

Scrutineers Par Excellence: The Observational Prowess of Jean-Martin Charcot and Charles Miller Fisher

Jeremy D. Zung MD¹

¹Division of Neurology, Department of Medicine, University of Toronto

“[...] there is no more difficult art to acquire than the art of observation, and for some men it is quite as difficult to record an observation in brief and plain language.” - Sir William Osler¹

Clarity of observation was the crowning virtue for clinician Jean-Martin Charcot, just as precise visualization was the key to unlocking each one of Charles Miller Fisher's discoveries. This essay compares and contrasts the observational techniques and the advice of these two great neurologists. Both Charcot and Fisher exhibited a remarkable aptitude for clinical-anatomic observations and made pioneering neurologic discoveries into transient ischemic attack, amyotrophic lateral sclerosis, and many more. For their pupils and biographers, these men leave a rich record of their learning and clues to their approach. This essay addresses the following three questions: How did Charcot and Fisher observe patients and visualize difficult cases? How did they generate new hypotheses? How and where did they record their observations?



Jean-Martin Charcot (1825-1893) was the second eldest of four sons born to a Parisian carriage designer. He exhibited an early interest in painting and a love for animals. After secondary school, he was torn between an artistic or medical career, and he eventually opted for the latter. At age 17, he entered the Paris Medical School as a black-haired, thinly mustachioed introvert who enjoyed sketching scenes from the Quartier Latin in his free time. He graduated with the highest grade for his thesis on gout and rheumatoid arthritis. On New Years' Day of 1852, he entered the Salpêtrière Hospital, whose 4000 residents included the crippled, elderly, and mentally ill. He would remain at this repurposed gunpowder storehouse for the rest of his career. He gathered around him a formidable group of students, investigators, artists, photographers, and a curious public, as he set about to describe the phenomenology he encountered there.¹ (Photograph: Wikimedia Commons)



Charles Miller Fisher (1913-2012) was born the son of an insurance businessman in Waterloo, Ontario, Canada to a family of nine children. He received his M.D. degree in 1938 from the University of Toronto. Soon afterward, he left his newlywed high school sweetheart to volunteer in the Canadian Navy. In 1941, the day his wife was expecting their first child, a German raider sank his ship, the HMS *Voltaire*, in South Atlantic waters. He spent the next three and a half years as a prisoner of war in the German camp Stalag XB Sandbostel, and later in Westertimke. After his release, he undertook a refresher course at the Montreal Neurological Institute. There, Wilder Penfield noticed his inquiring mind, mentored him, and arranged a neuropathology fellowship for him with Raymond Adams at Boston City Hospital. This gave him the expertise he needed for when he returned to Montreal. In 1954, he rejoined Adams at Massachusetts General Hospital where he created the world's first stroke service. Throughout his career, he touched the lives of numerous patients and students by his thoroughness and humility.² (Photograph: Graduation photo, Charles Miller Fisher, 1938, by Jeremy Zung at the Medical Sciences Building, University of Toronto, October 13, 2015.)

Precise Visualization and Juxtaposition

To see without bias was paramount for both of these masters because they knew that preconceptions could frequently obscure interpretation. Detractors disputing Charcot's description of hysteroepilepsy once received a curt reply during his weekly phenomenology rounds known as the *Leçons du Mardi* (Tuesday lessons): "I am not in the habit of advancing things not demonstrated experimentally. You know that I hold as a principle to disregard theory and to set aside all preconceptions; if you want to see clearly, you must take things as they are."³ During another lesson on amyotrophic lateral sclerosis, Charcot cautioned against a premature diagnosis of aphasia, stating "I am doing everything I can to get you used to looking at patients carefully and observing every possible detail. Sometimes even those [details] that might seem incon-

sequential turn out to be significant. Here we have a man who cannot speak but who can write, and so, unless he is a congenital deaf mute, and we can dismiss that possibility, we are dealing with a distinctly uncommon phenomenon.⁷⁴ Charcot was always wary of deeming any familiar appearing syndrome *ipso facto* to be the correct diagnosis.

Fisher echoed Charcot's caveat, noting that physicians "are liable to find what we expect rather than what exists" and "accurate visualization is the foundation of all new concepts."⁷⁵ Fisher believed that elicitation of a case's relevant details distinguished the expert from the novice. His discovery of pure motor or pure sensory strokes required his personal attention for what was typically misreported as mixed sensorimotor findings. Careful observations uncoloured by pre-existing assumptions are crucial for accurate recognition and diagnosis.

Ironically, however, Charcot's own preconceptions sometimes hardened him to a patient's report. He developed a patronizing attitude toward patients or students who dissented with his views. For example, he quickly ignored a patient's "lightning pains" when it did not fit with a classical description and he was quick to call a patient a liar in the case of family history. He even stated that family can "sometimes even try to be obstructive and lead you down a false path."⁷⁵ In contrast, Fisher routinely insisted that the "patient and his family are always right" and that "the patient is doing the best he can". As well, Fisher often cautioned others never to become angry with a patient or their family, and he himself demonstrated a remarkable courtesy and patience. In one instance, Fisher waited twenty-six minutes for a patient, whom he suspected was abulic from a ruptured anterior cerebral artery, to return his greeting of "good morning".⁷

Charcot was well aware that the practising clinician faces a thorny, undifferentiated jungle of disease which is far removed from the artificial clarity of a previously solved tutorial case or archetypical example. Thus Charcot's *Leçons du Mardi*, unlike his polished Friday lectures, demonstrated his raw thought process with all of the nuanced surprises and complexities that confronted a practising neurologist. Charcot recognized that visualization requires contrast. Accordingly, his *Leçons du Mardi* favoured side-by-side comparisons of similar patients. For example, he contrasted Sydenham's chorea with Huntington's chorea, and compared multiple cases of tremors including Parkinson's, multiple sclerosis, or mercury poisoning. Allan Starr, a visitor from America, commented that Charcot's lessons were "theatrical" and left a "series of mental pictures of patients and of lessons which no amount of private study could possibly produce" on the mind of the student. Charcot firmly expressed his opinion of the physician's most prized attribute:

Let someone say of a doctor that he really knows his physiology or anatomy, that he is dynamic – these are not real compliments; but if you say he is an observer, a man who knows how to see, this is perhaps the greatest compliment one can make.⁵

Fisher, who typically rounded postprandially with his fellows from 5 pm to 11 pm, must also have had ample clinical examples for cross-comparison. His dictum for success was that "it is all a matter of being in the right place, at the right time, with the right mentor". But it was in the neuropathology laboratory where serendipitous juxtaposition would most aptly describe his work. An abundance of pathologic material and the dissection of 1100 pairs of carotid arteries showed an association between carotid disease and stroke. His keen pattern recognition skills allowed for the description of the eponymous Miller Fisher syndrome and the discovery of transient ischemic attacks, one-and-a-half syndrome, and lacunar syndromes.⁹

Interpretation and the Working Hypothesis

While both Charcot and Fisher were not involved in direct laboratory experimentation, their observational methodology involved the testing of continually evolving hypotheses.¹⁰ Charcot stated that even the most stoic of minds linked facts into unifying theories, which was a technique he often used to argue his own cases.¹¹ Fisher also vigorously opposed the categorization of patients into any ill-fitting diagnostic "cubby-hole". He often asked his students, "does this patient's findings fit the usual rules for a lesion in this anatomical region?" and advised them to "examine thoroughly and if something doesn't fit, re-examine and read what others have written."¹² True to his word, Fisher tried to disprove his own theories by continually retesting his hypotheses, and he accepted traditional medical dogma only after personally reading or verifying his own data. This method of acquiring data also influenced the way he taught. Instead of lecturing passively, he invited his students actively to explore and reason through their cases.¹³

Fisher's active generation of hypotheses began with even a single unique observation. One afternoon, while his senior physician Dr David McDougall had not yet arrived to the pathology laboratory, Fisher noted the patency of the middle cerebral arteries (MCA) in several specimens with supposed MCA thrombosis. Observing the disseminated hemorrhagic infarcts in brain, kidney, and spleen without any visible arterial occlusions, Fisher inferred a theory in which cardiac emboli circulated and subsequently dissolved. This merely required an "abundance of pathological material and the examination of nine brains at one sitting".⁶ On another occasion, careful histories were taken from stroke patients within the course of one week to reveal the passing mention of a transient monocular blindness contralateral to the hemiplegic side. Fisher avoided the possible pitfall of misinterpreting this symptom as a hemianopic phenomenon, and it was this careful detail that contributed to the discovery of the transient ischemic attack as a warning sign of stroke. In another happenstance discovery, Fisher was given multiple cases of angiographic string sign revealing a carotid dissection. He was able to correlate these cases pathologically in less than 48 hours.⁶

Interpretation of any phenomenon requires picking out the relevant foreground details while eliminating the noisy background. An admiring Henri Meige wrote of Charcot, “the ability to discern the essential elements in a landscape or a human form, to seize immediately the total picture and to isolate from it the essential elements, this was a skill that Charcot possessed to a remarkable degree.”⁹ Both Charcot and Fisher modelled for their students how to distill complex phenomena into a unifying theory.

The Medical Record

Recording by photograph or drawing captures details vividly and avoids tedious verbal description. Charcot categorized the thousands of patients he saw at the Salpêtrière through unified case folders which contained drawings, lengthy descriptions, photographs, and painted footprint gait records. These were paired with posthumous anatomic and microscopic drawings, journal clippings, and letters about similar cases.¹⁴ Charcot turned to a large group of artists and photographers to supplement his work, instituting a photographic service at the Salpêtrière under Londe and Richer.¹⁵ His appreciation of this new technology was evident from his description of his own career, where he indicated that he was “absolutely nothing but a photographer”.⁴ Charcot employed slide projectors, statues, photographs, patients, and pantomime to illustrate clinical syndromes for a global audience, using a medium which transcended linguistic barriers.¹⁶ In the introduction to Charcot’s *Nouvelle Iconographie de la Salpêtrière*, a journal centred around photographic or drawn images, the editors seem to boast:

*When a patient demonstrates signs of particular interest – various atrophies, contractures, special postures or deformities – he is immediately drawn or photographed. With the aid of this immediate record, we are able to freeze the abnormality, to decompose the various abnormal movements one by one, and thereby capture the disorder with precision.*⁵

Likewise, Fisher advised that precision in recording was paramount. He taught his students that a reproducible visual description of a patient allowed for much greater reliability than nebulous encoding.¹⁷ His extensive file folder collection demonstrated a catalogue of many curious presentations. Some intriguing titles included “abulia and the telephone”, “burning feet of undetermined etiology in older people”, “unusual [sic] difficult to identify muscular jerking during action in limbs following a stroke”, and “post-operative hallucinations on eye closure”. The advent of the computed tomography scan in the 1970s and magnetic resonance imaging in the 1980s provided Fisher with an analogous advance to study pathology *in vivo*. Though he applauded advances in medical imaging, he was always an advocate for simple and direct tissue visualization. Armed with a hand-held magnifying glass and an angiogram, he invited clinicians to examine and diag-

nose a congophilic amyloid angiopathy for themselves. One month before his death, while discussing a complex patient with ambiguous MRI findings, he concluded that “you have to have pathology”.⁸

The World as Spectacle and Classroom

For Charcot and Fisher, people everywhere presented the opportunity to observe humankind and to study disease. Just as James Parkinson’s early field observations informed his case reports in his *Essay on the Shaking Palsy*, Charcot noticed and sketched Parkinsonian patients even while on vacation.¹⁹ While walking past the bell tower of the Santa Maria Formosa, a Venetian church, Charcot made the fortuitous recognition of a glossolabial hemifacial spasm engraved just above the door. This grotesque mascarón reminded him of cases presented just a few days earlier at the Salpêtrière and prompted his subsequent compilation of other depictions of disease in art in his book, *Les Diffformes et les Malades dans l’art*. Charcot shared Leonardo da Vinci’s view of science and art as united in their representation of reality.²⁰ A rare autobiographical glimpse into Charcot’s personal life comes from a journal entry written while on summer holiday in Morocco in 1887. Even here he saw medical cases such as eczema, arthritis, failed circumcisions, a hysterical mute, and a “beautiful case of Parkinson’s”. Charcot’s wish, even while on vacation, was to capture an “indelible visual impression” of the world around him.²¹

Fisher also loved to accrue knowledge wherever he went. Throughout his career, he collected information about people who piqued his interest. This included patients with unusual movements ipsilateral to a cerebral lesion, mumblers, a man strong enough to lift a small car, families with a history of impressive longevity, obese individuals who enjoyed excellent health, and people who succeeded at unusual occupations. Even those he deemed to be “normal” were subject to his intense scrutiny as controls.^{14,18} Unlike Charcot, who rarely commented on his personal life, Fisher relied on self-report and introspection to record observations of his own migraines, postoperative delirium, and difficulty recalling people’s names. As a captured prisoner of war, Fisher took the opportunity to learn German, read medical literature, learn about Strachan syndrome from his fellow malnourished prisoners, and treat those in need. As a practising clinician, Fisher frequented Boston libraries late into the night to gain insight from the past, noting that each generation cannot afford to rediscover the history of neurology. His diverse interests included hysteria and human free will.²³⁻²⁵ Well after his retirement in 1983, Fisher continued his relentless search for answers to the “puzzling cases”, and he continued to round regularly at the Massachusetts General Hospital. Toward the final years of his life, despite having his vision reduced to a small temporal field in the left eye, he continued to be an active reader, writer, and explorer.²⁶

Legacy and Challenge

Jean-Martin Charcot and Charles Miller Fisher are a glowing inspiration for all practitioners of the physical examination. Their example challenges clinicians everywhere to observe their patients humbly while not letting past assumptions overshadow what is directly observed through a continuous process of comparison and contrast. Recording their data with vivid precision, they exhibited a boundless and contagious curiosity. Their tireless efforts to explain complex human behaviour led them both to postulate and continually refine new hypotheses, which are still valuable to this day. For Fisher, “neurology abounds in phenomena created by nature’s experiments that invite the attention of neurologists interested in the neural activity that underlies or, more accurately, that is human experience.” The success of keen observation allowed him, along with Charcot, to dream of the day when the foundations of complex and psychiatric disease such as hysteria would reveal their clinical and anatomical secrets. Until then, Charcot offers a stirring soliloquy on the importance of observing and listening to patients:

Locomotor ataxia after all is not new. It probably existed at the time of the Greek siege of Troy, and Hippocrates’ tabes was likely locomotor ataxia. But it was recognized for the first time by a doctor who knew how to do only one thing – observe and describe what he saw. Such men are the real doctors, those who really contribute the most, those we call observers.⁵

References

- Osler W. *Aequanimitas*. 2nd ed. Philadelphia: P. Blakiston’s Son & Co.; 1914.
- Guillain G. J.-M. Charcot 1825-1893: Sa vie - son œuvre. Paris: Masson et Cie; 1955.
- Ropper AH. C. Miller Fisher. *Ann Neurol* 2012;72(1):1-3.
- Charcot JM. *Leçons du Mardi à la Salpêtrière*. Paris: Bureaux du Progrès Médical; 1887.
- Charcot JM. Charcot, the clinician : the Tuesday lessons : excerpts from nine case presentations on general neurology delivered at the Salpêtrière Hospital in 1887-88 by Jean-Martin Charcot. Goetz CG, translator. New York: Raven Press; 1987.
- Fisher CM. A career in cerebrovascular disease: a personal account. *Stroke* 2001;32:2719-24.
- Fisher CM. Pure sensory stroke and allied conditions. *Stroke* 1982;13:434-47.
- Ackerman RH. Celebrating the life of C. Miller Fisher. *Int J Stroke* 2012;7:444-6.
- Goetz CG, Bonduelle M, Gelfand T. Charcot: Constructing Neurology. New York: Oxford University Press; 1995.
- Mohr JP, Caplan LR, Kistler JP. C. Miller Fisher: an appreciation. *Stroke* 2012;43:1739-1740.
- Adams RD, Richardson EP Jr. Salute to C. Miller Fisher. *Arch Neurol* 1981;38:137-9.
- Charcot JM. *Leçons cliniques sur les maladies des vieillards et les maladies chroniques*. Paris: Adrien Delahaye; 1867.
- Fisher CM. C. Miller Fisher: the master of clinicopathologic correlation. Interview by Jonathan D. Trobe. *J Neuroophthalmol* 2004;24:68-80.
- Caplan LR, Mohr JP, Ackerman RH. In memoriam: Charles Miller Fisher, MD (1913-2012). *Arch Neurol* 2012;69:1208-9.
- Salomone G, Arnone R. Charcot and his drawings: images from “les leçons du mardi à la Salpêtrière 1887-1888. *Ital J Neurol Sci* 1994;15:203-211.
- Aubert G. Chapter 20: neurological illustration from photography to cinematography. *Handb Clin Neurol* 2010;95:289-302.
- Goetz CG. Visual art in the neurologic career of Jean-Martin Charcot. *Arch Neurol* 1991;48:421-5.
- Caplan LR. Fisher’s Rules. *Arch Neurol* 1982;39:389-90.
- Clutterbuck H. Fisher, Charles Miller, 1913-2012. C. Miller Fisher Papers, 1827-2004 (inclusive), 1950s-1990s (bulk): Finding Aid. Cambridge (MA): Francis A. Countway Library of Medicine. Center for the History of Medicine; 2013. Available: <http://oasis.lib.harvard.edu/oasis/deliver/~med00182> (accessed 2016 Nov 12).
- Parkinson J. An essay on the shaking palsy. London: Whittingham & Rowland; 1817.
- Charcot JM, Richer P. *Les Difformes et les Malades dans l’art*. Unchanged reprint of the original edition Paris, 1889. Amsterdam: B.M. Israël; 1972.
- Charcot JM. Charcot in Morocco. Gelfand T, translator. Ottawa: University of Ottawa Press; 2012.
- Fisher CM. Chronic obstructive pulmonary disease. *Lancet* 1998;352:1314.
- Fisher CM. Hysteria: a delusional state. *Med Hypotheses* 1999;53:152-6.
- Fisher CM. If there were no free will. *Med Hypotheses* 2001;56:364-6.
- Fisher CM. Cerebrovascular espial. *J Stroke Cerebrovasc Dis* 1994;4:46-51.