

Jean-René Cruchet (1875–1959)

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<https://doi.org/10.1093/acrefore/9780190264086.013.548>

Published online: 17 April 2024

Summary

Jean-René Cruchet (1875–1959) was a French physician from Bordeaux, where he practiced for the entirety of his career. His notoriety resulted from his publication of the first cases of the encephalitis lethargica epidemic in World War I soldiers in 1917, a few days before Constantin von Economo reported his cases. Cruchet developed an interest in abnormal movements, notably tics and dystonia, for which he primarily saw a psychological cause, to be treated rigorously with good habits and repressive precepts. He wrote prolifically about his areas of interest, also focusing on parkinsonian syndromes and the treatment of hysterics, notably soldiers with camptocormia. One of the first physicians to also be an aviator, Cruchet was a pioneer in the study of autonomic modifications caused by flying and pressure variations, which he referred to as aviator's disease. As a personality with an outsized ego, he imagined that he would remain as famous after his death as Jean-Martin Charcot or Louis Pasteur.

Keywords: Jean-René Cruchet, history of neurology, tics, dystonia, encephalitis lethargica, Parkinson syndromes

Subjects: Disorders of the Nervous System, Motor Systems

Brief Biography

Jean-René Cruchet (see Figure 1) was born in Bordeaux on March 21, 1875, and died on April 14, 1959, in his native city. Very attached to his native city, he rose through all the ranks that a medical career in Bordeaux had to offer. He attained the rank of chief physician in 1919, heading up the Hospice de Pellegrin for elderly patients. From there, he became chief physician at Saint-André Hospital in 1920, where he remained until his retirement. Also in 1920, he obtained the chair of Pathology and General Therapeutics at the Bordeaux medical school, and then in 1926, the chair of Paediatric Clinical Medicine (Cornet, 1920). Parallel to his medical studies, he obtained an undergraduate degree and then a “doctorat ès lettres” (doctoral degree in languages, literature, or social sciences; Fontan, 1959). His thesis, defended in 1912, was entitled *De la méthode en médecine* (On method in medicine; Cruchet, 1912a). He returned to this subject, making significant additions, in a thick philosophical volume published during World War II (Cruchet, 1942).



Figure 1. René Cruchet around 1950.

Source: Private collection of the author.

Throughout his career, Cruchet conducted scientific research in neurology, physiology, and pediatrics. Only his most emblematic works can be discussed here, given that between his first presentation to the Society of Anatomy and Physiology of Bordeaux in 1895 and the end of the war, Cruchet had already published 213 medical articles (Cruchet, 1920b). He was also interested in medical studies and wrote two manuals for students and researchers (Cruchet, 1921, 1955).

Encephalitis Lethargica

On April 27, 1917, Cruchet published the work he was perhaps the best known for. He had two famous co-authors, François Moutier (1881–1961), a student of Pierre Marie (1853–1940) at La Salpêtrière Hospital, and Albert Calmette (1863–1933), a bacteriologist at Pasteur Institute (Walusinski, 2022). They had observed 40 cases of subacute encephalomyelitis over a period of 9 months (Cruchet et al., 1917). The clinical picture was polymorphous, bringing together fever, pronounced torpor, paralysis of cranial nerve pairs (especially the ocular nerves), convulsions, abnormal movements, and so forth. If the progression did not end in death (30%–50% of cases), the convalescence was marked by parkinsonian aftereffects and other abnormal movements, such as oculogyric crises and dystonia. During the winter of 1918–1919, the severe Spanish flu epidemic was paralleled by a rapid, significant increase in the number of encephalitis lethargica cases, the disease spreading across the world (Foley, 2009; Lutters et al., 2018; Pearce, 1996).

On April 17, 1917, Constantin von Economo (1876–1931) presented a paper at the Society of Psychiatry and Neurology of Vienna in Austria, relating seven cases of a new form of encephalitis that he had identified and named “encephalitis lethargica.” His observations were published on May 10, 1917, in the journal *Wiener klinische Wochenschrift* (von Economo, 1917). The name given by von Economo would be adopted internationally, much to Cruchet’s chagrin. He continued to use the term “diffuse encephalomyelitis,” whereas English authors referred to “epidemic stupor.” Jean Lhermitte (1877–1959) proposed the term “*poliomésoencéphalite primitive avec narcolepsie*” (Primary poliomesoencephalitis with narcolepsy), too long to be used (de Saint-Martin & Lhermitte, 1918). In 1928, Cruchet published the details of his first 64 observations, as if to justify the eponym that he wanted to see used: “Von Economo–Cruchet disease.” Cruchet did not show any anatomicopathological data, unlike von Economo, who was an esteemed anatomicopathologist (von Economo, 1925; von Economo, 1929). Von Economo first described the disseminated centers of “polioencephalitis,” which were non-hemorrhagic, non-necrotic, and localized in mesencephalic grey matter (Cruchet, 1928). As Charles Achard (1860–1944) pointed out in 1921, this disease had already been described several times since the 18th century, but Cruchet never ceased to claim precedence over his now more famous co-describer von Economo, which remains factually true (Achard, 1921).

In 1926, von Economo had the prescience to localize focal lesions in the periaqueductal grey matter and the hypothalamus, which he hypothesized were regions implicated in sleep and wakefulness (Demetriades, 2012; Lavie, 1993; von Economo, 1926; da Mota Gomes, 2020). Cruchet never broached this type of reflection (Cruchet, 1920a); he returned many times to his clinical description of encephalitis lethargica. For example, in 1927 and 1929, he documented forms in which psychiatric symptoms were predominant: memory disturbance, psychotic episodes, and panic attacks in addition to episodes of prolonged sleep, parkinsonian syndrome, and dystonia (Cruchet, 1927a, 1929c).

Not far from the front line during World War I, Cruchet grasped that, among the thousands of ill and injured soldiers he treated, an epidemic disease had emerged that was not yet clinically described. On the other side of the conflict, von Economo was able to clearly portray the same clinical picture of this new entity adding the anatomopathological knowledge that Cruchet lacked

(Foley, 2018). The Austrian enjoys the posthumous fame of this description, something Cruchet so wanted for himself (Cruchet, 1929a). He wasted a lot of time trying to appropriate this fame for himself alone.

Tics, Tiquose, and Bad Habits

Another area in which Cruchet authored many works, including his thesis, involved tics and dystonia. Cruchet titled his thesis *Étude critique sur le tic convulsif* (Critical study of convulsive tics). In the first chapter (Cruchet, 1902a), Cruchet used an in-depth historical overview to map out the subject that interested him and attempted to distinguish between the various types of tics. The terminology was often inaccurate, fluctuating from era to era since the 17th century. The word “tic” encompassed the contraction following facial palsy, facial neuralgia, and “tic douloureux,” referred to by older authors (trigeminal neuralgia). It also included “the common tic, which is only a bizarre and unpleasant habit.” What constituted a tic for Cruchet could be any number of movements and habits, including nail-biting, trichotillomania, snoring, sniffing, yawning, sneezing, coughing, laryngeal and phonatory sounds, coprolalia, thumb sucking, rhythmic movement disorder, stuttering, polydipsia, bed-wetting, sleepwalking, and masturbation. He expanded on this broad range of symptoms in a volume for general practitioners in the “Consultations médicales françaises” collection entitled *La tiquose*. “Tiquose” was the condition centered on “a simple or complex movement that is sudden and frequently repeated without any apparent reason or purpose at irregular intervals” (Cruchet, 1909). “Tiquose,” then, dealt with a habit, and, as will be shown, it was indeed a bad habit according to Cruchet.

Previously, and in line with Édouard Brissaud (1852–1909) and his student Henry Meige (1866–1940; Brissaud, 1895; Meige & Feindel, 1902), Cruchet had arrived at a phenomenon with a mental cause based on the observation that most patients could stop the involuntary, intermittent contractions by using one of their hands “as an antagonist,” for example by placing their hand on the side of the chin to keep their head from turning (Broussolle et al., 2015). If these movements could be controlled, Cruchet reasoned, then tics were mostly voluntary and habitual. Cruchet also noted in passing a “purely mental [form] or idea tic that does not have any outward sign”; he was not interested in this form of tic. Finally, he believed it was necessary to eliminate partial epilepsy in each case, at a time when electroencephalograms were not yet available. For the common tic, he established a parallel with reflexes, deducing a spinal or bulbospinal origin. For other “convulsive tics,” the origin was cortical because the phenomenon was mental.

For him, any normal movement could be transformed into a tic. But the tic he was perhaps most interested in remained the common tic. Frequently observed in children, the common tic was for Cruchet a habitual tic. Without any discussion, he cited the popular belief that a blinking ocular tic may occur following the presence of a foreign body under the eyelid or after making a game of voluntary blinking or imitating another ticcer. In a popular book published in 1911, with a second edition in 1930, Cruchet, the pediatrician, advised parents and teachers on “bad habits,” that is, behaviors in children that, for him, caused lasting neuropsychiatric pathologies (Cruchet, 1911). He listed the descriptions of various localizations of tics in the face and limbs, including nail-

biting and trichotillomania as tics. He distinguished between “visceral tics,” including snoring, sniffing, yawning, sneezing, coughing, and laryngeal and phonatory sounds, including in this last category coprolalia. It should be noted that Cruchet considered thumb-sucking, rhythmic movement disorder, stuttering, polydipsia, bed-wetting, sleepwalking, and masturbation as “bad habits” in children that needed to be vigorously corrected: “Tics are bad habits due to a lack of authority and control.” The therapeutic methods he suggested ranged from a straitjacket-type restraint to application of an eye ointment or wash containing cocaine or camphor, or to gymnastic exercises.

Treatise on Spasmodic Torticollis

In his 1902 thesis on the various types of tics, Cruchet referred to “tonic or clonic convulsive tics,” such as “mental torticollis or mental tic of the neck,” this latter group including types what of is now called dystonia (see Figure 2). Five years later, in 1907, Cruchet published a voluminous 836-page treatise entitled *Traité des torticolis spasmodiques* (Cruchet, 1907). He wrote of multiple kinds of spasmodic torticollis, given that he considered his work as the first attempt to assess “neuropathic torticollis” not as a single disease but as a syndrome including several clinical forms, each with its own treatment. He listed: “1) neuralgic torticollis; 2) professional torticollis; 3) paralytic torticollis; 4) true and symptomatic spasmodic torticollises; 5) essential and symptomatic rhythmical torticollises; 6) neck tics; and 7) habitual torticollis and mental torticollis.” On neuralgic torticollis, he referred to a defensive posture, comparing this clinical picture to facial neuralgia. The professional form was due to a repeated movement or position sustained for a long time, as in the case of writer’s cramp. He established a similarity between paralytic torticollis and facial palsy, which can result in a spastic residual contraction. What he referred to as rhythmical torticollis or rhythmic movements of the neck can occur during infectious diseases (typhoid fever, meningitis, tetanus, malaria) or “constitute a habit at sleep onset.” Neck tic was “a bad habit” whereas “mental torticollis [was] an attitude based on a bad habit.” Cruchet’s classification did not have the longevity he had predicted for it. A psychological cause is no longer accepted. In addition to idiopathic forms, forms of symptomatic dystonia exist in Wilson disease, Huntington’s chorea, ataxia-telangiectasia, Fahr disease, certain cerebral peduncular infarctions, and post encephalic parkinsonism.



FIG. 411.

FIG. 412.

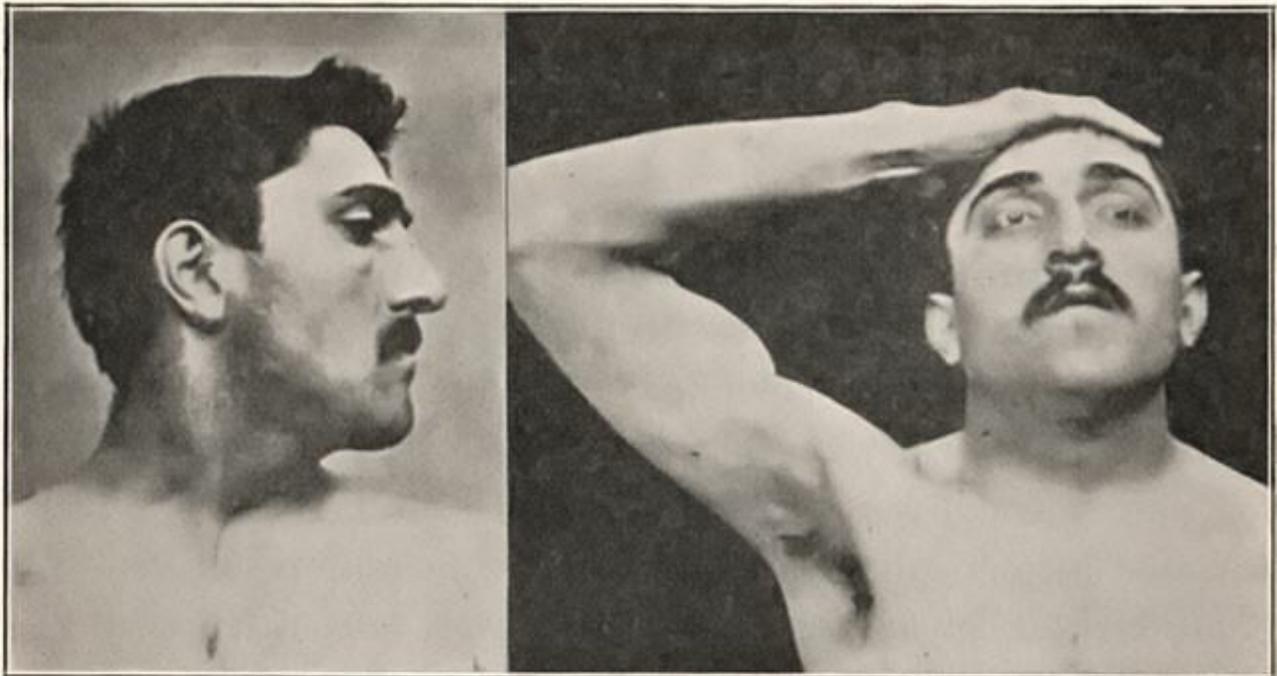


FIG. 413.

FIG. 414.

Figure 2. Geste Antagoniste, photo from reference (Cruchet, 1902a, p. 797).

Source: Private collection of the author.

Parkinsonian States and Bradykinetic Syndrome

Many patients who survived the acute phase of encephalitis lethargica developed neurological aftereffects in the months and years that followed, mainly extrapyramidal syndrome. Cruchet coined the expression “bradykinetic syndrome” to describe a new clinical picture characterized by an immobile, inexpressive face with a fixed stare, very slow movements with incoordination, rapid reaction to surprise stimulation or “paradoxical kinesia,” and, finally, a tendency to experience catatonia (Schilder et al., 2017; Verger et al., 1925).

Cruchet refuted the term “parkinsonism.” He saw Parkinson’s disease as involving shaking during rest, initially unilateral, with asymmetrical bradykinesia that developed progressively and became less marked during walking (Cruchet, 1925a). For him, what he observed was only rigidity, as Charcot and Alfred Vulpian (1826–1887) defined it in their first publication on paralysis agitans in 1861 (Charcot & Vulpian, 1861; Cruchet, 1925b). In the aftereffects of encephalitis, symmetry predominated, as well as an irregular progression of improvements that could alternate with worsening symptoms.

Dystonia, such as “spasmodic torticollis,” could appear suddenly, which did not seem to deter Cruchet in his psychological view of these symptoms, which he described as “spasmodic bradykinesia.” Shaking was often absent. Various types of ocular paralysis that progressed over time and oculogyric crises also distinguished this disease (Cruchet, 1929b; von Economo, 1931). In certain cases, the elbows held close to the body, hunched back, and festination were replaced by hyperlordosis, as in Steele–Richardson–Olszewski disease (progressive supranuclear palsy) or corticobasal degeneration. Finally, although there was a certain slowing of intellectual functions, no progressive mental deterioration occurred after several years of illness (Vilensky et al., 2010a, 2010b). This encephalitis disproportionately affected younger subjects, including children after several years of illness (Cruchet, 1947; Vilensky, 2011).

Hysterical Syndrome

In 1951, Cruchet published a brochure entitled *Le syndrome hystérique* (Cruchet, 1951) that brought together and classified various publications since the beginning of the century, particularly in the journal *Paris Médical* (Cruchet, 1912b). Cruchet’s pediatrics publications include the book *La pratique des maladies des enfants* (practical guide to childhood diseases), a collaborative work in nine volumes, published in several editions from 1909 to 1925 (Cruchet & Apert, 1909–1925). Cruchet remained aligned with his teacher Pitres (1891), denying any simulation during the hysterical episode, seeing it rather as a reaction to emotional trauma. It was characterized by the subject’s indifference to severe symptoms, such as paralysis and anesthesia. He recommended reading Marcel Proust (1871–1922) “because he detailed the countless nuances of this emotional trauma with an abundant sentimental and subjective palette so rich, subtle, and colourful that his writings remain a nearly inexhaustible source of documentation for psychologists wishing to learn more.” Cruchet opposed the concept of pithiatism proposed by Babiński (1906) and saw no triggering suggestion in any of the injured soldiers he treated who were suffering from mutism or

camptocormia (Cruchet, 1918). He instead cited an accident occurring sometime after an emotional trauma out of proportion with what one can normally handle. He did not deny the role of imitation, referring to psychosis by imitation. He saw emotional trauma as causing a state of transient mental confusion that “disturbed normal psychological relations between the operations of the mind, of which memory is an essential element.” He drew his conclusions from the treatment of more than 2,000 soldiers examined during the war, barely mentioning the care he provided to children who were made to work from an early age and suffered abuse. It was also an opportunity for him to express his hostility to what he called Freudianism (Cruchet, 1927b).

In 1935, during a visit to the United States, he was asked to give his opinion on the case of a secretary-turned-starlet, Patricia Maguire, who had been hospitalized for 3 years for a state of lethargic somnolence. Cruchet concluded that it was not a case of lethargic encephalitis but of hysteria, and he asserted that he had personally seen many similar cases in France (Traut, 1935).

On Morvan’s Disease

In 1939, Cruchet and Paul Delmas–Marsalet (1898–1977) proposed to review the nosographic status of “Morvan’s disease” (Cruchet & Delmas–Marsalet, 1939). What is now called Morvan’s disease is fibrillary chorea, an autoimmune ion channel pathology. In 1939, Cruchet still used the term Morvan’s disease to denote syringomyelia, as in Charcot’s day (Walusinski & Honnorat, 2013). After a beautifully written homage to Augustin Morvan (1819–1897) for his seminal description of analgesic panaris, Cruchet and Delmas–Marsalet recognized the similarity between this pathology and syringomyelia and hypothesized a lesion in the intermedio-lateralis tract to explain the trophic disturbances in syringomyelia. Regarding one of their clinical cases, they made an initial attempt to suggest a link with acrodynia.

Aviator’s Disease

In September 1915, Cruchet took his first flight in an airplane, built by Maurice Farman (1877–1964): “The impressions of a first flight are delicious, exquisite, and unforgettable” (Cruchet & Moulinier, 1911). In 1910, Cruchet began to research aviator physiology, presenting his first paper on “aviator’s disease” to the French Academy of Sciences in April 1911 (Cruchet & Moulinier, 1920). Once again, his tone was insistent: “We are the first to describe aviator’s disease, which has rapidly gained legitimacy in the French and foreign literature.” Rapid descents from altitudes of 2,000 or 3,000 meters with an open cockpit exposed aviators to blood pressure variations, heart palpitations, and visual disturbances. Cruchet’s 1920 book distinguished between prewar aviators and those who were exposed to every risk during air combat. Cruchet should be recognized as one of the first physicians to take an interest in the new discipline of aeronautic medicine. It should also be noted that during the same period von Economo became an accomplished pilot, helping to train pilots in the Austro–Hungarian army during the war (Sak & Grzybowski, 2013; van Bogaert & Theodoridès, 1979).

Other Publications

Cruchet's publications cover numerous fields of medicine, travel, history, and sociology (Cruchet, 1924, 1934, 1936, 1939, 1952). For example, he wrote several articles on blood transfusions, such as *Étude étiologique des accidents dans la transfusion sanguine de sang hétérogène, rôle de l'agglutination* (Aetiological study of accidents in heterogeneous blood transfusion and the role of agglutination; Cruchet & Caussimon, 1925). Cruchet had high hopes for a 1928 book that quickly proved unfounded: *La transfusion du sang de l'animal à l'homme* (Blood transfusions from animals to humans; Cruchet et al., 1928).

Travels

From 1900 onward, Cruchet traveled to represent his Bordeaux medical school in Germany, Switzerland, Canada, the United States, and South America. While traveling, he never forgot to talk about the city of Bordeaux and its wines, his maternal relatives having ties with the prestigious vineyards of Château Feytit-Clinet in Pomerol and Château Tour Grand Faurie in Saint-Émilion (Anonyme, 1926). During his trips in Germany, he studied under Wilhelm Erb (1840–1921) and met Ernst Siemerling (1857–1931), Friedrich Loeffler (1852–1915), Robert Koch (1843–1910), Eduard Hitzig (1838–1907), and many others. He reported on his travels in reports presented on his return at the University of Bordeaux, such as *La médecine dans les universités allemandes* (Medicine in German universities; Cruchet, 1901, 1902b; Rohmer, 1959). He elaborated on his accounts and observations for the public and published them in 1914 in a very dense, 450-page book, almost forgotten due to war (Cruchet, 1914).

In Conclusion

Jean-René Cruchet wrote prolifically and in a broad number of medical fields. And he wrote outside the domain of medicine; few physicians and researchers find the time or have the inclination to write as much as he did. After all, he believed in his work and his views, even when others contested him or, perhaps worse, forgot him. But nonetheless, he did win some acknowledgment by his peers in his day—enough so that he imagined he would remain famous, as his narcissistic personality, reflected through his book “*Titres et travaux*,” suggests (Cruchet, 1920b). But the rapid obsolescence of most of his publications quashed the dream he had nurtured throughout his life.

References

Achard, Ch. (1921). *L'encéphalite léthargique*. J.-B. Baillière.

Anonyme. (1926). Le Professeur Cruchet de la Faculté de Médecine de Bordeaux. *Chanteclair*, 21(222), 199.

Babiński, J. (1906). *Ma conception de l'hystérie et de l'hypnotisme (pithiatisme)*. impr. Durand.

Brissaud (Ed.). (1895). *Tics et spasmes cloniques de la face: XXIVe leçon. Leçons sur les maladies nerveuses (La Salpêtrière 1893–1894)*. G. Masson.

Broussolle, E., Laurencin, C., Bernard, E., Thobois, S., Danaila, T., & Krack, P. (2015). Early illustrations of Geste Antagoniste in cervical and generalized dystonia <https://doi.org/10.7916/D8KD1X74>. *Tremor and Other Hyperkinetic Movements*, 5, 332.

Charcot, J.-M., & Vulpien, A. (1861). De la paralysie agitante, à propos d'un cas tiré de la clinique du Professeur Oppolzer. *Gazette Hebdomadaire de Médecine et de Chirurgie*, 8, 765–767/8, 816–820/9: 54–59.

Cornet, P. (1920). Le Professeur René Cruchet. *Paris médical*, 38, 669.

Cruchet, R. (1901). *La médecine dans les universités allemandes: I^{er} rapport novembre 1900*. impr. Gounouilhou.

Cruchet, R. (1902a). *Étude critique sur le tic convulsif et son traitement gymnastique* [Thèse Bordeaux n°60, impr. Gounouilhou].

Cruchet, R. (1902b). *La médecine dans les universités allemandes: IIe rapport novembre 1902*. impr. Gounouilhou.

Cruchet, R. (1907). *Traité des torticolis spasmodiques, spasmes, tics, rythmes du cou, torticolis mental*. Masson.

Cruchet, R. (1909). *La Tiquose: Consultations médicales françaises (fascicule VIII)*. A. Poinat.

Cruchet, R. (1911). *Les mauvaises habitudes chez les enfants*. Expansion Scientifique Française.

Cruchet, R. (1912a). *De la méthode en médecine* [Doct. Univ. Lettres. Bordeaux, 1911–1912, n° 11, impr. Delmas].

Cruchet, R. (1912b). Diagnostic pratique de l'hystérie (spécialement chez l'enfant): L'origine n'est pas organique/le sujet est hystérique. *Paris Médical*, 7, 257–262.

Cruchet, R. (1914). *Les universités allemandes au XX^e siècle*. A. Colin.

Cruchet, R. (1918). *La crainte du danger chez le combattant*. Mercure de France.

Cruchet, R. (1920a). The Bordelaise conception of encephalitis lethargica. *New York Medical Journal*, 112, 173–174.

Cruchet, R. (1920b). *Titres et travaux scientifiques*. impr. Gounouilhou.

Cruchet, R. (1921). *L'esprit d'observation en médecine*. impr. Gounouilhou.

Cruchet, R. (1924). *Jean Hameau, médecin de campagne, et les précurseurs de Pasteur*. impr. Delmas, Chapon, Gounouilhou.

Cruchet, R. (1925a). Paralysis agitans and post-encephalitic conditions. *British Medical Journal*, 1(3349), 474–475.

Cruchet, R. (1925b). The relation of paralysis agitans to the parkinsonian syndrome of epidemic encephalitis. *Lancet*, 2, 263–268.

Cruchet, R. (1927a). Discussion on epidemic encephalitis. *British Medical Journal*, 87(3481), 532–543.

Cruchet, R. (1927b). Les erreurs et les dangers du freudisme. *La Presse Médicale*, 35, 257–259.

- Cruchet, R. (1928). *Encéphalite épidémique, ses origines, les 64 premières observations connues*. G. Doin.
- Cruchet, R. (1929a). Encéphalite léthargique de C. von Economo et encéphalomyélite épidémique. *La Presse Médicale*, 37(61), 990–992.
- Cruchet, R. (1929b). Post-encephalitic delinquency. *Edinburgh Medical Journal*, 36(10), 573–592.
- Cruchet, R. (1929c). Les pervers de l'encéphalite épidémique. *Le Progrès Médical*, 56(36), 1485–1494.
- Cruchet, R. (1934). *La Conquête pacifique du Maroc et du Tafilalet*. Berger-Levrault.
- Cruchet, R. (1936). *Au Canada: Vieille terre française*. Delmas.
- Cruchet, R. (1939). *La Médecine et les médecins dans la littérature française; précédé de Relations de la France et de Bordeaux avec la Louisiane; et suivi de Montaigne et Montesquieu "at home."* Louisiana State University Press.
- Cruchet, R. (1942). *De la méthode en médecine*. Presses universitaires de France.
- Cruchet, R. (1947). Comment faut-il considérer aujourd'hui l'encéphalomyélite, dite épidémique? *Alger Medical* 50(7), 521–538.
- Cruchet, R. (1951). *Le syndrome hystérique*. J.-B. Baillière.
- Cruchet, R. (1952). *Le tour du monde en 37 mois de Camille de Rocquefeuil*. Delmas.
- Cruchet, R. (1955). *Les règles de la pensée en médecine*. Masson.
- Cruchet, R., & Apert, E. (1909–1925). *La pratique des maladies des enfants*. J.-B. Baillière.
- Cruchet, R., & Caussimon, J. (1925). Étude étiologique des accidents dans la transfusion sanguine de sang hétérogène, rôle de l'agglutination. *Journal de Physiologie*, 23(2), 342–352.
- Cruchet, R., & Delmas-Marsalet, P. (1939). Sur la maladie de Morvan. *Confinia Neurologica*, 2, 32–45.
- Cruchet, R., & Moulinier, R. (1911). Le mal des aviateurs. *Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences*, 152, 1114–1115.
- Cruchet, R., & Moulinier, R. (1920). *Le mal des aviateurs, ses causes et ses remèdes*. J.-B. Baillière.
- Cruchet, R., Moutier, F., & Calmette, A. (1917). Quarante cas d'encéphalo-myélite subaiguë. *Bulletins et Mémoires de la Société Médicale des Hôpitaux Série III*, 41, 614–616.
- Cruchet, R., Ragot, A., & Caussimon, J. (1928). *La transfusion du sang de l'animal à l'homme*. Masson.
- da Mota Gomes, M. (2020). Encephalitis lethargica epidemic milestones in early sleep neurobiology researches. *Sleep Medicine*, 74, 349–356.
- de Saint-Martin, & Lhermitte, J. (1918). La poliomesocéphalite primitive avec narcolepsie. *Le Progrès Médical*, 35, 213–215.

- Demetriades, A. K. (2012). From encephalitis lethargica to cerebral cytoarchitectonics: The polymath talent of Constantin von Economo (1876–1931), pioneer neuroanatomist, neurophysiologist and military aviator. *Scottish Medical Journal*, 57(4), 232–236.
- Foley, P. (2009). Encephalitis lethargica and the influenza virus: II. The influenza pandemic of 1918/19 and encephalitis lethargica; Epidemiology and symptoms. *Journal of Neural Transmission (Vienna)*, 116(10), 1295–1308.
- Foley, P. (2018). *Encephalitis lethargica: The mind and brain virus*. Springer.
- Fontan, A. (1959). Nécrologie: Jean-René Cruchet. *Journal de Médecine de Bordeaux Sud-Ouest*, 136(4), 556–557.
- Lavie, P. (1993). The sleep theory of Constantin von Economo. *Journal of Sleep Research*, 2(3), 175–178.
- Lutters, B., Foley, P., & Koehler, P. (2018). The centennial lesson of encephalitis lethargica. *Neurology*, 90(12), 563–567.
- Meige, H., & Feindel, E. (1902). *Les tics et leur traitement*. Masson.
- Pearce, J.-M. (1996). Baron Constantin von Economo and encephalitis lethargica. *Journal of Neurology, Neurosurgery, and Psychiatry*, 60(2), 167.
- Pitres, A. (1891). *Leçons cliniques sur l'hystérie et l'hypnotisme: Faites à l'Hôpital Saint-André de Bordeaux*. O. Doin.
- Rohmer, P. (1959). Éloge funèbre de René Cruchet (16 juin 1959). *Archives Françaises de Pédiatrie*, 17, 1192–1193.
- Sak, J., & Grzybowski, A. (2013). Brain and aviation: On the 80th anniversary of Constantin von Economo's (1876–1931) death. *Neurological Sciences*, 34(3), 387–391.
- Schilder, J.-C.-M, Overmas, S.-S., Marinus, J., van Hiten, J.-J., & Koehler P.-J. (2017). The terminology of akinesia, bradykinesia and hypokinesia: Past, present and future. *Parkinsonism & Related Disorders*, 37, 27–35.
- Traut, E.-F. (1935). The case of Patricia Maguire. *JAMA*, 104(14), 1210–1212.
- van Bogaert, L., & Theodoridès, J. (1979). *Constantin von Economo, the man and the scientist*. Verlag des Österreichischen Akademie der Wissenschaften.
- Verger, H., Cruchet, R., Anglade, D., & Hesnard, A. (1925). *Les états parkinsoniens et le syndrome bradykinétique*. J.-B. Baillière.
- Vilensky, J.-A. (2011). *Encephalitis lethargica, during and after the epidemic*. Oxford University Press.
- Vilensky, J.-A., Gilman, S., & McCall, S. (2010a). A historical analysis of the relationship between encephalitis lethargica and postencephalitic parkinsonism: A complex rather than a direct relationship. *Movement Disorders*, 25(9), 1116–1123.
- Vilensky, J.-A., Gilman, S., & McCall, S. (2010b). Does the historical literature on encephalitis lethargica support a simple (direct) relationship with postencephalitic Parkinsonism? *Movement Disorders*, 25(9), 1124–1130.
- von Economo, C. (1917). Encephalitis lethargica. *Wiener Klinische Wochenschrift*, 30, 581–585.
- von Economo, C. (1925). *Die Cytoarchitektonik der Hirnrinde des erwachsenen Menschen*. J. Springer.

von Economo, C. (1926). Studien über den Schlaf. *Wiener medizinische Wochenschrift*, 76, 92–93.

von Economo, C. (1929). Encéphalo-myélite subaiguë diffuse de Cruchet et encéphalite léthargique épidémique. *La Presse Médicale*, 37, 798–800/990–992.

von Economo, C. (1931). *Encephalitis lethargica, its sequellae and treatment*. Oxford University Press.

Walusinski, O. (2022). René Cruchet (1875–1959), beyond encephalitis lethargica <<https://doi.org/10.1080/0964704X.2021.1911913>>. *Journal of the History of the Neurosciences*, 31(1), 45–63.

Walusinski, O., & Honnorat, J. (2013). Augustin Morvan (1819–1897), a little-known rural physician and neurologist. *Revue Neurologique*, 169(1), 2–8.