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Jean-Martin Charcot (1825–1893): A Treatment Approach Gone Astray?

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Abstract
Jean-Martin Charcot's reputation remains that of a physician who took little interest in treatments for the neurological diseases he did much to identify. After reviewing the limited number of medicinal remedies of slight effectiveness at Charcot's disposal, we analyze in this review the numerous therapeutic tests that he conducted: vibratory medicine for Parkinson's disease, treatment of tabes by suspension technique, metallotherapy and moral treatment for hysteria. Understanding that he fully and completely adhered to the far-reaching heredity-based theories of his day makes it possible to perceive his natural and fundamental pessimism. By drawing on both ancestral traditions and innovative approaches, Charcot "combined genius with charlatanism" in a surprising way: he demonstrated genius in the area of nosology, and a sort of charlatanism in the area of treatments.

"*To the joy of believing, he preferred the intoxication of knowing*" [1].

Jean-Martin Charcot (1825–1893) epitomises the 19th-century Parisian hospital physician who successfully combined clinical practice, teaching and research (Fig. 1). In his day, neurological nosography was developing and gaining in precision; clinical practices were growing more rationally founded and sophisticated. Treatment, however, was little more than the "poor relation" of these developments.

Leon Daudet (1867–1942), an embittered ancient pupil, portrayed Charcot this way in 1922, near to 30 years after the death of the Master:

> A brilliant clinician, Charcot was totally unconcerned with healing and curing, or even treating. Therapeutic medicine was of little interest to him; his prescriptions were generally limited to a few basic rules of hygiene, together with bromide, chloral and sending patients to Lamalou (i.e., spa town) [2].

On the other hand, Fulgence Raymond (1844–1910), Charcot's successor and admirer, had this to say:

All translations provided by the author.

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Fig. 1. Only known photo of Charcot examining a patient, around 1875 (albumen print mounted on card. Author's personal collection).

Charcot has been misrepresented as having neglected, as a matter of principle, therapeutic treatment, and some have even denied he had the skills necessary for the art of healing. What a fundamental error, what profound injustice! [...]. He tacitly resigned himself to being powerless when dealing with organic diseases, whose lesions, too often irreversible, he had come to know better than anyone else; to me this is not only wise, but proof of the utmost honesty [...]. But when we consult his writings on the treatment of hysteria, which is a purely dynamic affection, we find not the slightest trace of this scepticism; what we find, in fact, is exactly the opposite. We see him employing the most diverse methods, and not in any way disdaining those resources of real efficacy handed down by empiricism, but rather bringing the clearest rationalism to bear upon their application [3].

This hagiographic account calls for a more critical view, like that of Edmond de Goncourt (1822–1896), a former admirer rejected: "What is curious in Charcot's scientific activities is that he combined genius with charlatanism" [4].

Efficacy

Charcot is credited to have given an accurate depiction of several important diseases, such as multiple sclerosis, amyotrophic lateral sclerosis and Parkinson's disease. Since his time, recent advances have improved therapeutic efficacy for these diseases, but there is still a lack of curative treatments, 125 years after his death. This observation can be seen as a response to the question Charcot himself posed in writing the introduction to his lesson on "diseases of the elderly": "Do you cure more patients now than were cured in the past?" [5].

Expectant Treatment

On April 17, 1857, Charcot, a young physician working in the Central Office of the Paris hospitals, presented his thesis for the *agrégation* exam (to become an associate professor). Its title – *De l'expectation en médecine* – indicates Charcot's expectant approach, from which his scepticism about the therapeutic means available to him can be inferred: "Daily observation demonstrates that animal economies are very often adequate for remedying disorders and recovering their health through the regular exercise of their functions" [6]. Charcot, drawing inspiration from the disquisition of Ignace-Vincent Voullonne (1755–1807) [7], concluded his thesis this way: "The expectant approach generally applies to diseases, and their circumstances, in which active methods would be useless, ineffective or harmful." He fails this first competitive examination. Was his approach considered too archaic? "Some diseases are extremely benign, others are incurable; there are diseases that respond to medicines, as well as diseases for which a cure would be dangerous." Charcot thus took up the refrain of a Montpellier physician writing a century before him, Dominique Raymond (1686–1765) [8], and presented no novel ideas of his own, which his jury apparently judged harshly.

Treatments Used

Examples from articles Charcot published and from his well-known *Leçons du Mardi* [9] give us an idea of the "conventional" treatments he regularly recommended.

In 1862, Charcot and Alfred Vulpian (1826–1887) reported on their silver nitrate experiments for treating progressive locomotor ataxia, following the test performed by Karl August Wunderlich (1815–1877) in Leipzig: "In all of our observations, improvement was marked and indisputable during the period in which the medication was used." Pleased at bringing about improvement in a pathology considered incurable, they overlooked the need to understand how the medicine actually worked: "the empirical observation of facts is more

important than any other element" [10]. In the same vein, Charcot recommended, in 1862, high doses of sodium bicarbonate to curb acute rheumatoid arthritis of the joints [11].

Nevertheless, he paid attention to the side-effects of the medications he prescribed. For example, in 1864, he noted the sexual impotence that could result with prolonged use of arsenic [12], and in 1877, he warned against the risk of coma following the use of opiates for uraemia ("kidney atrophy") [13].

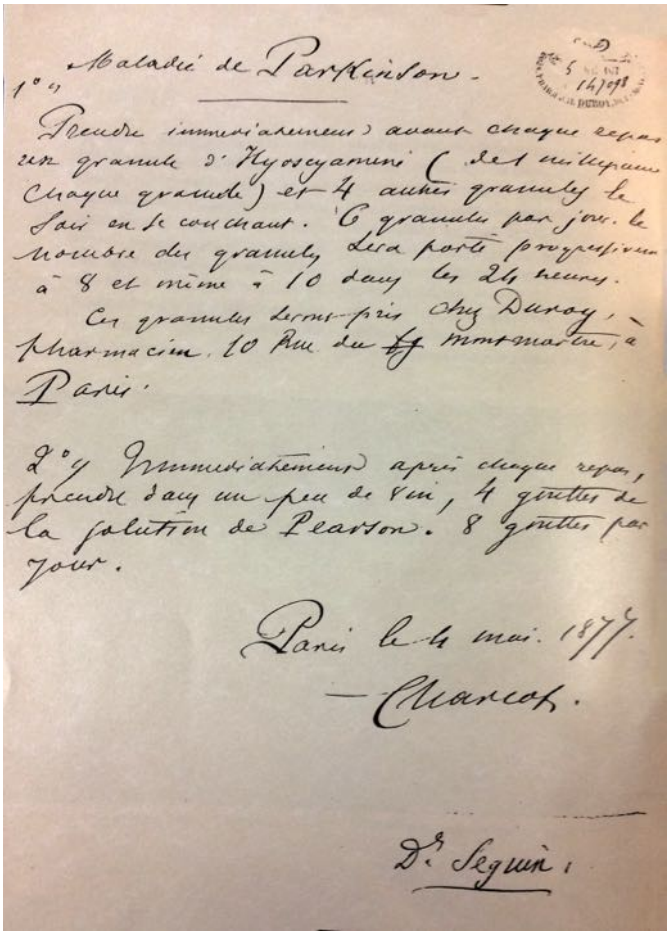
In his Tuesday lesson of November 15, 1887, Charcot presented the case of a patient with "syphilis, progressive locomotor ataxia, and facial paralysis." After questioning the patient, Charcot noted "marriage between blood relations" with 5 cases of facial paralysis: "As for all nervous affections, such as chorea and ataxic tabes, here we have the question of heredity – this is the conclusion I have reached." Despite his respect for Alfred Fournier (1832–1924), who in 1875 attributed the aetiology of tabes and general paralysis to syphilis, Charcot made the following statement: "I do not believe syphilis to be the cause of all of the accidents which I have presented to you." Later in this same lesson, Charcot proposed the following treatment, in front of the patient:

> Allow me to say that we do not have a wealth of therapeutic agents to treat his disease. However, this is not a reason to do nothing; we will give him ergoty rye, apply hot cauters (cautery irons) to his back, he will take silver nitrate and zinc sulfate (the effect of these medications is uncertain) – we will do what we can, but it is not by attempting to cure in all circumstances that a physician best serves his patients [9].

On Tuesday, July 10, 1888, Charcot re-examined a patient he had already seen and whom he had sent to Romain Vigouroux (1831–1895) for treatment of his "*spasmodic torticollis*." Charcot explained to his students how Joseph Babiński (1857–1932), who was put in charge of the patient, quickly obtained results:

> This required noting the hypertrophy of the sternocleidomastoid muscle and also the atrophy of the corresponding muscle on the opposite side; in addition, it required imagining or, if you will, guessing that faradisation should only affect the atrophied side, so as not to have any effect on the hypertrophied muscle [9].

Charcot's pharmacopoeia did contain some effective treatments. For example, he recommended bromide for epilepsy, potassium iodide associated with sodium salicylate as an analgesic and anti-inflammatory agent for rheumatism, colchicine against paroxysms of gout, mercury rubs for syphilis, and quinine against fever. Charcot also prescribed "stimulant" medications, which physicians favoured at the time, some of them containing coca: élixir d'Yvon[1], Mariani wine used as a tonic, and Colombo preparations[2] for dyspepsia. As an example, one of the items in the Charcot museum at Hôpital La Salpêtrière is a hand-written prescription, which Charcot addressed to a Dr. Seguin (Fig. 2) for treatment of Parkinson's disease:


1°) Maladie de Parkinson.

Prendre immédiatement après chaque repas une granule d'Hyoscyamine (de 2 milligrammes chaque granule) et 4 autres granules le soir en se couchant. 6 granules par jour. Le nombre des granules sera porté progressivement à 8 et même à 10 dans les 24 heures.

Ces granules se trouvent chez Duroy, pharmacien, 10 Rue de Montmartre, à Paris.

2°) Immédiatement après chaque repas, prendre dans un peu de vin, 4 gouttes de la solution de Pearson. 8 gouttes par jour.

Paris le 4 mai 1877.

— Charcot.

Dr Seguin.

Color version available online

Fig. 2. A hand-written prescription, which Charcot addressed to a Dr. Seguin for treatment of Parkinson's disease (copyright Bibliothèque Charcot. BUPMC, with kind permission).

(1) Take immediately after each meal: one granule of hyoscyamine (2 mg per granule) and 4 more granules before retiring. Six granules per day (granules available from the pharmacist Duroy,

[1] "Elixir d'Yvon" is a medicinal preparation containing an alcoholic extract of rye ergot. It is commonly referred to as "ergotine" and has a variable chemical composition due to the variety of its components: around ten molecules, including alkaloids derived from ergotamine and often lysergic acid.
[2] An alcoholic roots's tincture of Fraseria Walteri, a plant of the Gentiana family, mixed with red wine.

10 rue du Fg Montmartre in Paris); (2) immediately after each meal, take 4 drops of Pearson's solution in a little wine. Eight drops per day. Paris, May 4, 1877. Charcot.

Hyoscyamine (Charcot also recommends Belladona) is the atropine derivative that had been used the longest to reduce shaking; although efficacious, it has side effects rarely mentioned in Charcot's day. The solution introduced by Richard Pearson (1765–1836), a physician at St. George's Hospital in London, is an arsenite of soda solution that differs from the more well-known solution of Thomas Fowler (1735–1801) only by its reduced concentration; it was considered less dangerous and easier to manipulate. Used since antiquity to treat fevers and a number of cutaneous eruptions, clearly identified as a possible poison, arsenic was considered in Charcot's day a nervous system "stimulant", due no doubt to its ability to induce convulsions at the high doses recommended by Fowler [14].

Charcot was well aware of the placebo effect. During a Tuesday lesson (May 22, 1888) on tremors caused by mercury poisoning, he told his audience that he prescribed 3 or 4 teaspoons of sodium chloride solution per day. He used the term "*expectation déguisée*" (masked non-intervention) and added "*Populus vult decipi*" (Latin: people like to be fooled). He went on to note: "Under the influence of this method alone, all of the symptoms improved rapidly" but it must be also added, after 6 weeks of removal from the toxic source [15].

Compression to Treat Ovary Pain ("*Ovarie*")

In his thesis defended on April 9, 1879, Paul Richer (1849–1933) gave a summation of Charcot's thinking in this passage about hysteria:

> The influence of strong emotions on the development, progression or sudden cure of the diverse manifestations of grande hystérie, show that in these cases, more than with other diseases, this special moral action, which the English designate as expectant attention, plays a role that is undeniable, but care must be taken not to exaggerate its importance. To avoid creating confusion, each thing must be confined to its place [16].

During his lesson on Tuesday, February 7, 1888, Charcot shared a memory with his students:

> I inherited this department at a time when Mr. Delasiauve had intelligently directed it. That was around 15 or 20 years ago, and from the first, I was witness to attacks of epileptic hysteria. In my diagnoses, I proceeded with great circumspection, telling myself: how is it that what I'm seeing is not found in books? [15].

Fig. 3. Ink wash drawing that Paul Richer made during an episode of hysteria major (personal collection of Philippe Richer, with permission).

It was at that point that he implemented a semiology of hysteria with 4 phases – epileptoid, clownism (i.e., contortions and acrobatic postures), *attitude passionnelle*, delirium-hallucination – ("they are always the same"), which he called "hysteria major." In an earlier lesson, on May 21, 1872, he used the case of Justine Etchevery as an example; the patient was 40 years old, affected by contractions, hemianaesthesia and "ischuria[3] (retention of urine)." She also experienced pain near the left iliac fossa, referred to as "coeliaglie" (abdominal pain) or "ovarie" (ovarian pain). Charcot did not accept the idea defended by Pierre Briquet (1796–1881) in his *Traité de l'Hystérie* [17] of a muscular aetiology for hysteria, and while Charcot refused the classical "uterine" attribution, he agreed with Charles Négrier (1792–1862) who described "an ovarian hyperaesthesia" [18]. In 1877, when Jules Tourneux (1853–?) defended his thesis on ovarian lesions as causing hysteria attacks [19], Charcot presided over the jury. During a serious "epileptoid" attack, like the one addressed in the 1888 lesson (Fig. 3), Charcot would apply intense pressure on the right iliohypogastric region:

> If you do this to an epileptic, there will be no change. This is a rapid way to demonstrate the difference between hystero-epilepsy and epilepsy. In no way is epilepsy influenced by the ovaries, whereas in this case the opposite proves true. You have seen that the attack ceases with pressure applied to the ovarian region.

[3] Ἰσχουρίαfrom ἴσχειν to retain and οὖρον urine.

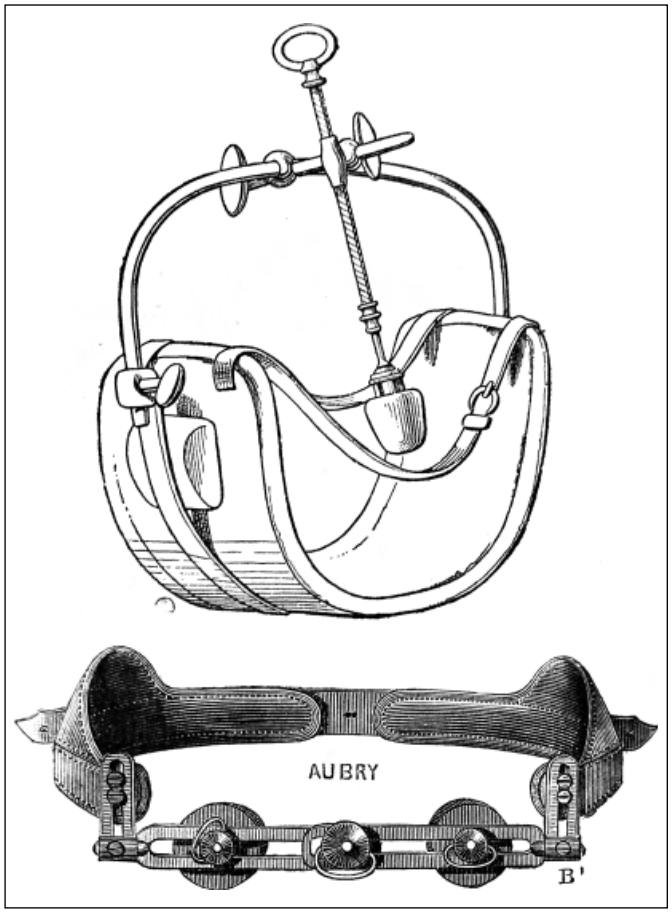


Fig. 4. Two examples of ovary compressors used in Charcot's day. Above: Paul Poirier, Below: Gilbert Ballet. Etching by Paul Richer (1849–1933), in *Etudes cliniques sur l'hystéro-épilepsie ou grand hystérie*. Paris, A. Delahaye & E. Lecrosnier, 1881. Top Figure 104 page 596; lower Figure 105 page 727 (author's personal collection).

Charcot went on to make this statement to his audience:

Stopping an attack is by no means a cure; it is simply to keep things calm. If we fit this patient with a compressive device, she will no longer have attacks, but a day will come when her belt will have to be removed, as it cannot be worn indefinitely, although the attacks may continue. Compression is a preventive measure, a means of maintaining tranquility [16] (Fig. 4).

Was this Charcot's way of saying that keeping the ward calm was more important than the well-being of individual patients? The method was not flawless, and it failed in certain cases. As for the compressive force, it was significant enough to raise the question of tolerance. Charcot also used chloroform, ether, amyl nitrite, morphine, electricity and the application of ice instead of compression.

Since experience showed that agitation returned once the compressive device was removed, in 1878 Paul Poirier (1853–1907), at the time an *interne* (house officer) who would later become an anatomist and surgeon, designed a compressor that patients could wear for hours or even days (Fig. 4) [20]. Two other Charcot interns, Gilbert Ballet (1853–1916) and Charles Féré (1852–1907) would later propose simpler models that allowed patients wearing them to walk about:

Ballet's compressive belt offers the advantage of being easy to use, such that patients "who feel an attack coming on" can put the belt on themselves [...]. This explains why patients at La Salpêtrière willingly make use of it, often wearing it for several days, without the need to change their daily habits [16, 21].

Neither Charcot nor his *interns* ever formulated a hypothesis to explain the mechanism by which abdominal compression acted on their patients. Richer gave this version of the Charcot's organicist thinking:

The influence of the moral on the physical is present at all levels of medicine, though we are not necessarily tempted to suggest that the moral aspect is excessively important in various phenomena [15].

In his critical response to Richer's thesis, Briquet argued that during autopsies performed in his department, the ovaries always had a normal morphological appearance in hysterics, and that the ovary's anatomical position made real compression impossible:

Compression of the ovary can be considered a hypothesis only; regardless of the violence of the pressure applied, there is no proof that the ovary is affected. Nonetheless, compression of the lower part of the abdomen does produce a real result, instantaneously ending hysterical attacks [22].

Vibratory Medicine

In 1892, Georges Gilles de la Tourette (1857–1904) published one of Charcot's lessons, entitled *La médecine vibratoire – application des vibrations rapides et continues au traitement de quelques maladies du système nerveux* [23]. The emphasis on vibratory applications brings to mind the 1734 writings of Charles-Irénée Castel, Abbot de Saint-Pierre (1658–1743):

Intelligent physicians have observed that the movement of the body in a mail carriage rolling rapidly over the cobbles for several days may be seen as an excellent remedy for several ills attributed to melancholy, vapours, bile and obstructions of the liver, the spleen and other glands in the lower belly [24].

Fig. 5. Vibratory helmet (author's personal collection).

Seeking a more practical application, the abbot had a "*trémoussoir*" built, a sort of vibratory chair that shook rapidly, to be used several hours a day to promote good health, taking the place of exercise. Although Charcot was apparently unaware of the work of Castel, he presented similar ideas:

I have long advised patients with paralysis agitans that they would find great relief in railway or carriage travel. Throughout the journey, the tiresome and sometimes painful sensations that nearly always accompany this disease seem to disappear almost completely. This well-being persists for a while once the journey has ended [...]. More than once I have presented the hypothesis of positive effects in Parkinson's disease using a procedure similar to the various movements that a moving vehicle imparts on the body.

Like the abbot, Charcot had a vibratory chair built:

In this chair, a special mechanism imparts rapid oscillatory movements around an anterior, lateral axis. These combined and opposing movements produce a rapid vibration or trepidation very similar to that felt when one is seated in a carriage in motion.

The Parkinson's patients who underwent this treatment were apparently satisfied:

Once the patient steps out of the vibratory chair, he feels lighter, rigidity disappears and walking is easier. The phenomenon is nearly constant. Nights go more smoothly; a patient who used to toss and turn miserably in his bed sleeps calmly, a source of great relief for him [24].

Drawing on the work of Joseph Mortimer-Granville in England (1833–1900) [25] and Maurice Boudet de Pâris (1849–?) [26], Gilles de la Tourette had a vibratory helmet (Fig. 5) built for Charcot with which he stimulated neurasthenics or relieved patients with migraines:

We will limit ourselves to the fact that the action of the vibratory helmet has always seemed highly sedative; we have obtained the best results in neurasthenic and hysterical headaches and in migraines, insomnia as well as certain cases of melancholic depression [27].

After describing the device, Charcot said this of its mechanism:

The little motor turns at about 6,000 rotations, all very regular, producing a continuous vibration that is transmitted all over the skull via the strips of the helmet. The entire head vibrates, as can be verified by placing one's hands on the mastoid process. In operation, the machine makes a continuous, soft buzzing noise, which may be of interest regarding the pathogenesis of the results obtained. The number and amplitude of vibrations can be increased or decreased by a very simple process of adjustment. Fitted on the head of a healthy subject, the device is perfectly tolerated and its operation causes no discomfort. After 7 to 8 min, a feeling of numbness overcomes the entire body and almost invariably leads to sleep.

Charcot also reported on 3 neurasthenics cured of dizziness, weakness in the limbs and sexual impotence. Charcot's concluding remarks: "there can be little doubt, further to what I have said here, that vibration used in this way is a powerful sedative for the nervous system" [23].

Suspending Tabes

Locomotor ataxia was described by Guillaume Duchenne de Boulogne (1806–1875) in 1858 [28]. In Germany, Moritz Heinrich Romberg (1795–1873) had described the same clinical picture in 1846, calling it tabes dorsalis [29]; this term would gradually replace its French counterpart. As we noted above, Charcot always saw syphilis as one cause among others. Despite silver nitrate and visits to Lamalou, a spa town in southern France for hydro-

therapy, Charcot's tabes patients experienced extremely painful attacks, which morphine did little to alleviate. Charcot was entirely aware of what little he could do to save his patients:

> It is hardly useful to remind ourselves that for progressive locomotor ataxia, we are not, in terms of treatments, as advanced as we are in clinical and anatomical terms; for this very reason, the disease in question is generally considered incurable, at least in the overwhelming majority of cases [30].

Fulgence Raymond, a former Charcot *interne*, made a trip to Odessa in 1883, accompanied by Jakow Naumowicz Onanoff (1859–1892), a student at La Salpêrière who served as translator. Raymond returned with an article published in Russian in the journal "Vracha," as Charcot pronounced it (*Vratsch* ["The physician"]) [31]. The author, Osip Osipovich Motchutkowsky (or Motchutkovsky; 1845–1903), described the relief felt by a patient suspended to make a corset for the correction of scoliosis, a technique introduced by the American orthopaedic surgeon Lewis Sayre (1820–1900) [32]. Surprisingly, the patient's pain and movement difficulties nearly disappeared. In fact, it was not the plaster corset that brought him relief, but rather the stretching of the spinal column; that is, the suspension necessary to make the corset. In 1881, Charcot tasked his *chef de clinique* (senior house officer), Gilles de la Tourette, with conducting experiments on this treatment approach. In his 1889 report, Charcot described 14 cases treated for 3 months. For 10 of them, the patient's condition markedly improved; in the other 4, pain remained undiminished [30]. As for Gilles de la Tourette, in the June 7, 1890 edition of the journal *Le Progrès Médical*, he published the results obtained after the suspension of 500 patients. According to him, there was clear improvement in 25% of treated cases [33]. Gilles de Tourette noted:

> The suspension must be tolerated. Having carried out suspensions now for some time, we have observed that lipothymia (a condition or feeling of faintness) and syncope are the main, if not the only obstacles to tolerance.

In reality, suspension was painful and exhausting, lasting 1–2 min, and repeated daily or every other day.

In his book *La Doulou* (*In the Land of Pain*), Alphonse Daudet (1840–1897) recounted the day-by-day progression of his "locomotor ataxia," for which Charcot had advised him to undergo suspension:

> I remain in the air for 4 min, supported only by my jaw for 2 of them." Pain in my teeth. Then, coming down, when they detach me, horrible discomfort in my dorsal region and neck, as if my entire spinal cord was splitting in 2. I have to squat down and straighten little by little, feeling that I have to let my drawn spine reposition itself. No noticeable curative effect. Thirteen suspensions. Then I spit blood, which I attribute to congestive fatigue from the treatment [34].

Charcot's approval of this strange procedure led to its rapid spread throughout Europe. Treatment centres opened everywhere, most often without any medical supervision. By 1889, Gilles de la Tourette concluded that "the method has been discredited, having been used incorrectly for all ataxics, resulting in serious accidents and even sudden deaths" [35]. Each centre developed its own suspension method as no rules had been established. Many authors criticised the use of any elongation method and suggested other explanations for the analgesic effect, which remained poorly substantiated. Despite Gilles de la Tourette's dogged efforts to perfect different methods of spinal stretching, the dangers and the absence of long-term benefits rapidly overshadowed the initial enthusiasm [36]. Suspension stopped being used around the turn of the twentieth century. Illustrations from the early days of this method show the sick lining up to be suspended (Fig. 6), and probably sharing their tales of suffering. Given the desire to find relief and the hardships endured, the treatment environment must have been similar to that of Mesmer's baquet, one century earlier. The enthusiasm of the method's early days was most likely due to the placebo effect and the spontaneous variations in pain levels during disease progression; it is also likely that initial diagnostic errors with regard to tabes were involved [37].

From Burq's Treatments to Hypnosis

Fulgence Raymond (1844–1910), who succeeded Charcot as the director of the Clinic for Nervous System Diseases, spoke of Victor Burq (1822–1884) during his inaugural lesson on November 1, 1894.

> This is an occasion to highlight the key role Charcot played in legitimising metallotherapy. Doctor Burq, who invented this treatment method and was a worthy physician, nonetheless exaggerated the prophylactic and curative virtues of metal applications. He had knocked at many doors, but in vain. He hoped to test the value of his observations in hospital departments. He was always tenacious, but he was met with disdain which might explain his exaggerations. In the realm of hospital physicians and medical school professors, Burq was considered too empirical, and even dismissed by some as a quack; I speak of what I witnessed. Thus, by taking an interest in metallotherapy, Charcot acted courageously, if you will. He invited Burq to repeat his experiments in his Salpêtrière department, which as you know led to important scientific contributions [3].

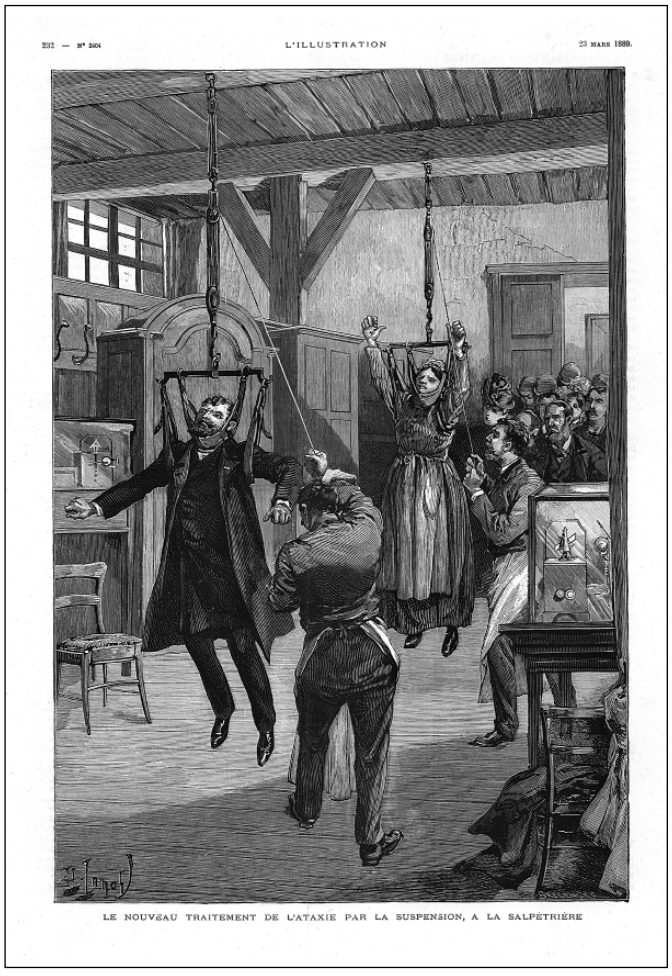


Fig. 6. "New treatment for ataxia by suspension therapy at the Salpêtrière." *L'Illustration* (newspaper) No. 2040, March 23, 1889 (author's personal collection).

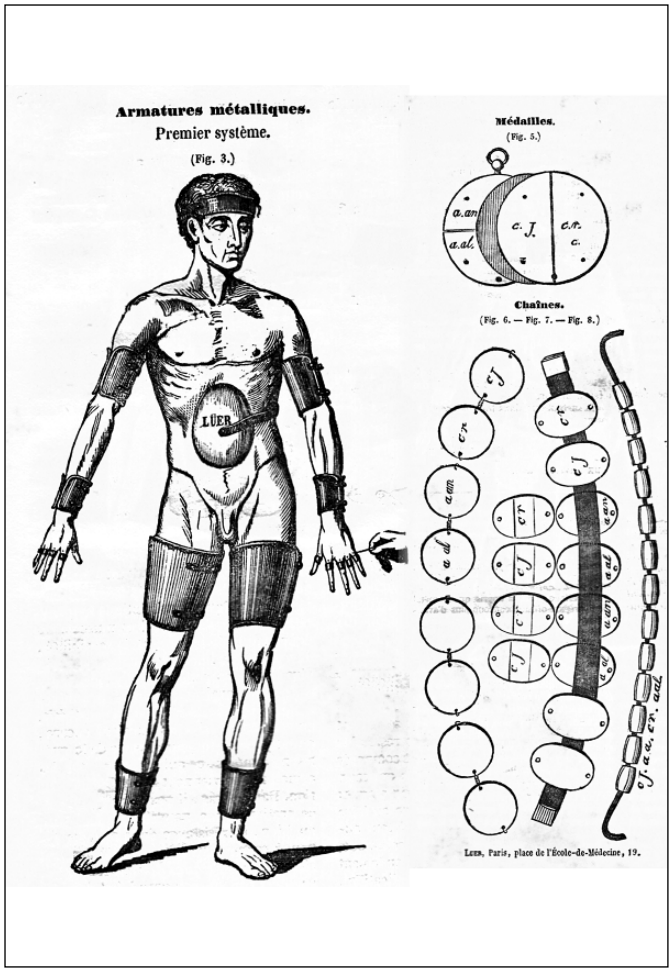


Fig. 7. Plates, bracelets and armour made by Lüer and used by Victor Burq (author's personal collection).

On February 7, 1851, Burq defended his thesis on anaesthesia and painful muscular sensations relative to hysteria, among other nervous disorders:

> De l'anesthésie et de l'amyosthésie au point de vue des symptômes, de la marche, de l'étiologie, du diagnostic et du traitement de quelques affections nerveuses en général et de l'hystérie en particulier.

Aligned with the mesmeric tradition, Burq believed he could cure hysterical anaesthesia and paralysis by applying metal plates. He called this practice external metallotherapy, which was proceeded by what he called metalloscopy, or determining each patient's specific sensitivity to a given metal. He developed a variety of instruments: a compass with which to precisely determine sensitivity as well as several dynamometers to measure muscular force. He also invented various procedures for applying the metal plates (Fig. 7). After 25 years of research and moving from hospital to hospital, Burq was pleased to learn that the Société de Biologie had named a commission of 3 experts to assess his results: Charcot, Jules Luys (1828–1897) and Victor Dumontpallier (1826–1899). The commission drafted 2 successive reports, in 1877 and 1878, that validated Burq's main findings.

As a result of their work on the commission, Luys and Dumontpallier reoriented their medical practice radically, towards hypnosis, whereas Charcot remained sceptical although not hostile: "In the past, this treatment was not taken seriously; I cannot see why, since there are many more unusual treatments that have been judged less severely." Charcot recognised that the external application of metals temporarily eliminated hysterical phenomena. Later he noted:

Fig. 8. Hypnosis. Photo taken by Paul Regnard for *l'Iconographie photographique de La Salpêtrière*, 1879–1880 (author's personal collection).

When Burq presented internal metallotherapy to me, stating that he had cured patients by directing metals inside the body, I responded with neither yes nor no, but said we would soon see whether this was possible. I endeavour to keep my distance from naïve credulity as well as arbitrary scepticism, which too often leads to pedantic ignorance. The observer must know how to navigate between these equally dangerous pitfalls [38].

Charcot realised he had perhaps found a means to uncover the pathophysiology of hysteria. During a lesson, he attempted to demonstrate the lack of sensitivity in a hysteric by pricking her with a needle. Suddenly the woman cried out in pain. Seeking the cause, Charcot learned that Burq had seen the patient shortly before he had. This convinced him of Burq's claims. A little later, he discovered a phenomenon he called "transfer":

This is how simple proximity with a magnet enabled moving a natural hysterical contraction to another limb and to the other side of the body [...]. After the hysteric had been afflicted with this momentary contraction, we were able to eliminate it immediately after the demonstration [...]. "A fixed gaze upon a hysteric suffices to bring about this special case of induced lethargy, this unconscious state of resolution of the limbs and of insensitivity that I bear witness to here" [38].

From his own testimony, and indirectly due to Burq and metallotherapy, Charcot realised that hypnosis was efficacious, which led him to regard hypnotism as a form of hysteria:

It could be called a nervous sleep, but I am not sure what that implies, so let us call it simply a state of dependence. The names we use are unimportant; I have observed it to exist [38].

Gilles de Tourette made this remark: "hypnotism and natural somnambulism are but branches of the same trunk: hysteria" (Fig. 8).

Fulgence Raymond, after mentioning Charcot's role in validating the discoveries of Burq, added this:

Charcot played this same role a little later, in circumstances that were even more to his credit. He decided to rehabilitate hypnosis and to accord it the scientific importance that voices of varying authority had been arguing for [3].

Charcot was initially quite uninterested in psychological matters. The moment in Charcot's tapping towards psychogenesis, away from somatogensis, occurred gradually after he observed hypnotic states. He will reconceptualize hysteria as a state of altered consciousness after working with Pierre Janet in connection with this one theories about "dissociation." This was the first step of a precise neurological semiology that was slowly developed and expanded in the years that followed, thanks to findings on hysteria. The emblematic example remains the discovery of the Babiński sign in the hallux, which confirmed the organicity of a neurological deficit.

Conclusion

Speaking of the principles of his research, Charcot noted: "Clinicians must have utter confidence in their own observations, without worrying whether these observations confirm or contradict the doctrines derived from

experimentation" [39]. Charcot approached treatment with the same methodology he used to isolate new anatomical-clinical entities: "The goal is to bring together and find cohesion between totally heterogeneous fields, such as clinical medicine for nervous diseases, for female diseases, also highly rigorous anatomical pathology, and conjectural physiology" [40]. One of the characteristic aspects of his work is the combination of ancestral models with innovative approaches. Since Charcot did not discover any nervous tissue lesions to explain hysteria and epilepsy, he used words such as "diathesis" and "degeneration"; that is, metaphors for the causes that remained elusive. As to the treatments he recommended for the diseases he identified, he gave priority to empiricism, since he lacked the pathophysiological tools for deriving an explanation:

I believe I have established that the empirical method is the vestibule necessary for science. We must never abandon this method, which has been validated by many centuries of experience. Empiricism must remain strong and serve to test and counterbalance scientific speculation.

Charcot's work is marked by an internal movement that must be grasped to better understand what might otherwise be viewed as regrettable detours. This clinician/teacher only elaborated a doctrine once he had tested it on real cases, which required constantly modifying and updating his thinking. The treatments he used can be seen as a branch grafted on a body of knowledge still evolving and thus unstable and uncertain; this model nevertheless formed the basis for future advances. It is also key to appreciating Charcot's therapeutic contributions and to understanding the reasons for which he is sometimes seen as a "charlatan." His publications establish a timeline of the progression of knowledge that reconfigured the fields of physiology, pathology and treatment for all aspects of the nervous system, that is, in neurology, neuropsychiatry, psychology, experimentation, psychiatry and psychotherapy.

Disclosure Statement

The author reports no disclosures relevant to the manuscript.

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