). Of this kindly Christian physician, Stokes was to write later:²⁸

It was my good fortune to be very closely connected with him during my student days in Edinburgh, and to attend him by day, and more often far into the night, in his visits of mercy to the sick poor of that city, to whom he was for many a year physician, counsel, and support.

This clinical and moral experience gave the young Irish student, then in his ‘finals’ year, a sound basis on which to build his future career at home in Dublin. He was appointed as Physician to the County Dublin Infirmary at the Meath Hospital in 1826, where he succeeded his father, at the age of twenty-two.

In 1828, he printed two lectures on the *Application of the Stethoscope*, designed for the medical students at the Meath.²⁹ Within ten years, as a result of his mature clinical studies, Stokes published his classical work on *Diseases of the Chest* in 1837.³⁰ A German edition was published in 1838. His classic description of a slow pulse and syncope in 1846 is well known as Stokes-Adams Syndrome. His textbook on *Diseases of the Heart and Aorta*, published in Dublin in 1854, earned him further fame. He was elected as President of the British Medical Association in 1867. In his Valedictory Address, he warned that its future would depend on it being seen to exist for the public good rather than for lining the pockets of the profession. Famous throughout Europe, he was decorated with the order of *Pour le Mérite* by the German Emperor in 1876

26 *Lancet*, 2 (1831-32), 121-22.

27 *Medico-Chirurgical Review*, n.s. 4 (1846), 256.

28 H.W. Acland, ‘Memoir to Dr W. Stokes’, in *A Treatise on the Diagnosis and Treatment of Diseases of the Chest. Part I. Diseases of the Lung and Windpipe*, by W. Stokes, 2nd edn, ed. for the New Sydenham Society by A. Hudson (London: The New Sydenham Society, 1882), p. viii.

29 W. Stokes, *Two Lectures on the Application of the Stethoscope to the Diagnosis and Treatment of Thoracic Disease* (Dublin: Hodges and McArthur, 1828).

30 W. Stokes, *A Treatise on the Diagnosis of Diseases of the Chest* (Dublin: Hodges and Smith, 1837).

and died, much mourned, in 1878. His *Diseases of the Chest* was reprinted as a posthumous revised edition in 1882.³¹

It has not been possible to discuss here the contributions of such eminent physicians as James Hope (1801-41) at St George's in London and Pierre-Adolphe Piorry (1794-1879) in Paris; the former was more concerned with how the heart sounds are produced and the latter with percussion. Nor have I included Dr Francis Ramadge (1793-1867), another Irish physician, who translated the fourth edition of Laënnec (1837) into English in 1846, nor Dr Peter Latham (1789-1875) of St Bart's, London.

Conclusion

In the original 1837 edition of his *Diseases of the Chest*, William Stokes had set out to study the relationship between physical signs and symptoms in a straightforward way. He acknowledged the original contribution made by Laënnec, and also mentioned those made by 'Forbes, Williams and Clark'.³² I have already described Forbes' translations of Laënnec and Auenbrugger and his *Original Cases*. Dr C.J.B. Williams (1805-89) graduated MD at Edinburgh in 1824. He spent fourteen months in Paris in postgraduate study at La Charité Hôpital, where he attended Laënnec's ward rounds, lectures and demonstrations. He moved to London and became a well-respected chest physician, publishing his attempt to link the underlying pathology and auscultation with the stethoscope to the physical laws of sound in 1828.³³ He and John Forbes were later to become the first two consulting physicians to the Brompton Hospital.³⁴ In 1835, James Clark published his textbook *A Treatise on Pulmonary Consumption*.³⁵ Yet earlier, in 1820, Clark had been one of the first to make Laënnec's work known in England.³⁶

31 Acland.

32 W. Stokes, ref.39, p. x. **TO WHICH STOKES PUBLICATION IS HE REFERRING? REF. 39 IS BY DOYLE!! – PERHAPS HE MEANS 29?**

33 C.J.B. Williams, *A Rational Exposition of the Physical Signs of the Diseases of the Lungs and Pleura. Illustrating their Pathology, and facilitating their Diagnosis* (London: T.&G. Underwood, 1828; 2nd edn: Churchill, 1833).

34 P.J. Bishop, 'The Brompton Hospital and its first medical report', *Tubercle*, 48 (1967), 346.

35 J. Clark, *A Treatise on Pulmonary Consumption comprehending an Inquiry into the Causes, Nature and Prevention and Treatment of Tuberculosis and Scrofulous Diseases in General* (London: Sherwood, Gilbert and Piper, 1835).

36 J. Clark, *Medical Notes on Climate, Diseases, Hospitals, and Medical Schools, in France, Italy and Switzerland; comprising an Inquiry Into The Effects of A Residence in the South of Europe in cases of Pulmonary Consumption and Illustrating The Present State of Medicine In Those Countries* (London: T.&G. Underwood, 1820).

After Laënnec's classical interpretation of the auscultatory signs in diseases of the chest and heart, it is true to say that subsequent writers were 'standing on the shoulders' of the great Breton physician. In Stokes' words:³⁷

A new source of knowledge has been added to medicine [...] by the stethoscope we substitute the ear for the eye; penetrate into the mysteries of hidden disease, and throw light on a class of affections perhaps more important than most of those to which the human frame is liable.

I shall end with a quotation from James Macartney (1770-1843), perhaps the greatest of Irish anatomists, who returned to his own country in 1813 from the post of Professor of Comparative Anatomy at St Bartholomew's in London to take up the Chair of Anatomy at Trinity College, Dublin. He had a distinguished career at the medical school there.³⁸ I am sure that he would not have been at all surprised to learn of the potential of the modern electronic stethoscope and computer-assisted learning for further elucidating the sounds from the thorax. In March 1843, Professor Macartney passed away – sadly, while composing his own epitaph.³⁹

All forms that perish other forms supply,
(By turns we catch the vital breath and die)
Like bubbles on the sea of matter borne,
They rise, they break, and to that sea return.

These Darwinian thoughts transcend the aspirations of the whole group of pioneering chest physicians who contributed, each in their own way, to the new science and art of stethoscopy in the early nineteenth century.

37 Acland, p. xii (quoting from Stokes, *Two Lectures on the Application of the Stethoscope*, p. 12).

38 E. O'Brien, 'The Georgian Era, 1714-1835', in *A Portrait of Irish Medicine*, ed. by Eoin O'Brien and Anne Crookshank with Sir Gordon Wolstenholme (Dublin: Ward River Press Ltd., 1984), pp. 79-81.

39 E. Doyle, "'The Dublin School of Medicine"', being the Presidential Address to the Biological Society, the Royal College of Surgeons in Ireland on November 8, 1959', *Ir. Med. J.*, 45 (1959), 103-10 (p.108).