



Available online at
ScienceDirect
www.sciencedirect.com

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



History of Neurology

Marin Cureau de La Chambre (1594–1669), a 17th-century pioneer in neuropsychology

O. Walusinski

Cabinet privé, 20, rue de Chartres 28160 Brou, France

INFO ARTICLE

Article history:

Received 13 September 2017
 Received in revised form
 10 November 2017
 Accepted 20 November 2017
 Available online xxx

Keywords:

History of neuropsychology
 Memory
 Emotions
 Soul
 Descartes
 Cureau de la Chambre
 French kings
 Séguier

ABSTRACT

Marin Cureau de La Chambre (1594–1669) was a physician from Le Mans who advised and treated two French Kings, Louis XIII and Louis XIV, as well as his patron, Chancellor Pierre Séguier. As both a physician and a philosopher, he was among the first members of the Académie Française and the Académie des Sciences. His key role in dethroning Latin and using French in its place would have sufficed to ensure his notoriety, as French then became a vehicle for disseminating the sciences throughout Europe. However, it was his interpretation of “the functions of the soul” that made him a true pioneer in the field of neuropsychology, even though he has since been forgotten and overlooked. Indeed, he developed concepts that even today seem contemporary, in particular, concepts dealing with emotions and memory in both animals and human beings.

© 2018 Elsevier Masson SAS. All rights reserved.

In 1664, Marin Cureau de La Chambre (1594–1669; [Fig. 1](#)) made an observation in his book, *Système de l'Âme* (System of the Soul), that remains a driver of neuroscience research today: “The mind of man, so vain and superb, must experience a strange confusion upon realizing that he who is destined to know all things, and who believes himself to know most things in the world, has no knowledge of what he is, nor of what he does, nor of how he goes about it. He arrives at a conception, he judges, he reasons; in a word, he thinks; nevertheless, he would not be able to say what thought is, nor how he thinks” [1].

After a brief overview of his life as a courtier and man of influence, the aim here is to show how his philosophical thinking, which often set him at odds with the thinkers and physicians of his day, was significant enough to qualify him as a neuropsychology pioneer alongside René Descartes (1596–1650), whose ideas, in fact, he did not share.

chology pioneer alongside René Descartes (1596–1650), whose ideas, in fact, he did not share.

1. Chair 36

Valentin Conrart (1603–1675), one of the initial members of the Académie Française and its first *Secrétaire Perpétuel*, was in need of a physician philosopher to complete the official roll of the nascent institution, which had been created by decree of the politician Armand Jean du Plessis, Cardinal Richelieu (1585–1642). On 4 December 1634, Conrart chose Marin Cureau de La Chambre, who became the first occupant of Chair 36 and the first physician academician (the Académie Française

E-mail address: walusinski@baillement.com.

<https://doi.org/10.1016/j.neurol.2017.11.008>

0035-3787/© 2018 Elsevier Masson SAS. All rights reserved.



Fig. 1 – Marin Cureau de La Chambre in 1665 by Antoine Moisson (1636–1700), engraved by Pierre Mignard (1612–1695) (public domain).

comprises 40 co-opted members who hold their offices for life, and each member occupies his own specific chair). At the time, Cureau de La Chambre had only written a preface, and the book in question, a collection of interpretations of hippocratic aphorisms by Gérard Denisot (?1515–1595), was limited to just a small circle of readers [2]. The preface, one of his only texts written in latin, is a mixture of various philosophies and has a curious title: ‘*Nouvelles pensées sur les causes de la lumière, du débordement du Nil, et de l’amour d’inclination*’ (New thoughts on the causes of light, the overflow of the Nile, and on love based on inclination) [3]. Nevertheless, Cureau de La Chambre “quickly established a brilliant reputation by his vast knowledge and his spiritual charm” [4]. To attain prominence in society, he knew how to flatter, such as when he dedicated to Richelieu his *Conjectures sur la digestion* in 1636: “I daresay that nature revealed to me treasures which she had always wished to hide, as if she knew of my plan to present them to you, and sought the honour of disclosing herself before the greatest man she would ever behold” [5].

As an academician, Cureau de La Chambre was a member of an elite referred to as ‘*les immortels*’ (the immortals), although this did not serve to perpetuate the memory of his medical-psychological thinking among physicians. On the other hand, his philosophical debates with, for instance, Descartes ensured his lasting legitimacy among philosophers, as evidenced by an early tribute by Jean Chapelain (1595–1674) in 1669: “He is an excellent philosopher and his writings are pure of language, exact of design, elaborate of ornament, and

subtle of reasoning” [6]. Pierre Bayle (1647–1706) was no less effusive, declaring Cureau de La Chambre to be “the finest French writer amongst physicians” [7].

2. From the province of Maine to the court of King Louis XIII

Cureau de La Chambre was born a commoner and this, along with the lack of parish registries, may explain the approximations as to his date and place of birth. He was probably born near Le Mans, in western France, in Saint-Jean d’Assé (or Saint Jehan d’Assée) around 1594 [8]. While there are many with the name of ‘Cureau’ in the registries, he was the first to be known as ‘Cureau de La Chambre’, which suggests he was ennobled by King Louis XIII for services rendered. A 1646 notarized act describing the sale of land appears to confirm this: ‘*Maître Marin Cureau de la Chambre, écuyer, sieur de La Chambre, conseiller du Roi, médecin ordinaire de sa Majesté et de la Grande Chancellerie*’ (Master Marin Cureau, squire, Sieur de La Chambre, advisor to the King, physician of his Majesty and of the Royal Chancellery of France). The place named ‘La Chambre’, which Marin inherited from his father, was simply a large bourgeois dwelling in the middle of his village; the home was, however, spacious enough to be converted into a religious school for girls in 1835 [9]. La Chambre was thus an adjunct name that distinguished him within “l’innombrable tribu des Cureau” (the immense Cureau tribe), which included Cureau de Lambossière, Cureau de Roullée, Cureau de La Moustière and other place names. This adjunct name conferred ‘nobility of the robe’, as established by royal letters issued by King Louis XIII on 15 October 1640 [10].

After studying medicine at the Montpellier Faculté de Médecine, the reputation of which was far superior to its counterpart in Paris at the time, Cureau de La Chambre first practised medicine in Le Mans. In 1629, he married Marie Duchesne, the daughter of a physician who was part of a vast medical dynasty. “By allying himself with these tribes of physicians who had formed a powerful corporation through arranged marriages, Marin Cureau ensured for himself a successful career.” His first son, François (1630–1680), was born in Le Mans, and would also become a court physician and an academician [11].

Leveraging his medical relations in Le Mans and forging connections within the court of King Louis XIII, Cureau de La Chambre became an advisor to Pierre Séguier (1588–1672), president of the Parlement of Paris [12]. He quickly fell under Séguier’s protection and became his personal physician. He then brought his family to Paris and was never to return to the province of Maine. Pierre Séguier “wanted to keep Cureau de La Chambre in his immediate entourage, not only because he was an excellent physician, but also because he was a consummate philosopher and man of letters. Cardinal Richelieu was of the same opinion and held him in singular esteem” [13].

Cureau de La Chambre was unfailing in his devotion to Séguier, a magistrate and his powerful protector, for 35 years, living in a small residence contiguous with the south wing of Séguier’s sumptuous mansion—the Hôtel Séguier, formerly Hôtel de Bellegarde, built in 1612 and considerably enlarged by

Séguier. After the death of his widow, it became the Hôtel des Femmes du Roi and housed the king's mistresses. Situated on Rue de Grenelle Saint-Honoré in Paris (now 15 rue du Louvre) in the first arrondissement, at some point in the 18th century, it was razed to the ground. During this time, Séguier was appointed *Gardien des Sceaux et Chancelier de France* (Minister of Justice and Chancellor of France) in 1633. This made him the second highest official of the State. On 16 January 1635, Séguier became a member of the Académie Française, which had convened in his mansion from its very first sessions. He occupied Chair 16 and became the body's protector in 1643, after the death of Richelieu [14]. Séguier died 3 years after his physician, at 84 years of age, which seems to justify his confidence in Cureau de La Chambre as a physician. As noted by Gédéon Tallemant des Réaux (1619–1692), “the Chancellor, though he is devout, enjoys the company of ladies, he pays his demoiselles with payable orders, but as his loins trouble him sometimes, La Chambre treats him with authority and is worthy of trust” [15].

As *Médecin de Monseigneur le Chancelier* (Physician to Monseigneur the Chancellor), Cureau de La Chambre soon gained access, much to his delight, to the salons of Mademoiselle Madeleine de Scudéry (1607–1701) and of Madame Madeleine de Souvré, Marquise de Sablé (1599–1678). These women were known as the ‘*Précieuses*’, to whom Molière’s mocking term, “*Précieuses ridicules*”, was not yet applicable. Their salons attracted writers, musicians and “*beaux esprits*”. A royal edict issued on 15 May 1635 created a medicinal garden, *Le Jardin des Plantes Médicinales du Roy* (The Royal Garden of Medicinal Plants) [16,17]. Three “pharmaceutical demonstrators and operators” were appointed. “By a one-time formal waiver”, which was indispensable for a graduate of the Montpellier medical school, one of these positions fell to Cureau de La Chambre. An ordinance tasked him with carrying out “visual and manual demonstrations for all surgical operations of any sort” [18]. While there is no trace of the classes he may have taught, according to Ernest-Théodore Hamy (1842–1908), the position held by Cureau de La Chambre more than 100 years before it was held by Georges-Louis Leclerc de Buffon (1707–1788), became the Chair of Anthropology [19] which, in 1855, Jean Louis Armand de Quatrefages de Bréau (1810–1892) was the first to hold.

3. A notable close to those in power

Cureau de La Chambre was accorded the honor of delivering Richelieu’s eulogy in 1642, an honor he owed to his connections with those in power, which was all the more reason for Richelieu’s successor, Cardinal Jules Raymond Mazarin (1602–1661, Giulio Raimondo Mazzarini) to place his trust in Cureau de La Chambre, as did also the superintendent of finances Nicolas Fouquet (1615–1680). Cureau de La Chambre successively wrote an epistle for each of these high-ranking men, which he included as a header in his books [18]. In May 1650, he bought the office of Physician to the King. Starting in 1664, Jean-Baptiste Colbert (1619–1683) granted him the substantial pension promised by Fouquet, whose disgrace had cancelled the payment. Then, in 1666, Colbert appointed Cureau de La Chambre a member of the Académie des



Fig. 2 – Tombstone bas-relief in marble of Marin Cureau de La Chambre, sculpted by Jean-Baptiste Tuby (1635–1700), Saint-Eustache church in Paris (photograph taken by the author).

Sciences that he had newly created. While there is no documentation to indicate how involved Cureau de La Chambre was in the medical care of King Louis XIV, according to Pierre-Antoine de La Place (1707–1793), there was secret correspondence between the monarch and Cureau de La Chambre, who served more as advisor than physician. The king was still very young when *La Fronde* (a series of civil wars) took place, but he was nonetheless affected by the turpitudes of those wars. Because he trusted Cureau de La Chambre, who was his elder and also a skilled physiognomist (Fig. 2), the king always sought his counsel before appointing a position or function. As Cureau de La Chambre wrote in the preface to his 1660 book, *L’art de connoistre les hommes* (The art of understanding men): “Nature has not placed a window before the heart enabling it to see the thoughts and intentions of men” [20]. La Place claimed to have read the following in the correspondence between physician and king: “If I die before his Majesty, he is at risk of making many poor choices”, to which La Place added: “What is even more singular is that the accuracy of this prediction has apparently been borne out many times over” [21]. However, Cureau de La Chambre’s prestige was probably the result of his books, which are examined below in greater detail.

Cureau de La Chambre died on 29 December 1669 and was buried at a Paris church, Église Saint-Eustache, at the foot of one of its pillars. His sons had a white marble gravestone erected, ornamented with a bas-relief (Fig. 3). This gravestone was designed by Gian Lorenzo Bernini (known as Le Bernin,



Fig. 3 – Frontispiece engraved by Laurent de La Hire (1606–1656): the Master reveals to his pupils the heart where the “Passions” burn (private collection of the author).

1598–1680) and executed by Italian sculptor Jean-Baptiste Tuby (born Giambattista Tubi, 1635–1700) [22] who, at the time, was highly esteemed by the royal court, where he worked with Antoine Coysevox (1640–1720).

Cureau de La Chambre was known in the royal court for his probity, a trait possessed by very few there. Guy Patin (1601–1672) paid him this tribute: “Master de La Chambre died at the age of 73; he was one of the first and most eminent members of the Académie Française not only because of his doctrine, which was far from common, but also because he had earned the trust of the Chancellor. He was thus obliging and beneficent to those whom he served and to those who had business with the chancellery” [23].

4. A selection of his writings: modernity and traditions

Cureau de La Chambre’s correspondence bears witness to his desire to innovate and give free range to discussion. This set him at odds with the scholasticism taught at universities, based as it was on the immutable dogmas of ancient authors. He was not afraid “of reproach if new paths are sought, if other guides are chosen, or if Aristotle and Galen are abandoned entirely, as they abandoned those who proceeded them [...] Philosophy and the world have become aged; what is called antiquity was a time of

childhood and youth; after so many experiences and centuries of aging, it would be unreasonable to call on antiquity to speak as it had during its first years, or to allow it the weaknesses of the opinions held during those early times” [24].

In 1636, Cureau de La Chambre published his first work, *Les conjectures sur la digestion* [5], dedicated to Richelieu. He wrote in French, mocking Latin and those who used it: “Seeing this language as foreign and vagabond, which it is in every place, seeing it as dead, which it is, seeing it usurp the empire of science and literature, I have often imagined that Latin must be the shadow and the phantom of old tyrants, who rise from their tombs to triumph over the liberty of our speech and our thoughts” [5]. In fact, the gradual disappearance of publications in Latin, amounting to a break with university tradition, became acceptable once Cureau de La Chambre the *Académicien* (member of the Académie Française and the Académie des Sciences) had published his book: “The author wrote in French, discussing in everyday language those questions of science which, until that point, had been formulated in a barbarous Latin, almost constantly inaccessible for most readers, such that our author is worthy of thanks for having broken with an outdated tradition” [18]. One of the first to benefit from this innovation was Descartes. Cureau de La Chambre’s book paved the way for him; one year after its publication, in 1637, Descartes published his famous *Discours de la méthode* [25]. Yet, in 1665, Cureau de La Chambre made an exception to his own rule: while preparing a new reading of Hippocrates and Aristotle to be submitted to the Paris medical school “for its edification”, he resorted to writing it in Latin [26].

In keeping with the title *Nouvelles conjectures sur le digestion* (New conjectures on digestion), Cureau de La Chambre developed, but did not attempt to prove, a theory that can be considered chemical: “Since Spirits have a dissolvent virtue, due to their acuity and subtlety, by which they penetrate and seep into foodstuffs, by which they separate the different parts, refine coarse material, liquify solid material [...]” [5]. In other words, digestion involves the chemical fermentation of food, which is then converted into blood. Cureau de La Chambre’s clear-sighted vision of medicine is immediately apparent in his conclusions: “With regard to Medicine, it is common knowledge that managing medical action is fraught with difficulties, that disorders for which the true causes are unknown and numerous, and that the remedies used to treat them offer little assurance” [5].

Cureau de La Chambre also set himself apart from the University by defying Guy Patin who, in turn, counted him “among the circulators”, due to his acceptance of the recent theory of blood circulation advanced by William Harvey (1578–1667). As Cureau de La Chambre wrote: “We do not wish to fight against this circulation, and although it involves significant difficulties, one can nonetheless ascertain that it is veritable, and that it in fact occurs, even if it does not do so in the manner in which they say it does” [20].

5. Emotions, ‘characters of the passions’ and ‘system of the soul’

Cureau de La Chambre’s second scientific work and his most well known, *Les caractères des passions* [27], was first published

in 1640, and would be revised and expanded over six successive editions until 1662 [28]. In this book, Cureau de La Chambre sought to “examine the passions, the virtues and the vices, the customs of peoples, the various inclinations of men, their temperaments, the traits of their faces; in a single word in which I claim to include that which in medicine, morality, and politics is the rarest and the most excellent”. Numerous authors writing about physiognomy copied from one another, starting in the 13th century and continuing into the 18th century with the famous work of Johann Kaspar Lavater (1740–1801). All of them hoped to provide the keys for transforming the perpetual mythic dream of determining another’s character, or even knowing another’s life, into objective data so that those who lied to improve their social position, particularly courtiers, could be unmasked. As for Cureau de La Chambre, he distanced himself from divinatory superstitions such as metoposcopy, developed by the Italian Gerolamo Cardano (1501–1576, Cardan in French) [29], “*la phisionomie naturelle*” or the chiromancy of Bartolomeo della Rocca (1467–1504) [30], and the chiromancy of the Italian Giambattista della Porta (1535–1615) [31].

These belief systems included such superstitions as believing that a man with a pointy nose was crafty like a fox. What set Cureau de La Chambre apart was the distinction he made between human behaviors and instincts (see below). He drew upon the work of Nicolas Coëffeteau (1574–1623) [32] and of Jean-François Senault (1599–1672) [33], as well as the *Traité de la phisionomie* (Treatise of physiognomy) by Guy de La Brosse (1586–1641) [34], available only in manuscript form [35]. This manuscript was kept by Séguier himself in his mansion, which was reputed to hold the largest library in Paris at that time, second only to Mazarin’s [36]. In 1660, Cureau de La Chambre pursued his own approach with the publication of *L’art de connoistre les Hommes* (The art of understanding men) [20], in which he developed his notions of physiology. In 1665, he added *Le système de l’âme* [1] (The system of the soul), which contains chapters on memory that are still conceptually relevant today.

According to Cureau de La Chambre, thoughts were no longer to be read in the wrinkles of the face (metoposcopy), but rather in the expression of individual behaviors and reactions with which one responds to different situations. These expressions were physiognomic signs or ‘passions’, and can be considered the precursors of psychological concepts [37]. The physician Jean Brouaut (1558–?16–) expressed his own esteem and that of his contemporaries for Cureau de La Chambre: “Your books teach me every day that your understanding of what happens inside of ourselves is too perfect for me to dare attempt anything else but to compliment you [...] You have given us in these works a library of Nature, a Mirror that speaks of man, both inside and out [...] By the strength of your Characters, man’s heart, this industrious Proteus that becomes its own abyss when it tries to hide itself, appears so naïvely on the face that it can no longer disguise the natural Intelligence between heart and visage. That is where Love and Hate, Pain and Joy, Gentleness and Cruelty, Courage and Fear, that is where all Passions are portrayed in their natural state” [38].

While Cureau de La Chambre was innovative in his use of French and his preference for objective examination over divinatory practices, he continued to pledge allegiance to the

philosophy of Aristotle (384 BCE–AD 322) to explain the physiology of the behaviors he described, including, for example, the movement of “*des esprits animaux*” (animal spirits) and “*des Humeurs*” (humors) [39]. The ‘animal spirits’ that circulate in the blood and nerves are subtle bodies, aerial or igneous, almost incorporeal and, thus, are the links between soul and body. They are instruments of organic function because they hold natural heat, and this explains why they are instruments of the soul in the movement of the passions, although such finalistic and circular reasoning was rejected by Descartes. Cureau de La Chambre based his thinking on the extraction by chemists of subtle parts from certain bodies, resulting in spirit of ‘nitre’ and spirit of wine, the products of distillation. Walther Riese (1890–1976) saw Cureau de La Chambre’s thinking as “medical understanding that combines physiological understanding and faith in a curious way” [40]. Once he had described and explained the corporeal expressions of the ‘passions’, Cureau de La Chambre situated their origins not in the brain, but rather in the heart (Fig. 4): “The movement of the Heart is for the Spirits, the movement of the Spirits is for the entire body. The heart moves to produce and conserve them; and they in turn move to communicate vital heat to all parts, to provide them with nourishment, and to transport the humors from place to place according to what the Soul deems necessary; this occurs with the Passions and with crises and other occurrences” [27].

Thus, ‘*les esprits*’ (the spirits) are instruments of the soul used without distinction for all functions that we would attribute to the nervous system, including physiognomic signs that “*s’échouant sur le visage*” (end up on the face as expressions). With the explanation for internal phenomena thus dispatched, thereby obscuring the epistemological obstacles ‘*des esprits*’ (of spirits) present in either the blood or nerves, primacy is given to visible, external manifestations [41]: “What is certain is that the body is altered and changed when the soul is moved, and the soul in all of her actions impresses the marks thereof on the body; these marks can be called the characters, because they are the effects of the soul, and they carry her image and contours. There are two appetites in man, the sensitive and the intellectual, the latter being the will. All actions of the sensitive appetite are called passions, to the extent that the soul is agitated by them and that the bodies perceptibly suffer and change in her movements.”

This explanation of the ‘passions’ can be understood as a physiological conceptualization of emotions: “The recognition of the object, the movement of the appetite that follows this recognition, and the feeling that the soul experiences” [27]—these phenomena can be understood as the perception that triggers recognition, the resulting autonomic nervous phenomena and conscious interpretation. Thus explained, the passions can be seen as similar to the premises of the theory developed independently between 1880 and 1890 by William James (1842–1910) and Carl Lange (1834–1900) [42], to which Antonio Damasio, Joseph E. Le Doux and Robert Plutchik returned in the 1990s, using such terms as ‘somatic markers’ of emotions [43]. Motor and somatosensory reactions associated with past emotional events are reactivated, consciously or unconsciously, when a new event occurs, with all its associated cognitive representations [44].



Fig. 4 – Frontispiece showing Cureau de La Chambre, the author, as a physiognomist (private collection of the author).

Cureau de La Chambre offered the following as justification: “These actions are common to soul and body, and medicine and moral philosophy must support one another to speak in an exact manner, whereas those who have wished to take up this matter have not been able to use both fields.” But being both a physician and a philosopher, Cureau de La Chambre could indeed draw upon both fields, unlike Descartes, at whom his words were subtly targeted [45]. In fact, the terms he used warrant a closer look. “*Le corps*” (the body) can be understood through interoception (emotions and the autonomic nervous system) [46], whereas the soul corresponds to what is felt and to affective expression or the psyche. The following explanation of laughter exemplifies the psyche: “For laughter, although it seems to be a particular effect of Joy, it does not always occur with her. And when it accompanies Joy, laughter does not owe its occurrence to Joy alone; there are other causes that play a role and excite in the soul an emotion other than pleasure. This is why we do not fear to call it a passion, as we do not consider the outer movement alone, what appears on the face, but also the movement that the soul

suffers within.” The body has its own language, independent of speech and of any lie expressed by speech. Cureau de La Chambre provided keys for decoding this language objectively: “The causes and effects serve as signs for the art of which we speak.” He linked a physical, causal order with a semiotic, qualitative one, the true language of physiognomy [47]. He also noted that, “instead of demonstrations which do not exist in these matters, I have resorted to conjectures and probable reasons”.

6. Knowledge and memory

“Knowledge is the proper and only function of the sensitive soul and the reasonable soul, because feeling, conceiving of ideas, judging, and reasoning are nothing other than knowing” [27]. There is no knowledge without memory: “Memory is an abyss of which the capacity is limitless and without measure; the more it fills, the more space it has to hold whatever new comes to it. Memory never grows weary of receiving, and it can be considered among those things that never say ‘enough’” [1]. Like animals, human beings think and reason based on what they perceive. Perception precedes reasoning which, in turn, triggers action: “The sensitive soul is beneath the reasonable soul [...] The actions of understanding start and are as sketches in the actions of the sensitive soul. Thus, it is that understanding comprehends things, which it judges, if it is aware of the consequences; this necessitates that something occurs in the Sensitive Soul that serves as a pencil for these actions, whereby certain images of this reasoning are recognizable” [48]. In addition, “a truth that must always be considered constant is that understanding and imagination always work together to form knowledge” [1].

But “how are memories made? What is the order and situation of Images that are preserved in the memory? How is it that we remember one image rather than another? How do we forget them? How do we remember forgetting them? Finally, has memory explained the manner in which the soul moves the body? What is the influence that the brain allows to flow through the nerves to give movement to the body’s parts? What is the purpose of the animal spirits? And this most admirable thing: how is the soul, unaware there are muscles, and knowing none of them, able to choose among them so precisely those appropriate to the movement she proposes, never erring in her choice, and never mistaking one for the other” [48]. All of these questions remain of interest today. Below are some of the answers that Cureau de La Chambre offers us.

“The soul knows things; she makes images and portraits of them”—thus, perception is followed by the storage of information in the form of images. “It seems that there are banks and galleries where all things of the same order are placed, that there are even theatres where some things can be seen from all sides, and hiding places where others are locked away” [1]. It is in the brain that “memories are formed” and that “diseases of this part injure memory”. Furthermore, “because the ventricles are empty spaces”, memory cannot reside in them, but Cureau de La Chambre situated memory at the back of the head, especially “in the small brain”—that is, in the cerebellum—even though “the more brains there are, the

more space there is to house images". Moreover, Cureau de La Chambre's thoughts about memory deficiencies resulting from disease strike a very contemporary note: "All of the images in the memory must be material, since disease erases them all." But, he adds: "These images do not remain only in the head; they flow through every nerve, and in this way spread throughout the body." Also, here is how he explained our concept of procedural memory: "Custom consists of several reiterated actions which leave in the powers a certain ease and promptitude to operate that these actions did not possess previously [...] this is why one should not be surprised to have memory at one's fingertips, which often replaces that of the head." Memory is not fixed; it reorganizes itself. Mental images, which Cureau de La Chambre considered the substrate of memory, "contract, extend, lengthen or shorten according to the actions undertaken and this is the source of the lassitude that follows long and significant applications of the Mind". Cureau de La Chambre also distinguished between a sensitive memory, shared by both human beings and animals, and a 'spirituelle' (spiritual) memory, the depository of "images de l'entendement" (images of understanding), a part of the Soul that, in some sense, survives the body, whereas "the sensitive memory is corrupted along with the body". As for the innermost nature of spiritual memory: "I conjecture it to be a spiritual substance, indivisible and immortal, and in no way do I wish to weaken by my demonstrations with a truth that religion has established, yet I seek to know its situation, its contours, its magnitude, and its movements" [48].

Memories are composite: "Once an object has imprinted its species in the organ of a given sense, imagination being excited by this forms in itself another image that resembles a new copy of the original it has before it; or, to put it more aptly, this species serves it as a model on which it bases a figure that has the same traits, but also a being and a nature more noble and excellent than the original, and this is commonly called a phantasm." These phantasms acquire the property of being able to combine with one another. Cureau de La Chambre does not, of course, distinguish explicitly between semantic memory (what he calls 'images') and episodic memory (he speaks of circumstances and situations), but he nevertheless comes close: "The faculty of knowledge must not only form the Image of the thing known, but also the action it performed to know this thing." He also has a clear view of memory recall: *L'esprit* (the mind) must "seek out where it is [the image], and the more it is far away or hidden in the folds of the brain, the more the mind struggles to find it" [48].

Cureau de La Chambre did not fail to highlight the fact that "on se souvient de n'estre pas souvenu ; il faut alors que l'oubli soit dans la mémoire" (one remembers being unable to remember; forgetting must then lie in memory). In this case, how does the reactivation of memory work? "A forgotten thing can be remembered in one of two ways: firstly, when the mind seeks it directly without using any means that could bring it into view [...] This applies to remembering a forgotten word from a speech; one returns to the period of its beginning, in order that what follows recalls the word to memory, because the mind goes straight in without detour." The notion of cued recall is made explicit: "The other way of remembering a forgotten thing is when the mind, being unable to find it by the first way, uses detours, and considers things that have some relation

and accord with the forgotten thing so that the latter is brought back by these other things even without the original memory [...] Remembering accidents and circumstances bring objects back to memory when they have been forgotten [...] And this form of oblique memory is veritable reminiscence, which can be defined by saying that a thing forgotten is remembered by means of the circumstances that accompanied this thing" [48].

After laying out his arguments so effectively, Cureau de La Chambre did not fail to anticipate those who might contradict him: "We can say that in the land of conjectures, one has the liberty to advance speculations and to present reveries as truths." He was indeed contradicted in his explanation of how animals perceive, feel, imagine and thus reason, mirroring human beings in this respect. A physician from the city of La Rochelle, Pierre Chanet (1603–?16–), denied all of Cureau de La Chambre assertions in a 1646 book, *De l'instinct et de la connoissance des animaux* (On the instinct and knowledge of animals) [49]. Chanet argued that instinct is predominant in animals and that they act by automatisms without the faculty of reason [50]. Cureau de La Chambre took this minor work by an unknown provincial as an affront and, in turn, refuted Chanet's demonstration, using an element of the latter's title [51] in the title of his own book, *Traité de la connoissance des animaux où, tout ce qui a esté dit pour, and contre le raisonnement des bestes, est examiné* (Treatise on knowledge in animals in which everything said for and against the reasoning of animals is examined), published in 1664 [52]. Having read Pierre Charron (1541–1603) and the *Apologie de Raymond Sebond* by Montaigne, Cureau de la Chambre developed an argument in this treatise to validate the concept of reasoning in animals. He thereby reattributed the faculty that Descartes had eliminated and that Chanet had denied in his forthright reply: "As for instinct, this is the most ordinary refuge for those who in no way wish to acknowledge reasoning in animals; for them, Instinct is a holy or magical word, with which they believe they can fascinate minds and stop all of the reasons used to refute them" [52]. To his credit, Cureau de la Chambre did not reduce instinctive actions to immutable, rigid mechanisms, a stance he justified in the final chapter by positing the existence of "animal language": "All animals with a voice use it to signal their desires; according to their various forms, they have cries and accents that pleasure or pain, hope or fear inspire in them" [52].

In addition to the auditory messages produced by animals, they are also capable of behavioral language. Indeed, Cureau de la Chambre's comparison of animal language with human language led to a long discussion on speech, which he defines by criteria more fundamental than simple auditory articulation. His treatise became a source of inspiration for Nicolas Malebranche (1638–1715) in his book *De la recherche de la vérité. Où l'on traite de la nature de l'esprit de l'homme, & de l'usage qu'il en doit faire pour éviter l'erreur dans les sciences* (On the search for truth, which deals with the nature of the mind of man, and its proper use to avoid error in the sciences) published in 1674: "Nothing is more evident than the fact that all creatures are particular beings and that reason is universal and shared by all minds." The underlying debates, recurring over the centuries, and Cureau de La Chambre's *Discours de l'amitié et de la haine qui se trouvent entre les animaux* (On the friendship and hatred

found among animals) [53], also justify placing him amongst the initiators of ethology.

7. By way of conclusion

Cureau de La Chambre explored numerous themes in his flamboyant and multiform works in which joy, sadness, language and pain are notable examples. The autonomic nervous system was not unknown to him: “Do the body and the mind communicate between themselves the good and the ill that they feel? On this matter, the mind, which is the noblest and most excellent part of man, is also like the king of this little monarchy, paying attention to the most considerable things that occur and taking particular care with the body, as it is the instrument of most of the mind’s actions, and as it combines with the mind to produce a whole, the subsistence and conservation of which concerns the mind as much as its own.” Yet, it is clear that the works of Descartes unfairly eclipsed those of this author [54]. Descartes disdained Cureau de La Chambre partly because of his close ties to the powerful and also because of his Aristotelianism. Cureau de La Chambre reworked a theory of the will and movement in living beings which he termed “the appetites” and which consisted of three degrees: the natural appetite in plants; the sensory appetite in animals; and the rational appetite, or will, in humans. Human beings combine these three appetites and, in this way, are superior to plants and animals; this also provides a vivid explanation for the global and diffuse soul that is active in all of its parts. Descartes proposed a conception of human beings whereby the material soul and immaterial soul are separate; this laid the groundwork for man as machine. The spiritual entity is pure thought. By contrast, movement, reproduction, sensory activity, speech and the passions are phenomena that reason can explain and are thus material, just as a machine is material. What separates the two conceptions is the problem, unsolvable for each, of explaining the interaction between soul and body.

Another of his contemporaries, Patin, also mocked Cureau de la Chambre: “The author speaks french very well, but aside from the purity of his style, he offers little more than babble: *Vox, præterea nihil*; the voice and nothing else; such is the character of the Nightingale. The century will not leave these trifles to be admired” [55].

Setting these disparaging remarks aside, we nevertheless share the opinion of Jean-Louis Guez de Balzac (1597–1654), who described Cureau de La Chambre in the following terms in a letter dated 15 September 1645: “There is no corner or hiding place in the human mind that you have not explored; therein nothing is empty or secret enough to escape the subtlety of your vision, and of such things you bring news that is very faithful and assured. Once can thus say, without saying too much, that you are a philosopher ahead of others” [56].

Funding

No funding was obtained for this work.

Disclosure of interest

The author declares that he has no competing interest.

REFERENCES

- [1] Cureau de La Chambre M. Le système de l’âme. Paris: J. d’Allin. 1664; Fayard; 2014, <http://www.corpus-philos.fr/cureau-systeme-ame.html>.
- [2] Deniset G. *Aphorismi versibus Graecis et Latinis expositi*. Apud Fiacrium Dehors: Parisiis; 1634.
- [3] Cureau de la Chambre M. *Nouvelles pensées sur les causes de la lumière, du débordement du Nil, et de l’amour d’inclination*. Paris: Chez Pierre Rocolet; 1634.
- [4] Panckoucke CLF. *Dictionnaire des sciences médicales*. In: *Biographie médicale*. Paris: Panckoucke. T3; 1821.
- [5] Cureau de La Chambre M. *Nouvelles conjectures sur la digestion*. Paris: Chez Pierre Rocolet; 1636, <http://www.biusante.parisdescartes.fr/histoire/medica/resultats/?cote=05567&do=chapitre>.
- [6] <http://www.academie-francaise.fr/les-immortels/marin-cureau-de-la-chambre>.
- [7] Bayle P. *Dictionnaire historique et critique*. Chez Reinier Leers: Rotterdam; 1697.
- [8] de Kerviller R. Marin et Pierre Cureau de La Chambre. *Rev Hist Archeol Maine* 1877;2:29–78 [131–182].
- [9] Coutard A. *Notes inédites sur Marin Cureau de La Chambre*. *Rev Hist Archeol Maine* 1891;30(2):253–6.
- [10] Parrain de Samainville PA. *Code de la Noblesse française ou précis de législation sur les titres la manière d’acquérir ou de perdre la Noblesse, les Armoiries, les livres, la particule avec des notes par un ancien Magistrat*. Paris: Chez les Principaux Libraires; 1860.
- [11] Hazon JA. *Notice des hommes les plus célèbres de la Faculté de Médecine en l’Université de Paris*. Paris: Chez Benoît Morin; 1778.
- [12] Nexon Y. *Le chancelier Séguier (1588–1672), ministre, dévot et mécène au Grand Siècle*. Champ Vallon: Paris; 2015.
- [13] Pélisson-Fontanier P, Olivet PJ. *Histoire de l’Académie Française depuis son établissement jusqu’à 1652*. Paris: Chez Jean-Baptiste Coignard fils, imprimeur du Roi, and de l’Académie Française; 1729.
- [14] Kerviller R. *Le Chancelier Pierre Séguier, second protecteur de l’Académie Française*. Paris: Didier et Cie; 1874.
- [15] Monmerqué LJ, de Chateaugiron H, Taschereau JA. *Les historiettes de Tallemant des Réaux : mémoires pour servir à l’histoire du XVII^e siècle*. Paris: Alphonse Levasseur; 1834.
- [16] *Edict du Roy pour l’Etablissement d’un Jardin royal des Plantes médicinales, avec confirmation des Officiers du dit Jardin, du 15 may 1635*. Archives nationales
- [17] de La Brosse G. *Description du Jardin royal des plantes médicinales, estably par le Roy Louis le Juste, à Paris, contenant le catalogue des plantes qui y sont de présent cultivées, ensemble le plan du Jardin*. Paris; 1636.
- [18] Doranlo R. *La Médecine au XVII^e siècle : Marin Cureau de La Chambre, médecin philosophe (1594–1669)* [Thèse Paris n° 26]. imp Jouve; 1939.
- [19] Hamy ET. *Les débuts de l’anthropologie et de l’anatomie humaine au Jardin des plantes : Marin Cureau de La Chambre et Pierre Dionis, 1635–1680*. *Anthropologie* 1894;5(17):257–75.
- [20] Cureau de La Chambre M. *L’art de connoistre les hommes*. Amsterdam: Iacques le Jeune; 1660, <http://www.biusante>.

- parisdescartes.fr/histoire/medica/resultats/?cote=07932B&do=chapitre.
- [21] de La Place PA. Pièces intéressantes et peu connues pour servir à l'histoire. Bruxelles: Prault; 1781.
- [22] Hamy ET. Note sur un médaillon de J.-B. Tuby représentant le portrait de M. Cureau de la Chambre, démonstrateur au Jardin Royal (1635–1669). *Bull Museum Hist Nat* 1895;1(6):229–32.
- [23] Lettres choisies de feu M. Guy Patin, Docteur en Médecine de la Faculté de Paris, et Professeur au Collège Royal. Dans lesquelles sont contenues plusieurs particularités historiques sur la vie et la mort des sçavans de ce siècle, sur leurs écrits, & plusieurs autres choses curieuses depuis l'an 1645 jusqu'en 1672. Cologne, Chez Pierre Du Laurens. 1692
- [24] Cureau de la Chambre P. Recueil des epistres, lettres et préfaces de Monsieur de La Chambre. Paris: Chez Claude Barbin, vis à vis de la Sainte Chapelle, au Signe de la Croix; 1664.
- [25] Descartes R. Discours de la méthode pour bien conduire la raison et chercher la vérité dans les sciences, plus la dioptrique, les météores et la géométrie qui sont des essais de cette méthode. Leyde: De l'Imprimerie Ian Maire; 1637.
- [26] Cureau de La Chambre P. *Novae methodi pro explanandis Hippocrate et Aristotele specimen, clarissimis scholae Parisiensis medicis*. Parisiis: Apud P. Rocolet Typographum in Palatio; 1655.
- [27] Cureau de La Chambre M. *Les Caractères des Passions*. Paris: Chez P. Rocolet; 1640.
- [28] Cureau de La Chambre M. *Les caractères des passions; 1662*, <http://www.biusante.parisdescartes.fr/histoire/medica/resultats/?cote=07934A&do=chapitre> [Volume I 1640, volume II 1645, volume III 1659, volume IV].
- [29] Cardan J. *La Métoposcopie comprise en treize livres et huit cens figures de la face humaine, à laquelle a été ajouté le Traicté des marques naturelles du corps ; par Melampus... le tout traduit en françois par le sieur C.M. de Laurendière*. T. Jolly: Paris; 1658.
- [30] della Rocca B. Excellente chiromancie monstrant par les lignes de la main les moeurs et complexions des gens, selon les figures qui y sont dépeintes : avec un petit traité de la vraie phisionomie naturelle. Lyon: Benoist Rigaud; 1582 [Translated by André Corve Mantouan].
- [31] dela Porta G. *De Humana physiognomoniam*. Hanoviae: P. Fischeri; 1593.
- [32] Coëffeteau FN. *Tableau des passions humaines, de leurs causes, et de leurs effets*. Paris: En la boutique de Nivelles, chez Sebastien Cramoisy, ruë Saint Jaques, aux Cicognes; 1620.
- [33] Senault JF. *De l'usage des passions*. Chez la veuve J. Camusat et Pierre Le Petit: Paris; 1641.
- [34] de La Brosse. « *Traicté de la Phisionomie, par Mr de La Brosse* ». Bibliothèque nationale de France. Département des manuscrits (site Richelieu), 103 feuillets. Séguier-Coislin. Ancienne cote Saint-Germain français 1912, actuellement Français; 1995.
- [35] Mousnier R. *Lettres et mémoires adressés au chancelier Séguier (1633–1649)*. Paris: PUF; 1964.
- [36] *Bibliographia Parisina, hoc est, Catalogus omnium librorum Parisiis annis 1643 & 1644*. Parisiis, Sumptibus Roleti Le Duc; Apud Sebastianum Cramoisy et Gabrielem Cramoisy; Ex Officina Cramosiana. 1645-1651
- [37] MacLean I. *Logic, Signs and Nature in the Renaissance*. Cambridge-UK: Cambridge University Press; 2002.
- [38] Brouaut J. *Traité de l'eau de Vie ou anatomie théorique et pratique du vin*. Paris: Chez Jacques de Senlecque; 1646.
- [39] Eckhert MET. *Astrology and humors in the theory of man: the work of Marin Cureau de La Chambre and their importance in the cultural evolution of the seventeenth century* [Doctoral Thesis of Mary Ellen Eckhert. The University of Arizona; 1975, <http://hdl.handle.net/10150/565329>].
- [40] Riese W, Cureau de La Chambre. *La théorie des passions à la lumière de la pensée médicale du XVII^e siècle*. *Confinia Psychiatria* 1965;8:19–27.
- [41] Darmon A. *Les corps immatériels, esprits et images dans l'œuvre de Marin Cureau de La Chambre (1594–1669)*. Paris: Librairie philosophique J. Vrin; 1985.
- [42] Cannon WB. *The James-Lange theory of emotion: A critical examination and an alternative theory*. *Am J Psychol* 1927;39:106–24.
- [43] Plutchik R. *Emotions and Life, Perspectives from Psychology, Biology and Evolution*. Washington: American Psychological Association; 2003.
- [44] Cameron OG. *Visceral Sensory Neuroscience*. New York: Oxford University Press; 2002.
- [45] Percival M. *The Appearance of Character, Physiognomy and Facial Expression in Eighteenth Century France*. London: W.S. Maney and Son; 1999.
- [46] Barrett LF, Simmons WK. *Interoceptive predictions in the brain*. *Nat Rev Neurosci* 2015;16(7):419–29.
- [47] Azouvi F. *Remarques sur quelques traités de physiognomonie*. *Etudes Philos* 1978;4:431–48.
- [48] Cureau de La Chambre M. *Les Caractères des passions, Vol. 2*. Paris: Chez Pierre Rocollet; 1646.
- [49] Chanet P. *Traité de la Connaissance des animaux où, Tout ce qui a été dit pour, et contre le raisonnement des bestes, est examiné*. La Rochelle Toussaint de Govy. 1646. *Traité de la connaissance des animaux*. Paris: Fayard; 1989, <http://www.biusante.parisdescartes.fr/histoire/medica/resultats/index.php?cote=extalfo00070&do=chapitre>.
- [50] Edwards M. *Marin Cureau de la Chambre and Pierre Chanet on Time and the Passions of the Soul*. *History of European Ideas* 2012;38(2):200–17.
- [51] Chevroton D. *L'instinct objet d'une controverse à l'époque de Descartes : Pierre Chanet et Marin Cureau de La Chambre*. *Hist Nat* 1976;8:21–32.
- [52] Cureau de La Chambre M. *Traité de la Connaissance des animaux où. Tout ce qui a été dit pour, et contre le raisonnement des bestes, est examiné*. Paris: Chez Jacques d'Allin; 1664.
- [53] Cureau de La Chambre M. *Discours de l'Amitié et de la Haine qui se trouvent entre les animaux*. Paris: Chez Claude Barbin. 1657. Dijon : Éditions Universitaires; 2011, <http://www.corpus-philo.fr/cureau-amitie-haine-animaux.html>.
- [54] Descartes R. *Les passions de l'âme*. Paris: Chez Henry Le Gras, au troisième pilier de la grand' salle du Palais, à L couronné; 1649.
- [55] Patin G. *L'esprit de Guy Patin tiré de ses conversations, de son cabinet, de ses lettres, et de ses autres ouvrages avec son portrait historique*. Amsterdam: Chez Heny Schelten; 1709
- [56] Guez de Balzac JL. *Les Lettres du sieur de Balzac*. Genève: Stoët; 1663.