



Available online at  
**ScienceDirect**  
[www.sciencedirect.com](http://www.sciencedirect.com)

Elsevier Masson France  
**EM|consulte**  
[www.em-consulte.com](http://www.em-consulte.com)



## History of Neurology

# Voices from the past: The pioneering use of the phonograph in neurology

F. Brigo<sup>a,\*</sup>, L. Lorusso<sup>b</sup>, O. Walusinski<sup>c</sup>, E. Drouin<sup>d</sup> on behalf of the Study Group on the History of Neurology of the Italian Neurological Society<sup>1</sup>

<sup>a</sup> Department of Neurology, Hospital of Merano (SABES-ASDAA), Merano, Italy

<sup>b</sup> UOC Neurology and Stroke Unit, ASST Lecco, Merate, Italy

<sup>c</sup> Independent researcher, Brou, France

<sup>d</sup> Service de neurologie, groupe hospitalier de l'institut catholique de Lille, GHICL, Lille, France

### INFO ARTICLE

#### Article history:

Received 28 March 2022

Received in revised form

9 June 2022

Accepted 10 June 2022

Available online xxx

#### Keywords:

Diagnosis

History of neurology

Phonograph

### ABSTRACT

Since its discovery by the American inventor and industrialist Thomas Alva Edison (1847–1931) in 1877, the phonograph attracted much interest in the field of medicine. This article describes the earliest pioneering examples of the use of the phonograph in neurology. In France, the use of the phonograph for obtaining audio recordings of delusions and speech or language disturbances was first proposed by Victor Maurice Dupont (1857–1910) in 1889 and in Italy by the physician Gaetano Rummo (1853–1917), who had studied at La Salpêtrière under Jean-Martin Charcot (1825–1893). The applicability of the phonograph to the record of speech disturbances was illustrated in England by John Hughlings Jackson (1835–1911) and William Halse Rivers (1864–1922), and by William Hale White (1857–1949) and Cuthbert Hilton Golding-Bird (1848–1939) in 1891. Since then, audio recordings have been used rarely in neurology, a branch of medicine where the visual aspects dominate, to the extent that inspection can be enough to reach a definite clinical diagnosis. In the mid-20th century, the advent of audio and video recordings supplanted audio recordings alone, relegating them to a very marginal role.

© 2022 Elsevier Masson SAS. All rights reserved.

## 1. Introduction

The phonograph was invented by the American inventor and industrialist Thomas Alva Edison (1847–1931) in 1877, as a

result of his work on two other inventions, the telegraph and the telephone [1]. It is a device for the mechanical and analogue recording and reproduction of sounds by means of the vibration of a stylus, or needle, following a groove on a

\* Corresponding author.

E-mail address: [dr.francescobrigo@gmail.com](mailto:dr.francescobrigo@gmail.com) (F. Brigo).

<sup>1</sup> Members of the Study Group on the History of the Neurology of the Italian Neurological Society: Paolo Benna, Neuroscience Department, University of Turin, Turin, Italy; Gianfranco De Stefano, Sapienza University of Rome, Rome, Italy; Davide Norata, Neurological Clinic, Department of Experimental and Clinical Medicine, Marche Polytechnic University, Ancona, Italy; Enrico Volpe, University L. Vanvitelli, Naples, Italy; Giorgio Zanchin, University of Padua, Padua, Italy.

<https://doi.org/10.1016/j.neurol.2022.06.007>

0035-3787/© 2022 Elsevier Masson SAS. All rights reserved.



**Fig. 1 – Edison wax cylinder phonograph c. 1899 (public domain).**

rotating cylinder or disc (Fig. 1). On April 23, 1889, Edison himself presented an improved version of the phonograph at a meeting of the Académie des Sciences in Paris [2].

The attachment of the stylus to the diaphragm was further refined by Gianni Bettini (1860–1938), a pioneer audiophile who in 1890 invented a micro-phonograph [3]. Since its discovery and rapid commercialization, the phonograph attracted much interest in the field of medicine. The American physician specialized in laryngology Julius Mount Bleyer (1859–1915) largely experimented its use, and in 1888 was able to record the sounds of the heart [4] using a system that could be considered the precursor of phonocardiography. He also advocated the use of the phonograph for recording “coughs, nasal obstructions, laryngeal growths, laryngeal obstructions like stenosis, hoarseness, defection in speech, and many of an allied kind” [5].

In this article, we describe the earliest pioneering examples of the use of the phonograph for the study of neurological disorders and their course.

## 2. The early use of the phonograph for the diagnosis of neurological disorders

In a communication given at the second Congress of Internal Medicine held in Rome in October 1889, a certain Dr. A. Bianchi, free lecturer in Florence (no further biographical details known) advocated the use of the phonograph in clinical medicine to record and keep track of patients’ sounds (e.g., moaning, cough, crying, abnormal breathing, asthma attacks) for teaching and diagnostic purposes, and to demonstrate the efficacy of treatments [6]. Among its possible uses, Dr. Bianchi mentioned the role of the phonograph in neurological disorders, as a way of obtaining audio recordings of language disorders. However, nothing in his talk suggests that he actually used this tool in clinical practice.

The applicability of the phonograph to the record of speech disturbances was illustrated by John Hughlings Jackson (1835–1911) and William Halse Rivers (1864–1922) at a meeting of the

Hunterian Society on March 11, 1891, when they “showed a phonogram recording the abnormal speech of a man, aged 26, the subject of disseminated sclerosis” [7].

The patient had a “typical high-strained jerking and syllabic utterance”, which was very well reproduced by the phonograph. At the close of meeting, an employee of the Edison United Phonograph Company gave some illustrations of the phonograph, explaining its mechanism. The same year, at a meeting of the Royal Medical and Chirurgical Society, William Hale White (1857–1949) and Cuthbert Hilton Golding-Bird (1848–1939), clinicians at Guy’s Hospital in London, described two brothers with a severe speech disorder, which gave the impression of an individual language [8]. To indicate the peculiarities of this condition, they coined the term “idioglossia”, using phonograph recordings to make lasting records to directly capture the speech of these children, playing them for others to judge and to make transcriptions of the impaired pronunciation.

On July 6, 1889, during a meeting of the Neurological Society of Paris, Dr. Henri Charles Victor Maurice Dupont (1857–1910) proposed the use of the phonograph for obtaining audio recordings of delusions and speech disturbances [9].

Very little is known about this physician, who had been interne in the national asylum of Vincennes (asile de Vincennes later called Asile national des convalescents de Saint-Maurice) under Dr. Octave Du Mesnil (1832–1898), graduating in medicine in Paris in 1882 with a thesis on the treatment of pulmonary tuberculosis by carbonic acid inhalation [10].

The French psychologist Georges Dumas (1866–1946) who had collaborated with Dupont on experiments of electrical excitation of the facial nerve to provoke the smile, referred to him as «chef du laboratoire d’électricité à Saint-Anne» (head of the electricity laboratory at Saint-Anne [hospital]) [11].

Dr. Dupont himself reported that he had investigated the use of the phonograph in the laboratory of Alix Joffroy (1844–1908), in the Saint-Anne hospital in Paris, where the remarkable collection of audio recordings of different types of delusions (delusions of grandeur, delusions of persecution) had made the hospital «a museum of delusions» [9]. Before his audience, Dr. Dupont described the use of the phonograph to induce hypnotism, and presented a sample of audio recordings of various delusions (grandiose delusions in a patient with general paralytic); speech disorders in pseudo-bulbar paralysis, multiple sclerosis, Friedreich’s disease, agitating paralysis (i.e., Parkinson’s disease), infantile paralysis, and double athetosis; and the psychomotor verbal hallucinations first described by Jules Séglas (1856–1939). According to Dupont, the phonograph was an effective tool “to collect, preserve and reproduce in a lively way, which speaks better than the writings, the delusions of the insane while preserving their intonation and accent, I would almost say the animated mimicry of the illness”. Furthermore, this instrument could be used to follow the course of speech disorders, comparing its evolution over time. In 1900, Dupont participated in the award prix Baignet with a project illustrating the use of the phonograph for recording speech disorders, but did not win.

In Italy, at the turn of the 19th century, the physician Gaetano Rummo (1853–1917), who had studied at La Salpêtrière under Jean-Martin Charcot (1825–1893) making some important contri-

butions to the development of neurology [12], promoted the use of the phonograph to record the voices of patients with speech or language disorders [13]. In 1898, he had been in contact with Thomas Edison himself to adapt the telephone to making permanent records of cardiac and other vital sounds [14].

### 3. Conclusions

To best of our knowledge, what we have aforementioned represent the earliest example of audio recordings for neurological purposes. Audio recordings have been used rarely in neurology, a branch of medicine where the visual aspects dominate, to the extent that inspection can be enough to reach a definite clinical diagnosis. In the mid-20th century, the advent of audio and video recordings supplanted audio recordings alone, relegating them to a very marginal role. However, recently there has been an increasing interest towards the use of audio recordings in several neurological disorders and with different aims. For instance, they have been used to: investigate motor speech patterns in Huntington disease [15]; evaluate the effectiveness of Deep Brain Stimulation for dystonia [16]; monitor Parkinson's disease progression [17]; detect dementia, depression or Parkinson's disease [18–21]; and differentiate between epileptic and non-epileptic seizures [22]. Finally, thanks to recent technological improvements, home monitoring and automatic speech analysis are emerging as promising tools for early detection of psychiatric symptoms [23].

As François Broussais (1772–1838) recognized, symptoms are the cry of suffering organs [24]. He was right: neurological disorders speak and have a lot to tell us, as long as we listen to them.

### Informed consent

Not required.

### Ethics approval

Not required.

### Funding

This study was not funded.

### Contributions

Francesco Brigo conceived and wrote the article; the other coauthors provided historical material and revised the article critically for important intellectual content.

### Disclosure of interest

The authors declare that they have no competing interest.

### REFERENCES

- [1] Sagers JD, McNeese AR, Lenhart RD, Wilson PS. Analysis of a homemade Edison tinfoil phonograph. *J Acoust Soc Am.* 2012;132(4):2173–83.
- [2] Janssen J (Note de). « Sur le phonographe de M. Edison », *Comptes rendus des séances de l'Académie des sciences*, tome 108, (séance du 23 avril 1889), pp 833-835.
- [3] <https://archive.org/details/jstor-1766957/page/n1/mode/2up>.
- [4] Mount J, Bleyer. The phonograph in physical diagnosis, with experiments, and its future. *Med Rec N Y* 1888;34(20):586.
- [5] Bleyer J, Mount. The phonograph: its physics, physiology, and clinical import. *J Laryngol Rhinol Otol* 1895;1:1–17.
- [6] Bianchi A. Il fonografo in clinica medica. *Lavori dei Congressi di Medicina Interna – Secondo Congresso tenuto in Roma nell. Antica Casa Editrice Dottor Francesco Vallardi; 1889: 398–400.*
- [7] Hunterian Society. Phographic illustration of disease. *BMJ* 1891;1:644–5.
- [8] Hale white W, Golding-Bird CH. Two cases of idioglossia with phonographic demonstration of the peculiarity of speech. *Trans Med Chir Soc* 1891;74:181–9.
- [9] Société de neurologie de Paris. Séance du jeudi 6 juillet 1899. IX. Application du phonographe à l'enregistrement des délires et des troubles de la parole, par le Dr Maurice Dupont (Présentation d'appareil). *Bulletins officiels de la Société de neurologie de Paris.* Paris: Société de neurologie de Paris. Masson; 1899: 18–9.
- [10] Dupont M. Traitement de la tuberculose pulmonaire par les inhalations d'acide carbonique. Paris: A. Parent; 1882.
- [11] Dumas. Le sourire. *Physiologie et psychologie.* Paris: Alcan; 1906: 38.
- [12] Brigo F, Lattanzi S, Martini M, Bragazzi N, Nardone R, Walusinski O. Spreading the word of the master: the contribution of Italian physicians in the early dissemination of Jean-Martin Charcot's theories. *Neurol Sci.* 2020;41(12):3787–94.
- [13] Cardillo M. Tra le quinte del cinematografo: cinema cultura e società in Italia 1900–1937. Bari: Edizioni Dedalo; 1987: 34.
- [14] Anonymous. A phonographic record of the cardiac sounds. *N Y Med J* 1898.
- [15] Diehl SK, Mefferd AS, Lin YC, Sellers J, McDonnell KE, de Riesthal M, et al. Motor speech patterns in Huntington disease. *Neurology.* 2019;93(22):e2042–5.
- [16] Finger ME, Siddiqui MS, Morris AK, Ruckart KW, Wright SC, Haq IU, et al. Auditory-perceptual evaluation of deep brain stimulation on voice and speech in patients with dystonia. *J Voice.* 2020;34(4):636–44.
- [17] Naranjo L, Pérez CJ, Campos-Roca Y. Monitoring Parkinson's disease progression based on recorded speech with missing ordinal responses and replicated covariates. *Comput Biol Med.* 2021;134:104503.
- [18] Xue C, Karjadi C, Paschalidis IC, Au R, Kolachalama VB. Detection of dementia on voice recordings using deep learning: a Framingham Heart Study. *Alzheimers Res Ther.* 2021;13(1):146.
- [19] Ozkanca Y, Öztürk MG, Ekmekci MN, Atkins DC, Demiroglu C, Ghomi RH. Depression screening from voice samples of patients affected by Parkinson's disease. *Digit Biomark.* 2019;3(2):72–82.
- [20] Tracy JM, Özkanca Y, Atkins DC, Hosseini Ghomi R. Investigating voice as a biomarker: deep phenotyping methods for early detection of Parkinson's disease. *J Biomed Inform.* 2020;104:103362.

- [21] Viswanathan R, Arjunan SP, Bingham A, Jelfs B, Kempster P, Raghav S, et al. Complexity measures of voice recordings as a discriminative tool for Parkinson's disease. *Biosensors (Basel)*. 2019;10(1):1.
- [22] Pevy N, Christensen H, Walker T, Reuber M. Feasibility of using an automated analysis of formulation effort in patients' spoken seizure descriptions in the differential diagnosis of epileptic and nonepileptic seizures. *Seizure*. 2021;91:141-5.
- [23] Brederoo SG, Nadema FG, Goedhart FG, Voppel AE, De Boer JN, Wouts J, et al. Implementation of automatic speech analysis for early detection of psychiatric symptoms: What do patients want? *J Psychiatr Res*. 2021;142:299-301.
- [24] Broussais FJV. Examen de la doctrine médicale généralement adoptée: et des systèmes modernes de nosology.. Paris: Gabon; 1816.