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## **Singing by Speechless (Aphasic) Children: Victorian Medical Observations**

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## Abstract

*In the second half of the 19<sup>th</sup> century, British clinicians made observations regarding the ability of individuals with impaired language abilities to sing or hum. One notable publication was of two cases of children briefly observed by John Hughlings Jackson (1835-1911) (1871). These children were speechless but could produce some musical expression. Other such cases attracted the attention of Victorian clinicians who were actively pursuing theoretical questions regarding the organization of brain function and laterality. The presence of musical expression in children who failed to develop spoken language was seen as a notable symptom for early practitioners of pediatric neurology.*

### KEY WORDS:

19<sup>th</sup> Century, Aphasia, Developmental Disorders, Great Ormond Street Hospital For Sick Children, Jackson (John Hughlings), Localization, National Hospital For Paralysis And Epilepsy, Singing, Speech, West (Charles).

## Introduction

British neurologists published a number of observations in the second half of the 19<sup>th</sup> century regarding the ability of speechless individuals to sing or hum. We consider cases noted by John Hughlings Jackson (1835-1911) and his contemporaries in which there was a pathological dissociation between speech and singing in vocal expression. Such observations of impaired speech with preserved singing abilities were considered a notable feature and were included in theoretical discussions regarding the neurological organization of motor and mental function, particularly with respect to their development in children. In this chapter, we examine reports of the ability to sing in cases of loss of speech in the British medical literature, and consider how they contributed to ideas regarding: 1) distinctions between voice, speech and language; 2) the localization of these functions with respect to the pathology evidenced by vascular disorders and epilepsy; and finally, 3) how developmental impairments in children became a new area of focus for clinical neurology.

After providing a historical context for ideas regarding speech impairments that arose in the early 1860s, we examine the brief details provided in the writings of Jackson on this topic over the next two decades. In particular, we consider the publication of two of Jackson's cases of singing in speechless children in 1871. This is placed in the context of contemporaneous debates regarding the neurological understanding of vocal expression and by extension to musical production.

### I. Historical Context

#### Biographical Background on the work of John Hughlings Jackson

From an historical perspective, Jackson was the preeminent Victorian neurologist -

possibly the most important British neurologist of all time, though not necessarily the most famous. The work that established his historical standing was instigated in the 1860s, when he began to develop the modern neurological paradigm, i.e., the intellectual framework that we use to analyze neurological problems.

Jackson was born in 1835 in the village of Green Hammerton, Yorkshire, about 10 miles northeast of the ancient city of York. His father was a brewer and farmer, who was generally in comfortable circumstances, except when he suffered a substantial loss in the railroad speculation of the 1840s. Jackson's mother died when he was only one-year old, and he was raised by his father and female servants.

In 1850, Jackson was apprenticed in medicine to a physician in York, and in 1852, he entered the now-defunct York Medical School. Among his teachers there was Thomas Laycock (1812-1876), whose theories about reflex activities in the brain had a significant impact on Jackson's later thinking. In 1855, Laycock left York to take the prestigious Chair of the Practice of Physic at Edinburgh. In that same year, Jackson decamped to London's St. Bartholomew's Hospital, where he was an external student for less than a year. During the years 1856-1859, Jackson was Resident Medical Officer at the York Dispensary, and in 1859, at age 24, he moved to London permanently.

When Jackson came to London, he initially lived with his fellow Yorkshireman, Jonathan Hutchinson (1828-1913) and family. Jackson began his London career as a medical reporter with Hutchinson, but soon received clinical appointments first at the Metropolitan Free Hospital and subsequently at the newly founded National Hospital for Paralysis and Epilepsy in 1862 and the London Hospital a year later. Shortly thereafter, he married his cousin, Elizabeth Dade Jackson. It was a very

happy marriage, albeit childless and tragic, because Mrs. Jackson died in 1876 leaving Jackson to live as a widower for the next 35 years. From that time, Jackson continued to do his work intensely, but he never really recovered from the loss (Greenblatt, 1965, Critchley and Critchley, 1998).

There is some evidence that Jackson had an interest in music when he was a medical student (age 19) in 1854. In a long letter to Jackson from his father, the elder Jackson wrote: "As to your music I do not say or indeed wish you to give it up" (Critchley and Critchley, 1998, p. 30). The most reliable "Recollections" of Jackson were written by his friend, Jonathan Hutchinson (1911) who said nothing about any interest in music, even when mentioning Jackson's impatience at the theater. Moreover, we have a quote from the daughter of Jackson's lifelong friend, Thomas Buzzard (1831-1919), who knew Jackson when she was a child to the effect that, "He had no particular taste for music or art in any form, he often admitted he could not distinguish the National Anthem from 'Rule Britannia'" (Farquhar Buzzard, 1934, p. 910).

At the early age of 29, Jackson first gained a modicum of reputation in the competitive medical scene of mid-Victorian London because of his contributions to the then hotly debated topic regarding the localization of what became termed aphasia (Trousseau, 1864). Despite the fact that Paul Broca's (1824-1880) first presentations about the localization of language impairments to the Paris medical community were made in 1861<sup>1</sup>, his ideas were given little if any consideration in England until Jackson brought them to notice in 1864 (Greenblatt, 1970, Lorch, 2008).

Jackson's interest in spoken expression was part of a larger enterprise to

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<sup>1</sup> For discussion of Broca's initial presentation in 1861 see Lorch, 2011.

develop a theoretical understanding of the functions of the cerebrum. His contemporary co-worker in this fundamental and more far-reaching endeavor to understand the functions of the nervous system was Jean-Martin Charcot (1825-1893) in Paris. Each of these two men knew about the other, and they accorded each other very deep respect<sup>2</sup>. They both began their life's work in the 1860s, and in the process, they created the modern neurological paradigm of localization in the central nervous system.

### Larger Historical Medical Context

In science and medicine - to some extent in the entire mid-Victorian culture - the 1860s were transitional to "modern" thought. Evolution was broadly hinted at and discussed in Robert Chambers' (1802-1871) *Vestiges of the Natural History of Creation* (1844), and Herbert Spencer (1820-1903) began to write about it in the early 1850s. Charles Darwin's (1809-1882) *On the Origin of Species* appeared in 1859, and within a few years, the debates became intense. An event of equal importance to medicine was Rudolph Virchow's (1821-1902) publication of *Die Cellularpathologie in ihrer Begründung auf physiologische und pathologische Gewebelehre* in 1858 (English translation, 1860), which put pathology and the rest of biomedical science on its modern footing. Louis Pasteur's (1822-1905) work on microbes and Joseph Lister's (1827-1912) development of antiseptic (shortly later, aseptic) surgery were both started in the 1860s.

For those interested in determining the function in the cerebral cortex, the test case in the early 1860s was the localization of the language faculty. Both Broca in

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<sup>2</sup> Charcot traveled London several times in the 1860s to visit the National Hospital and other hospitals, and also to attend meetings of the British Medical Association (Hierons, 1993).

Paris and Jackson in London worked on this problem in parallel. Before he actually learned about Broca's contributions, Jackson reported his own independent clinical observations on seven cases of "loss of speech", which he published on January 30, 1864 in "Clinical Remarks on Hemiplegia, with Loss of Speech - its Association with Valvular Disease of the Heart" (Jackson, 1864b). When he encountered those first patients, Jackson's mind had been prepared in two specific ways: (1) he had a prior interest in hemiplegia as a unilateral, clinical phenomenon, and (2) by the influence of his early mentor at Queen Square, Charles-Édouard Brown-Séquard (1817-1894)<sup>3</sup>. Brown-Séquard taught him the difference between internal brain-based loss of speech, that is, expression of ideas in language, and external speech, that is, the loss or difficulty in spoken expression in articulation (Koehler, 1996). Jackson explained: "Loss of speech cannot be too carefully distinguished from loss of power of articulation" (Jackson, 1864b, p. 123).

To explain the concurrence of hemiplegia and "loss of speech", Jackson (1864e) subsequently theorized that in each patient an embolus from a heart valve had lodged in the middle cerebral artery, each of which irrigates both the corpus striatum and the lateral frontal lobe. Jackson's reasoning was based on the contemporaneous conception that the corpus striatum is the most rostral extent of the motor tract, and was thus considered by Jackson to be the source of hemiplegia. In addition, since early in the 19<sup>th</sup> century, the area of the cerebrum termed the frontal lobes were thought by many to be the seat(s) of the faculty of language, based on the work of Gall and Spurzheim (1810-1819)<sup>4</sup>, Bouillaud (1825) and others

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<sup>3</sup> For a biography of Brown-Séquard see Aminoff, 1993.

<sup>4</sup> Further discussion of Gall's work will not be included here. See the chapter by Eling, et al. in this volume for his exploration of the faculty of music at the turn of the 19<sup>th</sup> century. These authors include a discussion of Gall's observations on "idiot" children with musical abilities.

subsequently.

Three months after his initial publication on loss of speech, on April 30, 1864, Jackson published a case series, in which he had “observed that whenever loss of speech occurs with hemiplegia, the hemiplegia is on the right side” (Jackson, 1864a, p. 482). It appears that Jackson had found Broca’s publications on cases of “aphemia” only a day or two after this report had appeared. Shortly after, the *British Medical Journal* printed a letter-to-the-editor from Jackson, which he dated May 2, where he admitted: “M. Broca believes that disease of the brain *on the left side only* produces loss of speech; and, if I were to judge from the cases under my own care, I should think so too” [italics in original] (Jackson, 1864c, p. 572). The strength of Broca’s argument for laterality was based on autopsy evidence whereas Jackson’s was based solely on clinical observation of symptoms. In any case, Broca had only raised the possibility of left-brain dominance for language (to use our terms, not his) in 1863, but he declared his conviction in this regard in 1865. In the mid-1860s, Jackson was deliberately focused on three clinical phenomena with unilateral manifestations and/or pathology: hemiplegia, a type of seizures that came to bear Jackson’s eponym<sup>5</sup>, and aphasia. While the clinical phenomenon of aphasia is manifest in midline structures (i.e., the mouth, jaw, tongue, and vocal cords), both Broca and Jackson were collecting evidence to establish that its underlying cortical pathology is paradoxically unilateral.

## II. Cases of singing in speechless patients

### Jackson’s observations on singing in speechless patients

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<sup>5</sup> See York and Koehler, 2000 for a detailed discussion of Jacksonian epilepsy.

Jackson's interest in the ability to hum or sing in speechless patients is signaled in one of his earliest publications. In the first volume of the *Clinical Lectures and Reports by the Medical and Surgical Staff of the London Hospital*, Jackson published a lengthy contribution on loss of speech (Jackson, 1864e) followed by a series of 28 cases presented as illustrations (Jackson, 1864d). In his presentation of both his theories on the subject, and the evidence provided by the cases he had surveyed, Jackson considered all aspects of expression: movement of the articulators, phonation and voice, as well as spoken (and written) language. Jackson set out the theoretical distinctions he thought were crucial to investigating the nature of loss of speech and explicitly stated that singing was the primary example of vocal expression:

In the first place, let me say, once for all, that I do not mean mere difficulty in utterance from more or less paralysis of the lips, tongue and palate, but a mental defect more or less loss of language, varying from the most general to the most special manifestation of that faculty.... Talking, in the conventional sense of the word 'talk' implies three inseparable but distinct things—Voice, Articulation and Speech. The first is for sound, as in singing; the second for utterance of words; and the third for the expression of ideas.... (Jackson, 1864e, p. 390)

What is of interest for the present purposes is that Jackson also made observations of the ability to sing in several of his cases of loss of speech. It is clear that Jackson, and the other physicians whose cases he drew upon, regularly recorded observations of such patients' musical abilities and found it notable that some with

defects of speech could sing. Three of the 28 patients included as illustrations in Jackson's presentation on loss of speech were noted to have some preserved musical abilities.

Case XVIII was a patient with loss of speech and hemiplegia on the left side that was supplied by a colleague out of London (Dr. Haydon, of Bovey Tracey). This case of a 32-year-old pregnant woman, who suffered paralysis and loss of speech during labor, was described in the acute phase but at Jackson's request there was follow up report two years post-onset of illness. In this report Dr. Haydon noted that her speech was limited to "aye aye" and "no no" but that she "hums a tune, and is fond of doing so" (Jackson, 1864e, p. 437).

Case XXVII had syphilis and right hemiplegia with loss of speech. The patient was a 25-year-old bargeman under the care of Dr. Fraser in 1860, who had completely lost his speech and could only say "no" or "oh". After being treated with iodine of potassium, the patient was noted to improve, now being able to say, "How d'ye do", and "Don't know". A "clown" in the wards, who was an entertainer at some minor music halls, had made efforts to teach him to sing. He was now able to sing "I'm off to Charleston", "So Early in the Morning!" and some devotional phrases (Jackson, 1864e, p. 449).

The final patient reported to have the ability to sing but not speak was Case XXXV, who had loss of speech and hemiplegia on the right side. This case is atypical of the series Jackson compiled, as he was not a current patient at the London Hospital or one of his colleagues. Rather it is of an observation that Jackson recollected from when he was a boy "about 18 years ago", that is in approximately 1846 (Jackson, 1864e, p. 457). Jackson recalled, "I have heard the patient, Case XXXV., sing many a time, after she had in a great measure recovered; but she

always made mistakes in the words of the song, omitting some, slurring over others and entangling the syllables oddly.” It is interesting that this observation was considered significant enough to merit being specifically noted in the index of the volume under the heading “singing, by speechless patients”.

Jackson’s interest in singing with respect to vocal expression was underpinned by the ideas of the widely popular (pre-Darwinian) evolutionary philosophy of Herbert Spencer. He often employed Spencer’s hierarchical outlook in his analyses of neurological problems. Jackson’s first published references to Spencer are found in his discussions of two cases in his first publication on “Loss of Speech” (Jackson, 1864e). In this article, Jackson was exploring the significance of “recurrent utterances” in chronically speechless aphasic patients. He observed that Case XX could say only “yes” and “oh! Yes”, but could produce these utterances in different tones. With regard to the use of intonation in this case, Jackson remarked: “‘All speech,’ says Herbert Spencer, ‘is compounded of two elements - the words and the tones in which they are uttered - the signs of ideas and the signs of emotion’” (Jackson, 1864e, p. 440). Furthermore, in discussing the recurring utterances in speechless Case XXVI, Jackson continued:

. . . She could say “yes” and “no”, but then she said these words with no bearing on the question asked. When spoken to she replied in one continuously repeated jargon, “Committymy - pittymy”. She used these words as if they had some real meaning, and kept continually trying to make herself understood . . . Here was voice, and also articulation; but not language, or at least, it was a language which could express emotion only . . . “Cadence,” says Herbert Spencer, “is the involuntary commentary of the emotions on the

intellect.” . . . It was indeed, a commentary with the text almost suppressed.  
(Jackson, 1864e, p. 448)

Jackson did not provide citations for his two quotations from Spencer, but they can be traced to an article on “The Origin and Function of Music,” which first appeared in *Fraser’s Magazine* in 1857 (Spencer, 1857). This was reprinted in Spencer’s (1859) collected *Essays: Scientific, Political and Speculative*, and that is the citation Jackson later used (Jackson, 1866a, p. 175). In his quotation from Spencer, Jackson made an interesting omission, because Spencer’s remark about cadence was actually “. . . *cadence is the commentary of the emotions upon the propositions of the intellect*” (Spencer, 1859, p.379, italics in original, our underlining) (see also Greenblatt, 1965, p. 374).

Jackson’s first publication of 1866, discussed above, seems to be a continuation of his earlier publications on loss of speech, in which he had quoted Spencer on the distinction between intellectual and emotional language<sup>67</sup>. In 1866, Jackson explored this subject in more depth. In the process, he came up with the idea of a “proposition”, which remained central to his thinking about language for the rest of his life. In discussing the case of a man who had right hemiplegia and severe Broca’s aphasia, Jackson argued:

. . . It is not safe . . . to conclude that a patient who has lost speech is regaining power of language because he begins to swear . . . By such words no part of a proposition can be conveyed; that is, they add nothing to

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<sup>6</sup> For a brief discussion of the previous history of this distinction between intellectual and emotional language see Harrington, 1987.

<sup>7</sup> For a discussion of the ideas of Spencer and Darwin on the evolution and functions of music that developed later in the 1870s see Kleinman’s chapter in this volume.

precision of expression in delivering an idea . . . Where no proposition is conveyed, there is no intellectual language. (Jackson, 1866a, p. 175)

For Jackson, a proposition delivers an idea. Various writers had employed this term with a range of meanings, but it is unclear to what extent Jackson's notion of propositional speech was based on a particular person's ideas or was being used in with a completely original meaning. The use of the term "proposition" was in fact common at the time. For example, in a discussion of names and language, the British philosopher John Stuart Mill (1806-1873) considered propositions extensively (Mill, 1851, vol 2, p. 18-22).<sup>8</sup> To support his argument regarding the distinction between intellectual and emotional expression (Jackson, 1866a, p. 44), Jackson drew on the work of the philologists Max Müller (1823-1900) and Robert G. Latham (1812-1888), whose book *Logic in Its Application to Language* (1856) was concerned with "Propositions". Jackson also continued to draw on Spencer's (1857) ideas in that author's article on "The Origin and Function of Music". This time, however, he went farther in detailing the physiological implications of the distinction between emotional and intellectual language. In a discussion of a patient who had severe and persistent loss of speech, Jackson states:

. . . having reference to Spencer's views, . . . we may conclude that our muscles may be used in two kinds of language, one intellectual and the other emotional. But the muscles may, in some cases of disease of the hemisphere, be readily put in action for most purposes, when they cannot be

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<sup>8</sup> For an extensive discussion of the philosophers who influenced Jackson see Jacyna, 2011.

used to make signs by words or by pantomime. (Jackson, 1866a, p. 175)

In his next publication on aphasia that followed later in 1866, Jackson includes a case of 3-year-old epileptic boy who could say “mam” and “dad”, and who was reported (but not observed) to be able to reproduce tunes his father played on the flute, but could not sing (Jackson, 1866b). It is notable that Jackson makes the distinction between the patient’s ability to reproduce the melody and the inability to sing (presumably being unable to produce the words of the song along with the melody). He also details another speechless patient, who was observed to “use her laryngeal muscles not only to utter single sounds like ‘ah! oh!’ but also in the complex process of singing” (Jackson, 1866a, p. 47).

At the time that Jackson was discussing the significance of singing in speechless patients, an extensive review of the existing literature on aphasia was presented by Scottish physician Alexander Robertson at the annual meeting of the Medico-Psychological Association in Edinburgh, July 31, 1866, and published in the *British Journal of Mental Sciences* early in 1867. He presented an original interpretation of the clinic-pathological evidence for the organization of the language faculty, one that diverged from Jackson’s on many points.

In this paper, Robertson includes the description of a case of a 47-year-old millworker, who had aphasia with right hemiplegia. Robertson observed: “At present can say ‘Dear, Dear!’ ... ‘Ay’—‘Oh Ay,’ and ‘No’... Her pronunciation is distinct; can sing; and, at my request, hummed over an old Scotch air; of course, without words” (Robertson, 1867, p. 505). The insertion of the “of course” by Robertson is notable. This observation about the ability to sing in a patient with no propositional speech is made without further analysis or comment, although the author presents an

extended discussion of the evidence for whether such disorders have a pathological source in the motor and memory faculties. Such an observation, made in passing, about the ability of aphasic individuals to be able to produce the melody of songs that they knew before the onset of illness did not attract much theoretical attention either in Robertson's considerations or others' generally at the time beyond those points considered by Jackson as presented above.

### Jackson on children's expression and musical abilities

In 1867, Jackson continued to develop his ideas regarding vocal and verbal expression based on his observations of clinical cases at the London Hospital and the National Hospital for Paralysis and Epilepsy. Jackson now includes comments on the behavioral difficulties of children who do not develop speech. For him, one of the most evident features in these cases is their musical expression:

Now, children who are speechless, presumably from disease of the hemisphere—who are not deaf, and who have no difficulty of swallowing—are in a far more distressing condition. They are often very vicious; they will bite and scratch their brothers and sisters, break the furniture, set fire to things, and seem quite regardless of punishment. The only thing some of them seem capable of learning is singing or humming, and some of them pick up tunes without any set teaching. (Jackson, 1867, p. 500)

In his writings, Jackson often considered cases of adults and children together without commenting on developmental issues that might be of consequence (as in his 1864 cases series discussed above). However, in his chapter on "Convulsions"

in Reynolds' *A System of Medicine* (Jackson, 1868), the most widely used textbook of the day in the London hospitals, the first section is completely devoted to children. Jackson states that the nervous system of a child is different from an adult's: "It is in a state of active change...the child's nervous tissue will naturally be more unstable than that of the adult" (Jackson, 1868, p. 254). With regard to childhood paralysis, Jackson states:

Now children are subject to two kinds of paralysis, one of which almost deserves the name essential, and is well enough recognized when called Infantile Palsy. The other, which will occur at any age, namely hemiplegia, is the form of paralysis which most frequently follows Convulsion... With loss of speech we may take in mental defects, because in children the two things often go together. (Jackson, 1868, p. 263)

Jackson then goes on to discuss cases of speechlessness in children with imbecility after convulsions. He cites his London Hospital colleague, John Langdon Down (1828-1896), who was also medical superintendent at the Earlswood Asylum for Idiots, from 1855-1868<sup>9</sup>, on this point:

Dr. Langdon Down tells me that idiots who have come under his care speechless have been taught to speak. Very strangely, the worst of such patients even when speechless have often a good ear for music, and will hum or sing tunes correctly. This is not an important sign of mental power. Dr.

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<sup>9</sup> For details of Langdon Down's work on children with disabilities see O'Connor, 1998.

Down tells me that idiots often can sing. The younger the child, the more likely is loss of speech to be attended by general mental deterioration.

(Jackson, 1868, p. 264)

Although Jackson first gained positive acclaim for his work on aphasia (Lorch, 2008), ultimately it was his analysis of the pathophysiology of unilateral seizures that cemented his reputation, now reflected in the eponyms “Jacksonian march” and “Jacksonian seizures”. The cornerstone of that work was laid in 1870, when he published the foundational statement of modern epileptology in a paper titled simply, “A Study of Convulsions” (Jackson, 1870). By the term “convulsions”, Jackson was referring to unilateral seizures, which were at this time not generally accepted as “genuine” epilepsy, because they did not necessarily involve loss of consciousness. It was only in the later 1870s that Jackson was able to bring together the pathophysiologies of focal and genuine epilepsies into a single conceptual framework. His “Study” of 1870 was a major step in that direction, and one of its underlying premises was the commonalities of localization among many seemingly different clinical entities, including aphasia. In a section on “Temporary Defects of Speech with [focal] Convulsive Seizures” Jackson stated:

I have long observed of convulsions that when spasm begins on the right side there is defect of speech<sup>10</sup> more marked than when it begins on the left . . . when the spasm starts in the *face and tongue* of the right side, there usually is great defect of speech . . . and there usually is not when it starts in the *right hand or right foot*. (Jackson, 1870, p. 179)

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<sup>10</sup> Jackson seems to be using “defect of speech” in this context to refer to loss of speech, i.e. aphasia not dysarthria.

The following year, the medical journal the *Lancet* published a short notice of two cases of singing in speechless (aphasic) children under the care of John Hughlings Jackson, one from the National Hospital for Paralysis and Epilepsy in Queen Square and the other from the London Hospital where he held joint posts (Jackson, 1871).<sup>11</sup> This type of brief medical case report was a common form of article included in many major British medical journals of the mid-19<sup>th</sup> century. They consisted of short medical reports of notable, rare, or otherwise interesting cases that had been examined by doctors at the major London teaching hospitals. In the *Lancet*, they were presented under the general title, “A Mirror of the Practice of Medicine and Surgery in the Hospitals of London”.

This kind of reporting was a common practice among the competing medical journals of that time. As mentioned above, Jackson himself had begun his career in London in the early 1860s by doing that kind of work (Hutchinson, 1911). This article was almost certainly written by a now-anonymous medical reporter who followed Jackson on his rounds at the National Hospital for Paralysis and Epilepsy, and the London Hospital. It is not known whether he had an opportunity to review the 1871 report before its publication, but that is a real possibility.

#### Jackson’s “Singing by Speechless (Aphasic) Children” (1871)

In the introduction to this report, it is noted that Jackson had made remarks regarding aphasic patients (i.e., adults with acquired disorders) who could

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<sup>11</sup> This article has recently come to scholarly attention through the work of Johnson and colleagues (Johnson, Graziano and Hayward, 2010). It is not listed in the bibliography of Jackson’s writings in the *Selected Writings* published posthumously by Taylor (Jackson and Taylor, 1931, 1932), nor even in the definitive bibliography of Jackson’s work by York and Steinberg (2006).

sometimes sing. However, emphasis is placed on the fact that these cases are of children (rather than adults) and on those with developmental rather than acquired difficulties, including but not exclusively language impairments, and having other behavioral disturbances as well. About these cases, Jackson echoes the opinion put forward in his chapter in Reynolds' textbook (Jackson, 1868) that these children are often "ill-tempered, mischievous, and spiteful". There is also a reference to Langdon Down's observation that idiots can sometimes sing repeating the point made by Jackson in his chapter in Reynolds. The report goes on to discuss speechless children's ability to learn to talk and makes the distinction between "backwardness" and other instances of speechless children who do begin to talk (after "training", or suddenly, or after having had a fever). This also rehearses the arguments found in Jackson's chapter in Reynolds' textbook presented above. Finally, in the report of Jackson's two cases the point is made that *persistent* hemiplegia is rare in cases of loss of speech (acquired?) in children, which is also first stated in Jackson's chapter in Reynolds' textbook. As such, this preamble has the flavor of a clinical instructor providing an overview of the current state of knowledge on the subject to prepare his students for the observations to be made at the bedside.

Case 1 was said to have been seen by Jackson at The National Hospital for Paralysis and Epilepsy a year ago (i.e., 1870) for only a few hours. The child was described as needing a special attendant because of his difficult behavior, and it was noted that he displays "willfulness". This ten-year-old boy was reported in the case history to have never developed normally: "He never could speak, and 'he never laughed or cooed' as a baby". His first observable "fit" was at age 12 months. However, Jackson could not get a "clear account of the paroxysms", which occurred at a rate of three or four per year. When he was seven, "he had a fit (a succession

of fits?) lasting eight days and nights. Ever since he has been hemiplegic . . .” (Jackson, 1871, p. 431). When Jackson examined the boy, he was described as “hemiplegic of the right side. The face is drawn slightly to the left; the right arm is useless; and he limps with the right leg,” all of which indicated that he had suffered a left middle cerebral artery stroke during his episode of *status epilepticus*. The child’s speech, reported at the time of examination, was limited to “Here”, “There” and “I won’t”. The major significance is placed on the fact that, “His mother affirms that he can sing very correctly, and can pick up tunes by himself”. His mother also reported that the boy could produce three other words that are people’s names, while singing when they occurred in lyrics of popular tunes but not in speech. The report states: “It is certainly worthy of remark that when he sings he can utter certain words besides those above mentioned—e.g., ‘Joseph,’ ‘Mary,’ ‘Maggie May,’ but can only do so while singing” (Jackson, 1871, p. 430).

After this brief description, extracts are provided from the notes Jackson had made when he had observed the boy the previous year. Jackson noted that the child could spontaneously sing the refrain “Not for Joe”<sup>12</sup>. The boy is also reported to be able to sing and make correct movements associated with the song “Heads and Tails”. This description of minimal speech production with enhanced singing ability in a child with a developmental disorder associated with epilepsy is followed by a second case of a child who was a patient at the London Hospital.

The fact that Jackson’s record of a case that had been seen the year before at the National Hospital is included in the current case report from the London Hospital might suggest that Jackson reviewed the earlier case in order to present on

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<sup>12</sup> This is a contemporaneously popular London music hall tune “Not for Joseph” by Arthur Lloyd, 1867 (source website <http://www.arthurlloyd.co.uk/NotForJoe.htm> author of website Matthew Lloyd, 2001-2014, accessed 8 May 2014).

the topic of singing in speechless children to those present in the ward. On the other hand, the inclusion of *Case 1* may reflect his interest in publishing a record of such observations. It might be that the earlier patient case notes were included subsequently in the *Lancet* report. It is difficult to determine whether these retrospective case notes of a child seen at another hospital the year before were included in Jackson's case presentation or provided later to the reporter, or even perhaps while Jackson himself was preparing the publication.

*Case 2* was an 8-year-old boy described by Jackson as "quite dumb", meaning largely mute or speechless. In Jackson's further description of the child's examination, he states:

...and there is no trace of palsy. He has a very large head, and at the age of seven months had "water on the brain". He has since had fits, of which no definite description is to be obtained; but it appeared that they comprised convulsions with loss of consciousness. This boy also can sing, but when Dr. Jackson saw him he would not sing, nor indeed do anything else he did not wish to do, however much he was coaxed or urged. His general mental condition is very like that of the boy whose case is above referred to.

(Jackson, 1871, p. 431)

The boy's speech is was limited to "Here" and his sister's name "Eleanor". His father stated that the boy was able to produce the notes of tunes very correctly but without words. The boy would not sing when Jackson examined him, but his ability to sing several tunes was confirmed by the boy's attendant outside the hospital. There is some emphasis on the point that, in *Case 1* the boy could produce a few additional

words when singing than he was able to spontaneously. This is not the case for Case 2 but the general point is not pursued further.

In the conceptions and terminology of the time, repetitive seizures that began with loss of consciousness and simultaneous (or nearly simultaneous) generalized motor attacks were defined as “genuine” epilepsy. Focal motor seizures that did not begin with loss of consciousness were considered to be “non-genuine” seizures, and thus, not considered to be epileptic. In his “Study” of 1870, Jackson began to use his analysis of focal seizures to develop the idea that *all* seizures share a common pathophysiology; they begin in unstable aggregations of brain tissue.<sup>13</sup> Jackson’s inability to get clear descriptions of the “fits” in both of these cases meant that he was unable to analyze the pathophysiology of the seizures in either child.

Included with the report of Jackson’s two cases is a discussion in which the theoretical point is made that the source of aphonia is a peripheral one. It is suggested that the symptom analogue to aphasia would be a loss of power to sing tunes that had been previously acquired. This is followed by the citation of a case reported by Dr. Charles Lasègue (1816-1883), professor of clinical medicine in Paris<sup>14</sup>, which appears in the second revised and expanded edition of Armand Trousseau’s (1801-1867) Lecture LVIII “De l’Aphasie” (1865). It appears likely that this citation was taken from the recent English translation made by Jackson’s junior colleague at the National Hospital, Dr. Victor Bazire (1835-1867), which included many commentaries and additions to the original (Trousseau, 1868). Dr. Lasègue had described a case of a musician with aphasia who could not read or write but

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<sup>13</sup> “Cells” and “fibers” were considered to be separate entities until the neuron theory was widely accepted in 1891.

<sup>14</sup> Ernest-Charles Lasègue worked at the Salpêtrière, la Pitié and later at Hôpital Necker and was a close colleague of Trousseau’s. He developed many ideas regarding psychology and psychiatry, particularly the notion of “folie à deux” with Jules Falret (Chabrol and Corraze, 2001).

could transcribe music in notation (as opposed to mere copying). After noting this, Jackson further theorized the possibility of an aphasic patient with alexia who could read music notation. This prediction was subsequently born out in reality as demonstrated by Knoblock in 1888 (Johnson et al, 2010). Finally, Jackson refers to Jules Falret's (1824-1902) ideas about the ability of some aphasic patients to produce words in singing that they cannot in speaking<sup>15</sup>.

In summary, the points raised in the commentary included in this very brief report focus on the distinction between voice and speech, as evidenced by observations of aphasic patients who were still able to vocalize, to say “yes” and “no” and were able to “vary the tone” of their voices. All of these observations are taken as evidence that the innervation to the larynx is intact in such patients, but Jackson insisted that the ability of such cases to sing is the most striking evidence for this conclusion. Finally, Jackson suggested that, in cases where both aphasia and aphonia exist, there must be two lesions, whereas in cases of loss of voice and impaired articulation, this was due to palsy of the articulators, also causing swallowing difficulty (but these patients can still write). This he contrasted with patients with acquired aphasia due to a unilateral cerebral lesion, who have loss of speech but good swallowing, and might be able to make written copies but not express themselves in writing.

It is not clear why the brief note detailing these two cases was thought to be significant enough to warrant publication either by Jackson or the anonymous reporter for the *Lancet*. One possible source of interest in neurological conditions in children and the distinction between singing and speech may be traced to the

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<sup>15</sup> Jules Falret wrote several articles on aphasia from 1864 onwards (Falret 1864, 1866). Falret's ideas about music and speech are discussed in the chapter by Johnson and Graziano in this volume.

prestigious Lumleian Lecture presented at the Royal College of Physicians in London by Charles West (1816-1898). West gave his lectures in March 1871. They were reviewed in all the major medical journals and published in full as *On some Disorders of the Nervous System in Childhood* (West, 1871). The report of Jackson's two cases of singing in speechless children was published in the *Lancet* six months later. It is extremely likely that Jackson heard these lectures or read them in their published form. It is also possible that the contents of West's third lecture, "Disorder and Loss of Power of Speech.—Mental and Moral Peculiarities and their Disorders", prompted Jackson and/or the reporter to publish these two cases. They were somehow thought to be worthy, even though there was slender material since one was recalled from a brief observation the year before and the other had only been examined for an hour and not admitted.

#### Cases of singing in speechless children recorded at Great Ormond Street

West was the senior physician at the Great Ormond Street Hospital for Sick Children (founded 1852), which was situated around the corner from the National Hospital for Paralysis and Epilepsy. The two hospitals shared staff and Jackson was known to have attended patients and autopsies there from time to time (Hellal and Lorch, 2007). West had a particular interest in diseases of the nervous system, both congenital and acquired (Hellal and Lorch, 2005) and was one of the few British physicians to write about language disorders with regard to childhood diseases (West, 1848).

In the third of his Lumleian lectures, West described in detail a case from Great Ormond Street Hospital of a 5-year-old girl with a sudden onset of right-sided paralysis said to have "entirely lost her speech." There was no evidence of

convulsions or loss of consciousness, “as the day was very hot, it was concluded that she had had a sunstroke”. Initially her only utterance was “da”, but after three months recovery she could say “here” and “oh”. West recounted that:

At the end of four months her mother announced with great glee that her little one could chant a line or two of some nursery songs, but all she did was to modulate the tone in which she sang the same old monosyllable ‘dah’”. (West, 1871, p. 112)

Further interest in the singing abilities of speechless children appears to have been created in West’s and Jackson’s immediate colleagues, perhaps initiated by their observations. For example, during 1871 a 9-year-old boy with loss of speech and right hemiplegia following convulsions during an attack of scarlet fever was admitted 3-months post-onset of illness to Great Ormond Street Hospital under the care of Dr. William Howship Dickinson (1832-1913). In his unpublished archived case notes, Dickinson recorded the child’s recovery over a period of nine months. Dickinson noted that the boy’s voice remained “a musical instrument though no longer an instrument of speech”. By the end of his stay in hospital, the child’s speech had improved. Dickinson included testing of repetition and singing in his final assessment before discharge. At this time, the boy could repeat “almost any word which was set to him and quite intelligibly although the words were by no means perfectly articulated”. Finally, Dickinson recorded that he “could sing a verse of a hymn ‘Onward Christians’ so that one could understand the words” (Hellal, 2004, p. 215).

Another unpublished case was recorded at Great Ormond Street Hospital in

1877. A 7-year-old boy was admitted to the hospital under the care of Dr. Samuel Gee (1839-1911) with right hemiplegia and aphasia. He had suffered convulsions two weeks previously during his recovery from a bout of typhoid fever 10 weeks before. The child was left paralysed and unable to speak after a severe fit. On admission, it was noted that he understood when spoken to, “but replied to every question put to him “dadda” which he appeared to consider as an answer”. At three weeks, Gee recorded in his case notes that the child “...now uses more words but does not pronounce them well... Sings songs but without words, sometimes comes out with some part of the chorus” (Hellal, 2004, p. 224).

### III. Later Observations

#### Continuing interest in singing abilities with “loss of speech”

Jackson also continued to record observations about cases with loss of speech that “may be able to sing”, for example, in his major work “On Affections of Speech from Disease of the Brain” (Jackson, 1878, p. 319-321). There he again underscored the significance of preserved ability to sing and produce automatic speech in otherwise speechless patients. By the 1880s, there was more widespread emphasis placed on the significance of preserved singing ability in aphasic individuals.

It is notable that Jackson’s colleague at the National Hospital, William Gowers (1845-1915), included a description of a speechless patient with the ability to sing in his now classic textbook, *Diagnosis of the Diseases of the Brain*, published in 1885. This patient could only say “Yes” and “No”. Gowers reported that one day another

patient in the ward began to sing the song, “I Dreamt that I Dwelt in Marble Halls”<sup>16</sup>. The speechless patient joined in and sang the first verse along with the other patient, and then sang the second verse by himself. This patient’s autopsy had shown that the whole of the motor speech region of the left hemisphere was destroyed through embolism of the middle cerebral artery. Gowers made the point that the words were used automatically, and his utterances must have been effected by the right hemisphere (Gowers, 1885).

Henry Charlton Bastian (1837-1915), another of Jackson’s colleagues at the National Hospital, who was also a close friend of Herbert Spencer, had begun to establish a formalized system for assessing impaired and preserved modalities in aphasic patients also at this time. In addition to speaking, listening, reading, and writing, Bastian included numerous tasks testing all aspects of musical ability with respect to every expressive and receptive modality (Lorch, 2013). *Question 11* in the scheme Bastian devised for testing aphasic and amnesic patients was, “Can he sing airs, or the actual words of songs?” (Bastian, 1898, p. 306-8)

### French interest in the musical abilities of aphasic patients

While Jackson and his colleagues in London continued to include consideration of musical abilities as a significant dimension with respect to the faculty of language, their French colleagues shared this interest. Jean-Martin Charcot, one of Jackson’s colleagues in Paris, began to develop a model of the organization of various modalities of language reception and expression in the 1880s. For Charcot music was also a relevant dimension to explore (Johnson et al., 2013).

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<sup>16</sup> This was a popular aria from the 1843 opera *The Bohemian Girl* by Michael William Balfe and Alfred Bunn (Source Wikipedia [http://en.wikipedia.org/wiki/I\\_Dreamt\\_I\\_Dwelt\\_in\\_Marble\\_Halls](http://en.wikipedia.org/wiki/I_Dreamt_I_Dwelt_in_Marble_Halls), accessed 8 May 2014).

During the summers of 1883 and 1884, Charcot delivered a series of 14 lectures about language and aphasia (“On the Different Forms of Aphasia”) at the Salpêtrière Hospital. In these lectures, Charcot included observations regarding the musical abilities of patients with language and speech impairments. A patient reported by Charcot’s assistant physician, Charles Féré (1852-1907), was discussed during the 1883 lecture series. Féré (1883) noted that aphasic patient “H” could correctly sing the melody of the French national anthem “*Marseillaise*”, although using a “guttural sound”. Féré emphasized the point that the preserved ability to produce the melody but not the words of the song demonstrated how music and speech could be dissociated.

#### IV. Discussion and Conclusions

Jackson’s consideration of observed preservation musical abilities in cases with impaired speech can be seen to reflect two overarching concerns with respect to his theories of neurological function: 1) the observation of “recurrent utterances”, and their significance for the evolutionary development of emotional language; and 2) “propositionising” as the essence of intellectual language.

Neither of the two patients in Jackson’s 1871 report about singing in speechless children could be said to have propositional language, with or without singing. This raises the question: Why did Jackson choose to record these cases? It is possible that he did not make the choice, but only discussed these cases in the course of his hospital rounds. It might have been the medical reporter’s decision that these cases held some significance and so should be recorded in the *Lancet*. As for the faculty of music, it appears that, for Jackson, this was of purely theoretical

interest<sup>17</sup> .

Beyond the specific impetus provided by West's *Lumleian Lectures*, which had been presented only a couple of months before these cases appeared in the *Lancet*, there is another potential motivation. This is the widespread public debate regarding the evolution of language sparked by the publication of Charles Darwin's *The Descent of Man* that also appeared in 1871. In this book, Darwin first offers his theory that music is the source of human language:<sup>18</sup>

With respect to the origin of articulate language ... I cannot doubt that language owes its origin to the imitation and modification, aided by signs and gestures, of various natural sounds, the voices of other animals, and man's own instinctive cries. When we treat of sexual selection we shall see that primeval man, or rather some early progenitor of man, probably used his voice largely... in producing true musical cadences, that is, in singing.... The imitation by articulate sounds of musical cries might have given rise to words expressive of various complex emotions. (Darwin, 1871, Vol 1. p. 56)

Alternatively, the motivation for publishing these cases might have been a very personal one. This was explained decades later by Leslie Paton, an ophthalmologist who worked with Jackson in his later years.

. . . Jackson, in composing his papers, wrote and rewrote them page by

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<sup>17</sup> It is interesting to note that Jackson lived next door to Sir Julius Benedict (1804-1885), the composer and conductor, who was knighted in 1871 (Source Wikipedia, [http://en.wikipedia.org/wiki/Julius\\_Benedict](http://en.wikipedia.org/wiki/Julius_Benedict), accessed August 18, 2014).

<sup>18</sup> For a more detailed discussion of Darwin's ideas about language development in children see Lorch and Hellal, 2010.

page, four, five or even six times, omitting nothing practical bearing on the subject, believing, as he insisted, that “what might prove of utility to anyone working later on should be included; one never can know what might prove of use in days to come”. (Chance, 1937, p. 253)

It appears that when Jackson saw a clinical phenomenon that instinct told him might later prove useful, he recorded it for future use. In his own work, he never dealt systematically with the special difficulties of language disorders in children. He understood they were important beyond mere curiosity, and so he left his observations of them to others of his own time and to posterity, that is, to us. In addition, more general theorizing about the place of musical ability in the larger scheme of neurological thinking about localization of function in the second half of the 19<sup>th</sup> century was relatively limited. Both Charcot and Bastian did consider that developed musical ability was a parallel modality of expression alongside language.

As documented above, investigation of the ability to hum or sing a melody as a clinical sign in speechless patients appears to have been common for many London clinicians in the 1860s, 70s and 80s. However, these observations were not developed with a theoretical dimension by Jackson or his colleagues at this time. This research program only came into focus in the second half of the 20<sup>th</sup> century with the questions raised by cognitive scientists.

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