Available online at
ScienceDirect
www.sciencedirect.com

Elsevier Masson France
EM|consulte
www.em-consulte.com

History of Neurology

Jean-Louis Brachet (1789–1858). A forgotten contributor to early 19th century neurology

Jean-Louis Brachet (1789–1858). Ses contributions méconnues à la neurologie au début du XIXe siècle

O. Walusinski

20, rue de Chartres, 28160 Brou, France

INFO ARTICLE

Article history:
Received 7 March 2015
Received in revised form
15 April 2015
Accepted 19 April 2015
Available online 28 August 2015

Keywords:
History of neurology
Brachet
Vegetative nervous system
Meningoencephalitis
Epilepsia
Hydrocephalus
Hysteria

Mots clés :
Histoire de la neurologie
Brachet
Système nerveux végétatif
Ménigoencéphalite
Épilepsie
Hydrocéphalie
Hystérie

ABSTRACT

Specialists of the history of hysteria know the name of Jean-Louis Brachet (1789–1858), but few realise the influence of this physician and surgeon from Lyon, a city in the southeastern part of France. Not only a clinician, he was also a neurophysiology researcher in the early 19th century. Along with his descriptions of meningoencephalitis, including hydrocephalus and meningoencephalitis, he elucidated the functioning of the vegetative nervous system and described its activity during emotional states. He also helped describe the different forms of epilepsy and sought to understand their aetiologies, working at the same time as the better-known Louis-Florentin Calmeil (1798–1895). We present a biography of this forgotten physician, a prolific writer, keen clinical observer and staunch devotee of a rigorous scientific approach.

RÉSUMÉ

Si le nom de Jean-Louis Brachet (1789–1858) reste familier à ceux qui s'intéressent à l'histoire de l'hystérie, ils méconnaissent l'activité de ce médecin et chirurgien lyonnais qui, au début du XIXe siècle, sait être à la fois un médecin clinicien et un chercheur en neuro-physiologie. À côté de sa description des méningo-encéphalites, notamment tuberculeuses, il met en évidence le fonctionnement du système nerveux végétatif et décrit son activité lors des émotions. Il participe à la description des différentes formes d'épilepsies et recherche leurs étiologies, en contemporain du plus célèbre Louis-Florentin Calmeil (1798–1895). Nous présentons ici une biographie de ce médecin méconnu, écrivain prolifique, doué d'un talent d'observation clinique acéré, chevillé à une foi scientifique rigoureuse.

E-mail address: walusinski@baillement.com.
http://dx.doi.org/10.1016/j.neurol.2015.04.012
0035-3787/

Jean-Louis Brachet (1789–1858) is one of those obscure figures whose work in the early 19th century paved the way for the experimental sciences, the clinical anatomical method, and psychology, which would respectively blossom with Claude Bernard (1813–1878), Alfred Vulpian (1826–1887), and Jean-Martin Charcot (1825–1893) followed by Pierre Janet (1859–1947). After a biographical sketch and a brief look at his numerous publications in all fields of medicine, we will mainly focus on his research into the physiology of the vegetative nervous system, hydrocephalus and meningoencephalitis, epilepsy and most importantly his work on hysteria.

1. A life devoted to medicine

Jean-Louis Brachet was born on 21 April 1789 in Givors, near Lyon, a city in the southeastern part of France (Fig. 1). He was a gifted student and pursued his secondary education under ''an adept ecclesiast left over from one of these educated communities that, before the French revolution, dedicated themselves to educating the youth'', according to his biographer François-Ariste Potton (1810–1869), also from Lyon [1]. Potton adds that Brachet's tutor ''developed in him the spirit of observation that would be the main source of his success''. From the ages of 17 to 21, he trained as a surgeon at Hôtel-Dieu de Lyon, then went to Paris to defend his doctoral thesis. His fellow students in the capital included Claude François Lallemand (1790–1854), Jacques Lisfranc de Saint-Martin (1790–1847) and François Magendie (1783–1855). He began his internship in 1810, along with Hippolyte Cloquet (1787–1840), the famous author of an 1821 treatise on odours. Brachet worked under Augustin Landré-Beauvais (1772–1840), Jean-Nicolas Corvisart (1755–1821) and Guillaume Dupuytren (1777–1835), building on the surgical education he had received in Lyon. His thesis, defended on 4 March 1813, was already focused on physiology, specifically the cause of dilatory movement in the heart [2].

At around this time, a typhus epidemic broke out in Paris. Brachet was relentless in caring for the victims: ''While this obscure citizen silently consumed the strength of his youth to perform his sad duties, external events continued their march: on 31 March 1814, the enemy entered the capital, Paris surrendered to the Russians, and Lyon was abandoned to the Austrians'' [1]. After the Emperor abdicated in April 1814, it fell to Dupuytren to select the surgeon who would accompany Napoleon into exile on the island of Elba. Brachet was chosen as ''the best subject of his time [...]. As he is extremely learned, and has many faculties, I think that His Majesty will find his conversation agreeable'', noted the dean of the *Faculté de Médecine*, Jean-Jacques Leroux des Tilliets (1749–1832). Brachet journeyed to Fontainebleau to join Napoleon, but once there, he was struck with typhus himself, the man who ''up to that point had braved everything with impunity [...]. His vigorous constitution fought back, triumphing over the violence of his ills, and he miraculously returned from the threshold of his own grave'' [1]. After a period of convalescence with his parents, he began practising as a surgeon in Lyon and ''returned with joy to his favourite pursuits: experimental research and pathological anatomy''. In addition to working as a prison doctor, he became an assistant surgeon at Hôtel-Dieu de Lyon in 1813, going on to become a house surgeon in 1818 and Professor at the École de Médecine de Lyon from 1842 to 1858. On 5 April 1825, he became a corresponding member of the Académie de Médecine.

Fig. 1 – Jean-Louis Brachet (1789–1858).

''Brachet thought only of medicine and its application''. Keeping far from public life to devote as much time as possible to his professional activities, ''he practiced medicine as a serious art, which inspired confidence. [...] He made no distinction between day and night, making himself available to his patients at all times. He only left his office to see the sick, and returned to await their arrival; in the meantime, research provided a form of relaxation. [...] His character and abilities were well portrayed by his appearance: his calm, regular physiognomy was marked by finesse rather than distinction, and his deportment and attire were in perfect harmony with his habits'' (Fig. 1). ''As his speech was paralysed by shyness, he was far more at ease with patients than at the professor's rostrum'' [1].

Brachet left us a body of publications on an impressively abundant and varied number of topics. As a young surgeon, he was interested in wound sutures and the treatment of anal fissures and ingrown nails [3]. He modified the shape of the cannula that his teacher Dupuytren used to drain tears in cases of lacrimal fistulas [4]. He designed an extension-rotation device for repositioning femoral neck fractures [5]. In 1829 he described a condition later named carbon monoxide poisoning, of all the possible causes of asthenia, noting that the malady was not due to ''a lack of air'' but rather to ''the introduction of a venomous principle in the constitution'' [6]. As a physiologist, he wrote a booklet on the rarefaction of oxygen at high altitudes in the Alps, which he knew well; he was attempting to explain dyspnoea in mountain dwellers [7]. As an obstetrician, he studied ''the diseases of the placenta and their influence on the life of the foetus'' [8], the vascular

connections in the placenta for twin pregnancies [9], uterine prolapse [10], and other topics. In 1820, in a dissertation on Werlhof's disease (autoimmune thrombocytopenic purpura), he described this mortal syndrome involving purpuric rash and bleeding, and implicated scurvy or measles as the cause [11]. As a disciple of Corvisart and Philippe Pinel (1745–1826) and a strong advocate of reason, he argued against using the concept of inflammation to explain all diseases. For example, he criticised the doctrine of François Broussais (1772–1838), who focused on stomach inflammation: ''This exalted doctrine has wandered from the difficult path of experience and observation, and forms the basis of a veritable sect'' [12]. Brachet wrote a basic human physiology book, published in two editions (1835 and 1855), for physicians in training. Students appreciated the work in both its original French version and its German translation. Brachet notes in the introduction: ''The study of anatomy is the basis of physiology. [...] It would be an error to believe that the simple inspection of form and structure sufficed to reveal function. All the folds in the brain have been smoothed in vain; they yield nothing to this investigation, no trace of the sublime acts that take place during life'' [13]. In 1847, as an epidemiologist, Brachet confirmed the need to quarantine sick patients in order to wipe out epidemics of the plague [14].

His practical treatise on lead colic was published in several editions from 1824 to 1850. After a long history of the ills suffered by workers in contact with lead, Brachet attributed a pathophysiology to saturnism involving the ''ganglionated nervous system''. As a sanitarian, Brachet recommended replacing ceruse with zinc white to reduce the toxicity of paints [15].

Brachet practised medicine in Lyon for 40 years, during which time his love of medicine led him to acquire some 18,000 books, a library he made constantly available to his colleagues [1]. Potton goes on to note: ''It would be easy to accuse Brachet of having precipitated the decay of his robust temperament through sleepless nights, poor hygiene and immoderate use of opium, which he took to alleviate the acute pains reminding him he had a serious digestive disorder'' [1]. In 1828, Brachet wrote a book on opium usage in which he recommended prescribing high doses [16]. Likely suffering from stomach cancer, Brachet died in Lyon on 10 April 1858. In his will, he stipulated that his home should become a retirement centre for old physicians and donated his monumental library to the École de Médecine et de Pharmacie de Lyon [17].

2. ''Ganglionic'' or vegetative nervous system

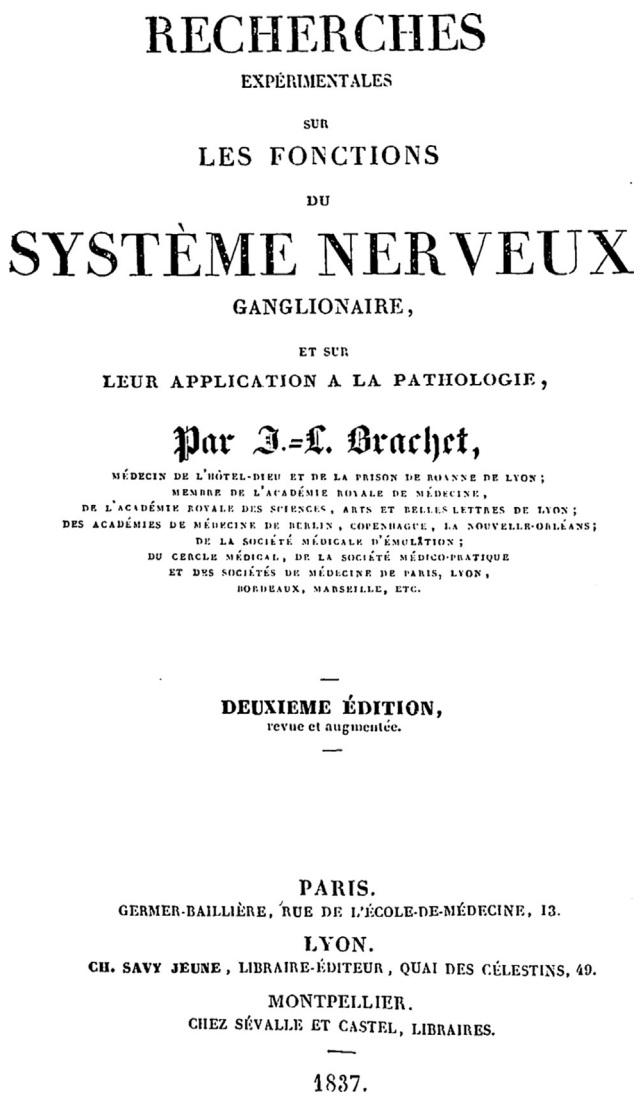
Trained by master physicians who chose observation and experimentation over philosophy — Corvisart, César Legallois (1770–1814) and Xavier Bichat (1771–1802) — Brachet embraced the same precepts and only accepted facts confirmed by experience. Legallois, Brachet and his contemporary François Magendie (1783–1855) can be considered among the pioneers of modern experimental physiology. Published in 1812, Legallois's book on experiments concerning the ''life principle'' and exploring the movements of the heart and the main location of this principle, served as inspiration for Brachet's thesis, defended the year Claude Bernard was born [2,18].

Brachet's colleague and friend Pierre-Antoine Prost (1770–1832), an alienist in Paris, who would be succeeded as head of the *Montmartre* asylum by the famous physicians Esprit Blanche (1796–1852) and Emile Blanche (1828–1893), a father and son, wrote a book on the progress made in understanding pathological anatomy. Along with Brachet, Prost carried out numerous experiments involving vivisection, writing that he was ''struck by the many lacunae in this science (i.e. physiology), and by the gratuitous explanations that did not appear to rest on any facts'' [19]. For Brachet, pathological anatomy and physiology, ''by supporting each other [...] will advance with ever more positive results''; Brachet also mentions a third source ''perhaps too often overlooked up till now: comparative anatomy'' [20].

The individualization of the vegetative nervous system may be credited to the work of several important scientists from the 16th, 17th and 18th centuries, to which Brachet's contribution would be added in the early 19th century. In 1563, Bartolomeo Eustachio (1510/13–1574) described the sympathetic nerve as the continuation of the sixth pair of cranial nerves and differentiated it from the vagus nerve [21]. Thomas Willis (1621–1675) was the first to distinguish voluntary motor activity (cerebrum) from automatic activities which he believed were governed by the cerebellum, where he also situated the descent of the vagus nerve and the intercostal nerves (sympathetic) [22]. In 1710, François Pourfour du Petit (1664–1741) severed the superior cervical ganglion in a dog and observed a triad of effects: miosis, ptosis and enopthalmos [23]. But it was in 1732 that the Danish Jacobus Benignus Winslow (1669–1760) correctly individualised the anatomy of the facial nerve as ''the small sympathetic'', the vagus nerve as the ''medium sympathetic'' and the ganglionated sympathetic trunk as ''the large sympathetic'' [24]. The Scottish Robert Whytt (1714–1766) explained the results of his experiments by the notion of ''sympathy'', which moves through the nervous system and which Brachet described as follows: ''Any act or phenomenon in an organ or any part of the body, during which the cause determining it has acted on an organ or part more or less at a distance, without there being any known direct relation between the two parts'' [20,25]. In 1771, the Scotsman James Johnstone (1730–1802), continuing the thought of Giovanni-Maria Lancisi (Italian, 1654–1720), conceived of the ganglionic system as a modulator of volition [26,27]. In 1800, Bichat distinguished between the ''animalistic life''—perceiving, moving, learning, which he situated in the brain—and the ''organic'' or ''vegetative life'', similar to that of plants—breathing and digesting, independent of the will whose centre he situated in the epigastrium. Based on these ideas, Bichat coined the term ''vegetative nervous system'' [28,29].

Following in Bichat's footsteps, in 1823 Brachet published a dissertation on the ganglionic nervous system, released in book form in 1830 and expanded in a second edition in 1837. ''In animals as in plants, absorption, capillary circulation, nutrition, secretions and exhalations function under the influence of the ganglionic nervous system'' — which the Englishman John Newport Langley (1852–1925) would term the autonomic nervous system in 1921 [20,30].

''Anatomists have patiently and tenaciously overcome difficulties, and the sympathetic nervous system has been pursued to the farthest reaches, on the arteries it accompanies



RECHERCHES

EXPÉRIMENTALES

SUR

LES FONCTIONS

DU

SYSTÈME NERVEUX

GANGLIONAIRE,

ET SUR

LEUR APPLICATION A LA PATHOLOGIE,

Par J.-L. Brachet,

MÉDECIN DE L'HÔTEL-DIEU ET DE LA PRISON DE BOANNE DE LYON;
MEMBRE DE L'ACADÉMIE ROYALE DE MÉDECINE,
DE L'ACADÉMIE ROYALE DES SCIENCES, ARTS ET BELLES LETTRES DE LYON;
DES ACADÉMIES DE MÉDECINE DE BERLIN, COPENHAGUE, LA NOUVELLE-ORLÉANS;
DE LA SOCIÉTÉ MÉDICALE D'ÉMULATION;
DU CERCLE MÉDICAL, DE LA SOCIÉTÉ MÉDICO-PRATIQUE
ET DES SOCIÉTÉS DE MÉDECINE DE PARIS, LYON,
BORDEAUX, MARSEILLE, ETC.

DEUXIEME ÉDITION,
revue et augmentée.

PARIS.
GERMER-BAILLIÈRE, RUE DE L'ÉCOLE-DE-MÉDECINE, 13.

LYON.
CH. SAVY JEUNE, LIBRAIRE-ÉDITEUR, QUAI DES CÉLESTINS, 49.

MONTPELLIER.
CHEZ SÉVALLE ET CASTEL, LIBRAIRES.

1837.

Fig. 2 – Experimental research on the functions of the ganglionic nervous system 1837.

in the form of a plexus, many branches of which have a gangliform appearance, regenerate the nerve, and prolong the trunk''. Brachet goes on with emphasis: ''We should not exaggerate the superiority of the cerebral system, as the ganglionic system and its functions seem to work only for the cerebral system, which in turn seems to work only for the ganglionic system and it dependencies. [...] Each is the other's slave, or rather they are united and combined to form a harmonic whole'' [20] (Fig. 2).

The alcoholic coma is one of the many cases examined by Brachet. Brachet noted that consciousness has been put to sleep, but the heart beats normally. He deduced that the brain is not indispensable for cardiac activity. In many animals, he removed the brain without causing the heart to stop beating. Then he destroyed the medulla oblongata; breathing stopped immediately and death ensued. He concluded that respiratory control was located in the medulla, which Legallois had already demonstrated, but Brachet noted that automatic cardiac function, whose mechanism he did not fully understand, continues after breathing stops, showing variations in rhythm and frequency [20].

Pursuing his vivisection experiments, Brachet described the physiology of the ''ganglionic system'', with transmission by the vagus nerve (or eighth pair in the parlance of the time) to the eye, stomach, intestines, organs of micturition, and organs of ''generation''. A chapter of his book is devoted to ''sympathies''. In one experiment, Brachet ''tickled'' the back of a dog's throat that had just eaten, thereby triggering vomiting. Rather cruelly, he severed the oesophagus in the upper part of the thorax and stimulated the dog's throat again. The stomach contractions and vomiting movements persisted, which for him demonstrated that it was ''by sympathy'', i.e. by mediation of the ganglionic nervous system, that the vomiting had occurred, rather than ''by continuity of digestive membranes''. Brachet concluded that the ganglionic nervous system governed vital unconscious functions, and unlike the ''relational'' or somatic nervous system, it did not need a single centre of action. Rather, it was situated diffusely throughout the organism and governed reciprocal or sympathetic influences, such as those of the brain and stomach (headache and vomiting) and those of the brain and heart in emotional states: ''In a man overcome with fury, the entire constitution manifests the violent state [...] speech is more rapid, expressions do not arrive with the same speed as ideas, and they give the impression of stammering. [...] the contractions of the heart quicken and accelerate circulation. [...] colour in the face intensifies, the eyes become bloodshot and lustrous'' [20]. Brachet was also interested in ''passions'', which is to say psychology. For example, he considered intellectual exaltation ''to depend on the central nervous system'' and the accompanying physical phenomena ''to depend on the ganglionic system, which is only influenced secondarily by the brain; that is, in a communicated, reflected way'' [20]. Brachet showed that for joy or ''sad passions'', the physiological mechanisms were comparable. The origin of emotions was thus not the epigastrium as suggested by Pinel and Broussais based on Bichat but was in the brain, ''the seat of passions and the imagination'' [31–33]. Brachet applied this data to his theory of hypochondria and hysteria. His descriptions anticipated the theories of William James (1842–1910) and Carl Lange (1834–1900) in 1884, namely that emotions are perceived following bodily modifications, as well as the theories of Walter Cannon (1871–1945) and Philipp Bard (1898–1977) in 1929, whereby a cognitive perception of the bodily state is determined by hypothalamus-based physiological activation [34].

Brachet boldly stated that he had given ''a new physiognomy to the study of physiology''. He continued to develop his concepts of the two nervous systems with their embedded functions in order to explain a number of pathological facts and therapeutic modes of action such, as the placebo effect: ''The physician who knows how to inspire confidence and persuade his patient may owe greater success to this approach than to the remedies he prescribes. Most often, a potion will only be an additional means of controlling his patient's imagination, or of practising moral medicine by the use of remedies [...]. All of these arguments can only act on the brain'' [20,33,35].

However, he was unaware of the hypothesis by which a mode other than the nervous system caused the ''sympathies''.

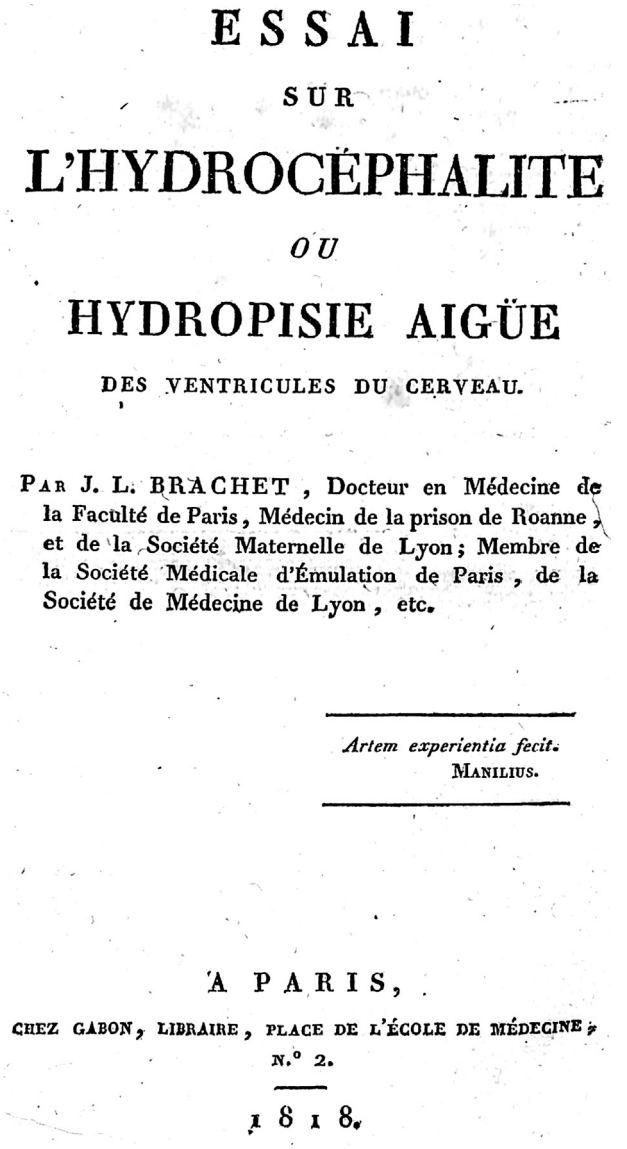
His friend Prost, on the other hand, suggested in 1806 the existence of two communication mechanisms between these "sympathies": "Two systems affect the attribution of roles; the first, the red blood system sends a liqueur through the body that contains principles whose character varies according to the manner in which each function is executed; the second system includes all the nerves" [36]. Whereas Joseph Lieutaud (1703–1780) had described the pituitary gland and its portal vascular network in 1742, Prost, with great foresight of endocrinology, was apparently inspired by Théophile de Bordeu (1722–1776), who in 1751 suggested that the "humour" of one organ influenced others [37–39]. We also should note that as early as 1810 Henri Dutrochet (1776–1847) conceived of a humoral mechanism regulating circadian rhythms, referring to it as "synergies or habits of frequency" [40]. It is clear that Brachet's contemporaries did not perceive the novelty of his concepts. Henri Milne Edwards (1800–1885) concluded his assessment with these words: "This dissertation is nothing but a collection of vague arguments, hypothetical explanations and common truths that everyone knows but that no one takes the trouble to write down" [41].

Subsequently to the contribution of Brachet and the other eminent researchers mentioned above, new findings and concepts on the sympathetic nervous system would be provided later in the 19th century by Claude Bernard and by Charles-Edouard Brown-Séquard (1817–1894) [42].

3. Hydrocephalus and meningoencephalitis

"The negligence with which we have treated childhood diseases is sufficient explanation for why acute hydrocephalus has remained unidentified for so long" [9]. Whytt is classically attributed with the first description of this clinical picture, in 1768, which included dilation of cerebral ventricles, notably of the foramina of Monro, with brain swelling or hydrops, caused by meningoencephalitis, most often tuberculous meningitis [43]. It should be noted that, at the time, only hydrocephalus was recognized, but meningoencephalitis was not properly appreciated. However, the Scotsman John Paisley (1685?–1740) is credited with the first clinical description in 1733 [44]. François Boissier de la Croix de Sauvages, also known as François Boissier de Sauvages or shortly as Sauvages (1706–1767) and the Scottish William Cullen (1710–1790), in their renowned pioneering nosological work on diseases of the nervous system published in 1763 and in 1787 respectively, identified this form of meningoencephalitis as "hydrocephalus interior", including it among the "partial hydrops" [45,46]. At the time, this condition was also known as a type of apoplexia hydrocephalica [45,46]. We should recall that the notion of a liquid circulating around the nervous system was documented by Domenico Cotugno (1736–1822) in 1768, but was only demonstrated by Magendie in 1825, after Brachet's 1818 "Essai", published when he was still a young physician and addressing a hotly debated subject [47–49] (Fig. 3).

Brachet drew on the dissertation of Louis Odier (Geneva, 1748–1817) and the book of Englishman John Fothergill (1712–1780), known for having individualised the "painful tic of the face" in migraine in 1776 and part of the clinical symptoms, as distinct from those of brain compression by bone indentation.


ESSAI

SUR

L'HYDROCÉPHALITE

OU

HYDROPISIE AIGÜE

DES VENTRICULES DU CERVEAU.

PAR J. L. BRACHET, Docteur en Médecine de la Faculté de Paris, Médecin de la prison de Roanne, et de la Société Maternelle de Lyon; Membre de la Société Médicale d'Émulation de Paris, de la Société de Médecine de Lyon, etc.

Artem experientia fecit.
MANILIUS.

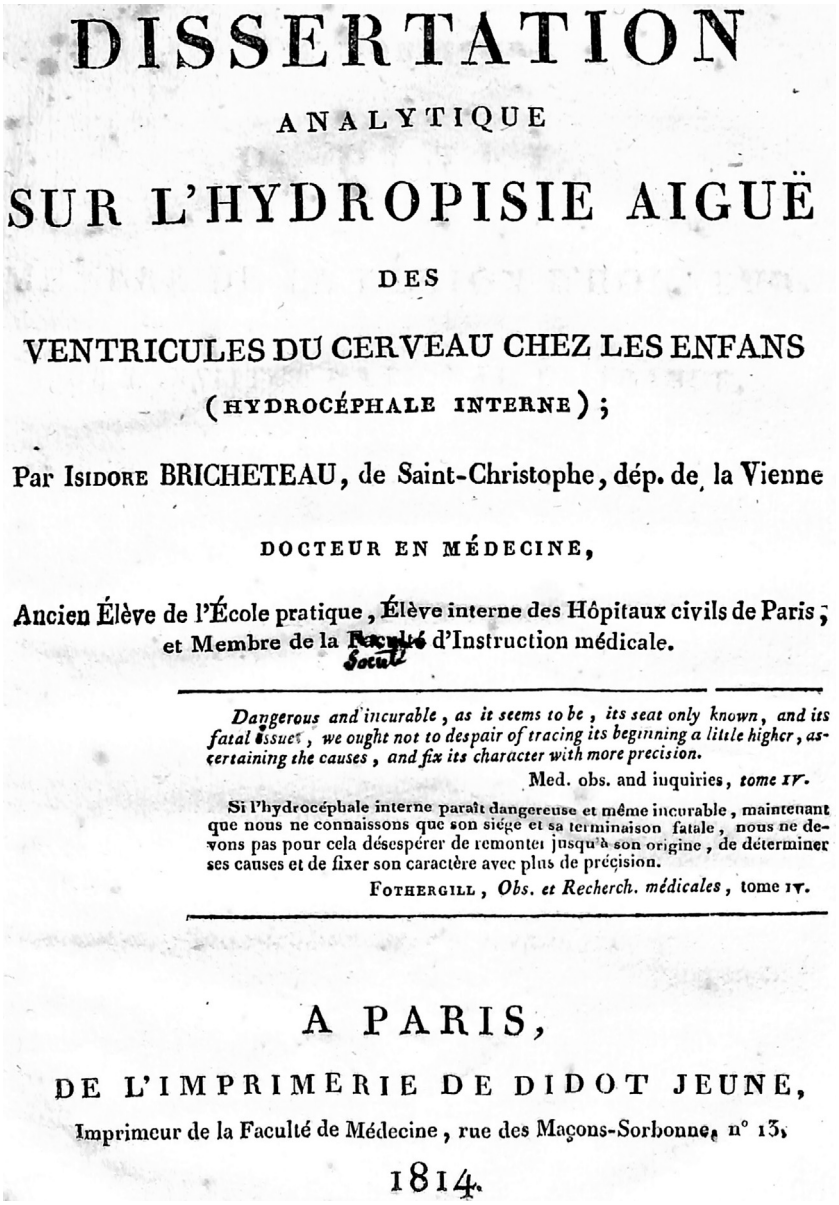
A PARIS,

CHEZ GABON, LIBRAIRE, PLACE DE L'ÉCOLE DE MÉDECINE, N.° 2.

1818.

Fig. 3 – Essay on hydrocephalus and acute dropsy of the cerebral ventricles 1818.

Fothergill, insisting on the condition's verminous origin, mixed brain tumours with cases of "hydrocephalus", notably ventricular hydatidosis (1771) [50,51]. Brachet referred to Joseph Lieutaud (1703–1780) in describing "drowsiness", i.e. progressive slipping into coma [52]. In his 1802 thesis, L.P. Collinet attributed novel importance to the associated fever, a "remittent malignant brain fever", and he was the first to describe it as "contagious" [53]. The highly detailed 1814 thesis of Isidore Bricheteau (1789–1861) and the dissertation of Jean-François Coindet, (Swiss, 1774–1834) were an important source of inspiration for Brachet, especially the clinical descriptions and the cases detailed [54,55]. For Brachet, the symptoms were "cephalgia in the forehead, the sinciput, or crossing from one parietal lobe to the other, worsened by noise and light, causing cries of pain [...]. The patient becomes torpid, only leaves his bed with difficulty, holding his head on the pillow; the vertical position usually causes vomiting that exhausts his strength". Gradually the sick child "drowses



DISSERTATION

ANALYTIQUE

SUR L'HYDROPISIE AIGUË

DES

VENTRICULES DU CERVEAU CHEZ LES ENFANS

(HYDROCÉPHALE INTERNE);

Par ISIDORE BRICHETEAU, de Saint-Christophe, dép. de la Vienne

DOCTEUR EN MÉDECINE,

Ancien Élève de l'École pratique, Élève interne des Hôpitaux civils de Paris; et Membre de la Faculté d'Instruction médicale.

Dangerous and incurable, as it seems to be, its seat only known, and its fatal issues, we ought not to despair of tracing its beginning a little higher, ascertaining the causes, and fix its character with more precision.

Med. obs. and inquiries, *tome IV.*

Si l'hydrocéphale interne paraît dangereuse et même incurable, maintenant que nous ne connaissons que son siége et sa terminaison fatale, nous ne devons pas pour cela désespérer de remonter jusqu'à son origine, de déterminer ses causes et de fixer son caractère avec plus de précision.

FOTHERGILL, *Obs. et Recherch. médicales*, tome IV.

A PARIS,

DE L'IMPRIMERIE DE DIDOT JEUNE,

Imprimeur de la Faculté de Médecine, rue des Maçons-Sorbonne, n° 13.

1814.

Fig. 4 – Analytical essay on acute dropsy of the cerebral ventricles in children. Isidore Bricheteau 1814.

without sleeping", then grows agitated and vomits; "his eyes are convulsively agitated and superior strabismus results". Paralysis, convulsions and lethargy with dilated pupils followed; "light no longer produces sensation or convulsive oscillation". Before death, "strabismus, trismus and facial features pulling to one side indicate the role of the muscles of the different head regions. Everything suggests that a large quantity of serosity is amassed inside the brain". Bricheteau repeatedly notes the salvos of yawning at this stage, a sign of intracranial hypertension [54]. At the autopsy, Brachet found that the arachnoid was opaque and thickened, with at some points the redness of inflammation. He noted the presence of pus in some places and very dilated ventricles containing clear or turbid liquid, "with a turgescence of blood" in the vessels, and "choroid plexuses dotted with glandulous bodies". Brachet remarked on the high number of familial cases, which like most of his contemporaries he attributed to heredity, not contagion. He distinguished between acute forms, and subacute or chronic forms accompanied by fever and cachexia or worsening of the patient's general condition. The aetiology remained a mystery for him, as the symptoms were often secondary to another disease such as scarlet fever or measles, or to trauma; in this case, his descriptions call to mind the "shaken baby syndrome". His observations seem to confuse infectious forms of meningoencephalitis with intracranial hypertension due to tumours. Brachet mentions the opinion formulated by René Laennec (1781–1826), who thought that the "disease is not essentially produced by the accumulation of serosity in the ventricles" but is linked to the "development of tubercles in the cerebral matter itself. This is entirely incurable, and is no way an idiopathic hydrocephalus" (Fig. 4).

While Brachet's "essay" helped identify various forms of meningoencephalitis, mostly tuberculous meningitis, it

should be noted that the "Hydrocephalus" entry in the dictionary of medical sciences by Jean-Gaspard Itard (1774–1838) is briefer, clearer and more instructive [56].

4. Convulsions in children

"Convulsions belong especially to childhood; the slightest condition in children can include these disordered movements, more often frightening than dangerous; they chose their victims at all levels of society, both in golden perambulators and thatched huts", Brachet said in his 1824 book on epilepsy [57]. He was awarded a prize for this work by the Cercle Médicale de Paris. Brachet starts with an in-depth history of epilepsy from the time of Hippocrates, but he only recognises the work of Samuel Tissot (1728–1797) and Jean Baptiste Théodore Baumes (1756–1828) as source material [58,59]. "By convulsions, I refer to any violent, alternating, involuntary and short-lived movement, involving a variable number of muscles under voluntary control, with or without loss of consciousness". Brachet acknowledges "the key distinction separating idiopathic convulsions from symptomatic convulsions", but leaves the reader in doubt as to what he sees as the difference, if any exists, between convulsions and epilepsy. Brachet describes the attack: "The child cries out; his face grows animated and reddens; his eyes glisten haggardly; he loses consciousness, stiffens, then flails about with a variety of violent movements" (Fig. 5). After noting the possibility of injury, Brachet distinguishes convulsions from tetanus, chorea and rabies. Usually the attack spontaneously stops, but "convulsions do not always have such a fortunate ending. Too often the physician must lament the insufficiency of his art, and parents the loss of their beloved child, the darling and hope of the family" — after several hours or days of suffering. But he cautions against immediately acquiescing to death. Brachet distinguishes clearly between partial convulsions, which he considers less serious than generalised convulsions without providing more information. The long list of causes indicates physicians' ignorance: heredity, fever, cold, worms, tooth eruption, polluted air in cities, asphyxia, head wounds, anger, masturbation, excessively tight swaddling clothes, and so on. Brachet criticises a view widely held by his contemporaries whereby illnesses were looked upon as "beneficial efforts by Nature [...] and consequently, convulsions are good". Undoubtedly the first to do so, he links the convulsions of children to pathological brain activity rather than a simple muscular phenomenon: "The primary cause of convulsions is brain irritation. To explain how this happens, we must start by explaining how the brain acts on the muscles to make them contract. All that physiology teaches us is that the nerves are the means of transmission. Anything assumed beyond this is mere hypothesis, and offers nothing solid". His concerns are well founded: "Will convulsions tell us the seat and precise degree of damage, based on whether a given muscle convulsed and not another?" Also: "The infinitely varied pathological lesions found in the brain following convulsions teach us two things: first, that they were the cause of these movements; second, that the convulsions do not have a single mode of damage". And his conclusion is sound: "Convulsions never exist prior to the brain affection;

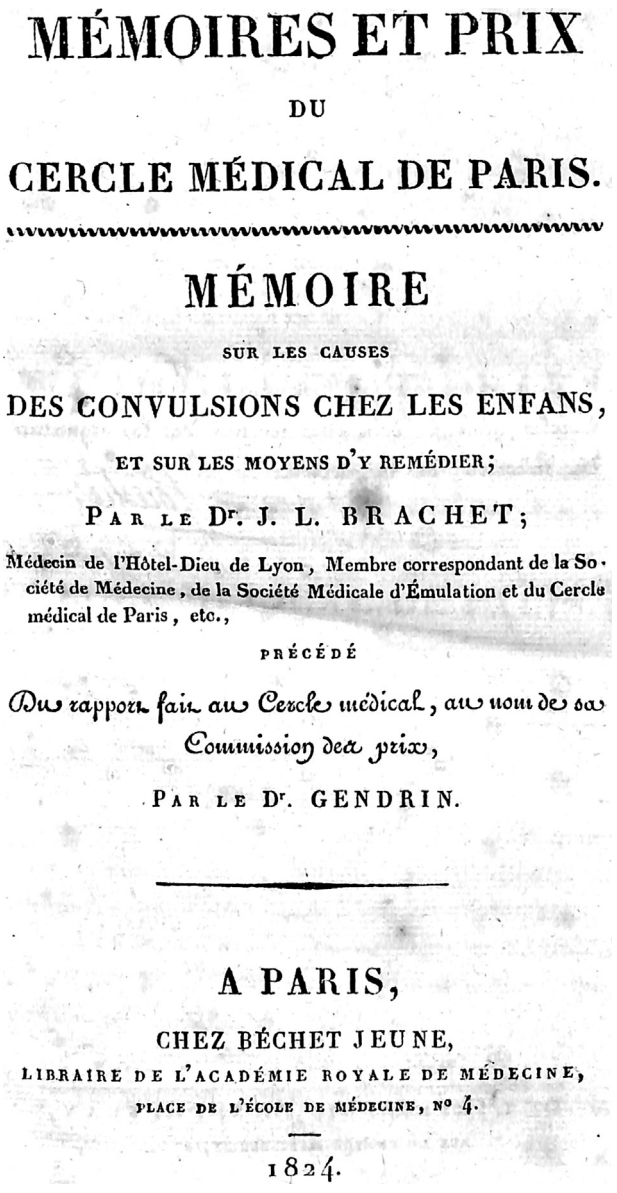

MÉMOIRES ET PRIX
DU
CERCLE MÉDICAL DE PARIS.
MÉMOIRE
SUR LES CAUSES
DES CONVULSIONS CHEZ LES ENFANS,
ET SUR LES MOYENS D'Y REMÉDIER;
PAR LE Dr. J. L. BRACHET;
Médecin de l'Hôtel-Dieu de Lyon, Membre correspondant de la Société de Médecine, de la Société Médicale d'Émulation et du Cercle médical de Paris, etc.,
PRÉCÉDÉ
Du rapport fait au Cercle médical, au nom de sa Commission des prix,
PAR LE Dr. GENDRIN.
A PARIS,
CHEZ BÉCHET JEUNE,
LIBRAIRE DE L'ACADÉMIE ROYALE DE MÉDECINE,
PLACE DE L'ÉCOLE DE MÉDECINE, No 4.
1824.

Fig. 5 – Memoir on the seizures'causes in children. 1824.

they are always subsequent to it." The recommended treatments range from spraying the head with cold water to the ingestion of zinc oxide, henbanes and numerous other plants, ether, opium, ammonium hydroxide, and quinquina; "vesicants were also applied to the limbs, the neck and even the top of the head. [...] The remedy would be worse than the malady if, rather than calm and peaceful sleep, narcotism and brain congestion were triggered"—then a purgative would be necessary! [57].

Apart from Brachet, important contributions to the field of epilepsy were made in the 19th century by several authors. Jacques-Gilles Maisonneuve describes epilepsy in adults, in 1803 [60]. The year Brachet's book was published, Louis-Florentin Calmeil (1798–1895) defended his thesis, distinguishing clearly a grand mal seizure from an epileptic absence. He invented the term "état de mal" for severe prolonged attacks [61]. As for Louis François Bravais (1801–1843), he defended his

thesis on 31 May 1827, three years after Brachet's publication. Bravais includes observations of epilepsy limited to the arm and face, with post-critical paresis that he terms ''hemiplegic epilepsy'' [62]. In his Tuesday Lesson on 15 November 1887, Jean-Martin Charcot (1825–1893) stated: ''This phenomenon of partial epilepsy was described and distinguished from ordinary epilepsy by Bravais, who did his internship in this hospital. That was back in 1827 or 1828. But more recently, an English scholar, Mr. Jackson of London, took up the subject again and handled it in such a particular way that I sometimes call this condition Jacksonian epilepsy, and the name persists. This is justified, I don't regret it. I may be wronging Bravais a little, but Mr. Jackson's study is so important that he truly deserves having his name associated with this discovery. If the French and English names could be merged into Bravais-Jacksonian epilepsy, this would do justice to both, although it would be a little longer'' [63]. The multiple publications of John Hughlings Jackson (1835–1911) on this form of epilepsy spanned a decade starting in 1863 [64–66]. Théodore Herpin (1799–1865) described myoclonic epilepsy in 1867 [67,68]. It should also be noted that when Brachet wrote his book, adult epileptics were locked in asylums with lunatics. Etienne Esquirol (1772–1840) suggested they be separated in 1838: ''They must not be housed pell-mell with lunatics, as is the current practice in all hospices where epileptics and lunatics are kept'' [69]. Undoubtedly, all the researchers listed above including Brachet should be credited for their contribution to the field of epilepsy. It must be added that throughout the 19th century, epilepsy was studied in asylums by alienists. Unfortunately, Owsei Temkin (1902–2002), in his ''reference'' work on the history of epilepsy, totally ignores Brachet [66].

5. Hysteria

The conceptual rigor and ever critical position that Brachet adopted in study and research on his broad range of subjects easily explains why he developed a purely cerebral theory of hysteria for the 1845 Prix Civrieux awarded by the Académie Royale de Médecine. He had already defended this concept in 1832 in his study of hypochondria: ''A bizarre contamination of the sensation of the cerebral nervous system, of several acts of organic life and of the functions of the organ of intelligence, relative to the perception of these phenomena and the judgment of this organ itself'' [70]. Brachet's work owes its novelty to the fact that he solely used clinical cases he had personally handled, and to his placing of hysteria in its social and cultural context. He recognised masculine hysteria but only in effeminate men, as did Etienne Georget (1772–1840), with whom Brachet shared the view that women had more fragile nervous systems: ''The real world doesn't suffice for [the hysteric]; she needs an imaginary world that her mind delights in embellishing''; but ''hysteria does not damage the intellectual faculties in any way'' [71,72]. For Brachet, a precursor to Pierre Briquet (1796–1881) and Charcot, the hysteric expressed an immoral and socially inappropriate behaviour without any sexual deficiency. He outlined a theory of the gender-specific brain, whereby each sex has its own way of reacting dynamically to emotions and psychic aggressions, the basis for the idea that women have specific behavioural reactions. The novelist Gustave Flaubert (1821–1880) would completely assimilate this in his character of *Madame Bovary* [73–75]. Brachet proposed, like Esquirol and later Paul Sollier (1861–1933), a ''moral'' treatment of hysteria, during a hospitalisation that removed the patient from her traumatic environment and included repeated one-on-one interviews with the physician, so that her complaints could be heard. Hydrotherapy and ''anti-spasmodics'' [76,77] were also used. Hysteria is a theme that Brachet had continually studied since 1828, with his treatise on asthenia, followed by a work on hypochondria in 1832 and his hysteria treatise in 1847. Brachet ultimately shared the 1845 Prix Civrieux with Hector Landouzy (1812–1864) who defended a neuro-uterine theory, which their contemporaries were much more receptive to. It is unfortunate that this prize, recognising two authors with opposing views, and Charcot's tendency to refer mainly to Briquet led the innovative concepts advanced by Brachet as early as 1832 to be overshadowed [6,78–80].

6. Conclusion

Potton had a perfect understanding of Jean-Louis Brachet: ''While he is not ranked among the most exceptional men whom Nature endows so rarely, one cannot deny that she granted him highly felicitous gifts, which he developed through tenacious study''. We share his analysis: The noteworthy points and characteristics that stand out in his wide-ranging publications are:

- a demonstrated faith that science would reward whoever took the pains to follow and study its principles;
- strong powers of observation and comparison which allowed him to combine isolated facts and to establish rules sanctioned by his practical experience as a physician;
- experimental demonstration applied on a large scale to physiology and pathology;
- the energy to study a series of problems, even if the solution remained beyond reach, in the diverse branches of the art of healing [1].

Two explanations can be advanced as to why Brachet's work has remained more or less forgotten to this day. By using experimentation to confirm facts, and thus abandoning philosophical reasoning, Brachet developed a materialism viewed with disdain, and often hostility, by his contemporaries. He also remained in his native region and did not seek out a prestigious professorship at the Faculté de Médecine in Paris, which, in a country as centralised as France, constitutes an irremediable barrier to recognition among one's peers and to immediate and future renown. My hope is that this article will give his innovative ideas the exposure they should have received from the start.

Disclosure of interest

The author declares that he has no conflicts of interest concerning this article.

Acknowledgements

My sincere thanks to Professors Jacques Poirier, Emmanuel Broussolle and the reviewers for their critical and constructive readings.

REFERENCES

[1] Potton FA. Notice historique sur la vie et les travaux de Jean-Louis Brachet. Lyon: Imprimerie d'Aimé Vingtrinier; 1859.
[2] Brachet JL. Dissertation physiologique sur la cause du mouvement de dilatation du cœur. Paris: Didot jeune; 1813 [Thèse n° 18].
[3] Brachet JL. Mémoire sur la réunion secondaire de la plaie après l'amputation circulaire des membres. J Gen Med Chir Pharm Fr Etrang 1816;16(37):96–105.
[4] Brachet JL. Modification de la canule de Mr Dupuytren, pour l'opération de la fistule lacrymale. Lyon: J.-M. Boursy; 1816.
[5] Brachet JL. Mémoire sur une nouvelle modification du bandage à extension permanente, dans les fractures du col du fémur. J Gen Med Chir Pharma Fr Etrang 1816;16(37):36–51.
[6] Brachet JL. Mémoire sur l'asthénie. Paris: Gabon; 1829.
[7] Brachet JL. Note sur les causes de la lassitude et de l'hanélation dans les ascensions sur les montagnes les plus élevées. Suisse: SI; 1830.
[8] Brachet JL. Des maladies du placenta et de leur influence sur la vie du foetus. J Gen Med Chir Pharma Fr Etrang 1828;102:10–60.
[9] Brachet JL. Mémoire sur la communication vasculaire des placentas, dans le cas de grossesse multiple. J Gen Med Chir Pharma Fr Etrang 1822;79:3–22.
[10] Brachet JL. Note sur les effets curatifs de la grossesse dans la retroversion et le prolapsus de la matrice. Gaz Med Paris 1858;28:341–2.
[11] Brachet JL. Mémoire sur la maladie tachetée hémorrhagique de Werlhof. Bull Soc Med Emul Paris 1820;1:469–86.
[12] Brachet JL. Essai sur l'hydrocéphalite ou hydropysie aigüe des ventricules du cerveau. Paris: Gabon; 1818.
[13] Brachet JL. Physiologie élémentaire de l'homme. Paris/Lyon: Germer-Baillière/Savy; 1855 [2 vol.].
[14] Brachet JL. Mémoire sur la peste et les quarantaines. Lyon: L. Perrin; 1847.
[15] Brachet JL. Traité pratique de la colique de plomb. Lyon: Chez Savy; 1850.
[16] Brachet JL. De l'emploi de l'opium dans les phlegmasies des membranes muqueuses, séreuses et fibreuses: suivi d'un mémoire sur les fièvres intermittentes. Paris: Gabon; 1828.
[17] Bonnet H, Guisti P. Un précurseur de la neuro-psychiatrie, Jean-Louis Brachet (1789–1858), médecin de l'Hôtel Dieu de Lyon. In: Conférences d'histoire de la médecine, cycle 87-88. Institut d'histoire de la médecine. Musée d'histoire de la médecine; 1989.p. 95–123.
[18] Pariset E. Œuvres de C. Legallois. Paris: Chez Le Rouge; 1830 [2 vol.].
[19] Prost PA. Médecine éclairée par l'observation et l'ouverture des corps. Paris: Chez Demonville; 1804 [an XII, 2 vol.].
[20] Brachet JL. Recherches expérimentales sur les fonctions du système nerveux ganglionnaire, et sur leur application à la pathologie. Paris/Lyon/Montpellier: G. Baillière/Savy jeune/Sévalle et Castel; 1837.
[21] Eustachio B. Opuscula anatomica. Venitiis: V. Lichinus; 1564.
[22] Willis Th. Cerebri anatome nervorumque descriptio et usus studio. Amstelodami: apud Casparum Commelinum; 1664.
[23] Pourfour du Petit F. Trois letttres d'un médecin des hôpitaux du Roy. Albert, Namur, 1710. Mémoire dans lequel il est démontré que les nerfs intercostaux fournissent des rameaux qui portent les esprits aux yeux. Histoire de l'Académie Royale des Sciences. 26. Paris: Imprimerie Royale; 1772. p. 262–72.
[24] Winslow JB. Exposition anatomique de la structure du corps humain. Paris: G. Desprez; 1732 [5 vol.].
[25] Whytt R. Observations on the nature, causes, and cure of those disorders which have been commonly called nervous, hypochondriac, or hysteric: to which are prefixed some remarks on the sympathy of the nerves. London/Edinburgh: T. Becket, and P.A. De Hondt/J. Balfour; 1732, [5 vol.].
[26] Lancisii IO. Opera quae hactenus prodierunt omnia: dissertationibus nonnullis adhuc dum ineditis locupletata, & ab ipso auctore recognita atque emendata; collegit; ac in ordinem digessit Petrus Assaltus. Genevae: Sumptibus Philiberti Perachon; 1718.
[27] Johnstone J. Essay on the use of the ganglions of the nerves. Philos Trans R Soc 1764;54:177–84.
[28] Bichat FX. Recherches physiologiques sur la vie et la mort. Paris: Chez Brosson, Gabon et Cie; 1800 [an VIII].
[29] Ackerknecht EH. The history of the discovery of the vegatative (autonomic) nervous system. Med Hist 1974;18(1):1–8.
[30] Langley JN. The Autonomic Nervous System. Cambridge: W. Heffer & Sons Ltd.; 1921.
[31] Pinel Ph. Nosographie philosophique, ou, la méthode de l'analyse appliquée à la médecine. Paris: Chez J.A. Brosson; 1802–1803 [3 vol.].
[32] Broussais FJV. Examen de la doctrine médicale généralement adoptée, et des systèmes modernes de nosologie, dans lequel on détermine, par les faits et par le raisonnement, leur influence sur le traitement et sur la terminaison des maladies. Paris: Chez Gabon; 1816.
[33] Brachet JL. Mémoire sur les fonctions du système nerveux ganglionaire. Paris/Lyon: Gabon/Maire; 1823.
[34] Cannon WB. The James-Lange theory of emotions: a critical examination and an alternative theory. Am J Psychol 1927;39:106–24.
[35] Brachet JL. Recherches expérimentales sur les fonctions du système nerveux ganglionnaire et sur leur application à la pathologie. Paris/Montpellier: Gabon; 1830.
[36] Prost PA. Dissertation sur les sympathies. Paris: Imprimerie de Didot Jeune; 1806.
[37] Lieutaud J. Essais anatomiques, contenant l'histoire exacte de toutes les parties qui composent le corps de l'homme, avec la manière de disséquer. Paris: chez Pierre-Michel Huart; 1742.
[38] de Bordeu Th. Recherches anatomiques sur la position des glandes et sur leur action; chilificationis historia – Dissertatio phisiologica desensu generice considerato. Paris: GF. Quillau père; 1751.
[39] Kreier F, Swaab DF. History of neuroendocrinology ''the spring of primitive existence''. Handb Clin Neurol 2010;95:335–60.
[40] Dutrochet H. Nouvelle théorie de l'habitude et des sympathies. Paris: chez Allut. imprimeur; 1810.
[41] Edwards HM. Bibliographie: mémoires sur les fonctions du système nerveux ganglionnaire par M. Brachet. Arch Gen Med 1823;1:159–60.
[42] Barbara JG, Broussolle E, Poirier J, Clarac F. Figures and institutions of the neurological sciences in Paris from 1800 to 1950. Part II: neurophysiology. Rev Neurol (Paris) 2012;168(2):106–15.

[43] Whytt R. Observations on the dropsy in the brain. To which are added his other treatises never hitherto published by themselves. Edinburgh: Balfour, Auld, & Smellie; 1768.
[44] Paisley J. A hydrocephalus with remarkable symptoms. Medical essays and observations, 3. Society in Edinburgh: Hamilton, Balfour and Neill; 1733. p. 333–41.
[45] Boissier de Sauvages F. Nosologica Methodica sistens Morborum Classes Juxta Sydenhami mentem & Botanicorum ordinem. Amstelodami: Sumptibus Fratrum de Tournes; 1768 [2 vol.].
[46] Cullen W. Synopsis nosologiae methodicae. Edinburgi: apud A. Kincaid & W. Creech; 1772 [2 vol.].
[47] Viets HR. Domenico Cotugno: his description of the cerebrospinal fluid. Bull Inst Hist Med 1935;3(9):701–13.
[48] Magendie F. Sur un liquide qui se trouve dans le crâne et le canal vertebral de l'homme et des animaux mammifères. J Physiol Exp Pathol 1825;5:27–37.
[49] Walusinski O. History of the emergence and recognition of syringomyelia in the 19th Century. Vesalius 2012;18(1):18–29.
[50] Odier L. Mémoires sur l'hydrocéphale interne ou l'hydropisie des ventricules cérébraux. Paris: Mémoires de la Société Royale de Médecine; 1779.
[51] Fothergill J. Remarks on the hydrocephalus internus. In the works of John Fothergill by John Coakley Lettsom. London: Charles Dilly; 1783: 63–76.
[52] Lieutaud J. Précis de médecine pratique. Paris: Chez Théophile Barrois; 1781 [2 vol.].
[53] Collinet LP. Dissertation sur une maladie du cerveau avec quelques réflexions particulières sur la nature et le traitement de cette maladie. Paris: Impr. Denonville; 1802 [Thèse n° 114].
[54] Bricheteau I. Dissertation analytique sur l'hydropisie aiguë des ventricules du cerveau chez les enfants (hydrocéphale interne). Paris: Didot Jeune; 1814.
[55] Coindet JF. Mémoire sur l'hydrencéphale ou céphalite interne hydrencéphalique. Paris & Genève: J.J. Paschoud; 1817.
[56] Itard JG. Hydrocéphale. Dictionnaire des sciences médicales, 22. Paris: Panckoucke; 1818. p. 219–56.
[57] Brachet JL. Mémoire sur les causes des convulsions chez les enfants et sur les moyens d'y remédier. Paris: Béchet jeune; 1824.
[58] Tissot S. Traité de l'épilepsie. Lausanne/FPF: A. Chapuis/ Didot Jeune; 1770.
[59] Baumes JB. Traité des convulsions dans l'enfance, de leurs causes et de leur traitement. Paris: Méquignon l'aîné; 1805.
[60] Maisonneuve JG. Recherches et observations sur l'épilepsie, suivies d'un tableau des genres et des espèces de cette maladie, avec l'indication du traitement qui leur convient. Paris: chez F. Louis; 1803 [Thèse n° 385].
[61] Calmeil LF. De l'épilepsie étudiée sous le rapport de son siège et de son influence sur la production de l'aliénation mentale. Paris: Imp. Didot le Jeune; 1824 [Thèse n° 110].
[62] Bravais LF. Recherches sur les symptômes et le traitement de l'épilepsie hémiplégique. Paris: Imp. Didot jeune; 1827 [Thèse n° 118].
[63] Charcot JM. Leçons du Mardi à La Salpêtrière. Policliniques. 1887–1888. Notes de cours de MM. Blin. In: Charcot et Colin. Paris: Aux Bureaux du Progrès Médical; A. Delahaye et E. Lecrosnier; 1887.
[64] Jackson JH. Unilateral epileptiform seizures, attended by temporary defect of sight. Med Times Gaz 1863;1:588.
[65] Jackson JH. Note on the comparison and contrast of regional palsy and spasm. Lancet 1867;89(205):295–7.
[66] Temkin O. The falling sickness: a history of epilepsy from the Greeks to the beginnings of modern neurology. Baltimore: The Johns Hopkins Press; 1945.
[67] Herpin T. Des accès incomplets d'épilepsie. Paris: JB. Baillière; 1867.
[68] Eadie MJ. The epileptology of Theodore Herpin (1799–1865). Epilepsia 2002;43:1256–61.
[69] Esquirol E. Des maladies mentales considérées sous les rapports médical, hygiénique et médico-légal; accompagnées de vingt-sept planches gravées Ambroise Tardieu (1788–1841). Paris: Chez J.-B. Baillière; 1838 [2 vol.].
[70] Brachet JL. Recherches sur la nature et le siège de l'hystérie et de l'hypocondrie et sur l'analogie et les différences de ces deux maladies. Paris: Chez Gabon; 1832 [178 p.].
[71] Georget E. De la physiologie du système nerveux et spécialement du cerveau. Paris: J.B. Baillière; 1821 [2 vol.].
[72] Edelman N. Les métamorphoses de l'hystérique. Du début du XIXè siècle à la grande guerre. Paris: La Découverte; 2003.
[73] Edelman N, Walusinski O. Socioeconomic background of hysteria's metamorphosis from the 18th century to world war I. Front Neurol Neurosci 2014;35:11–9.
[74] Semelaigne R. « Brachet Jean-Louis ». In: Semelaigne R, editor. Les pionniers de la psychiatrie française avant et après Pinel, 1. Paris: J.B. Baillière; 1930. p. 164–7.
[75] Kaptein AA. Emma Bovary, Hedda Gabler, and Harold Brodkey would not have lived without Charcot: hysteria in novels. Front Neurol Neurosci 2014;35:90–8.
[76] Broussolle E, Gobert F, Danaila T, Thobois S, Walusinski O, Bogousslavsky J. History of physical and 'moral' treatment of hysteria. Front Neurol Neurosci 2014;35:181–97.
[77] Walusinski O. Paul Sollier, Pierre Janet, and their vicinity. Front Neurol Neurosci 2014;35:126–38.
[78] Brachet JL. Traité de l'hystérie. Paris/Lyon: J.B. Baillière/ Savy; 1847.
[79] Landouzy H. Traité complet de l'hystérie. Paris: J.B. et Germer Baillière; 1846.
[80] Bogousslavsky J. Jean-Martin Charcot and his legacy. Front Neurol Neurosci 2014;35:44–55.