The Embodied Soul in Seventeenth-Century French Medicine*

JOHN P. WRIGHT

Abstract. While medical historians have noted the continuing importance of the soul in seventeenth-century physiology, it is not generally recognized that there were systematic discussions of the role of the physiological soul even after it was banished from science by Descartes and Malebranche. In this paper I analyze important accounts of it by founding members of the Académie des Sciences who were physicians—Cureau de La Chambre and Claude Perrault. Both these thinkers argued that the soul is spread throughout the body and manifests a form of knowledge in all its actions. Cureau was an Aristotelian who argued that all life processes require some form of active imaging on the part of the vegetative or natural faculty. He argued that life processes themselves must be conceived as passionate responses organized through innate patterns built into the organism itself. While the vegetative soul (like the sensitive soul) reasons through a kind of linking of images, it does so without any knowledge of the goal of its actions. Unlike Cureau, his successor Claude Perrault’s account of the embodied soul was developed in response to the new physiology of Descartes. Like the latter, he thought that bodily processes must be described in mechanistic terms. However, he rejected the Cartesian theory that the body is an automaton and insisted that the mechanism must be guided by a soul. Perrault argued that this soul is constantly reasoning in order to achieve certain goals. In response to the Cartesian view that the soul is always conscious and aware of its own actions, he gave a systematic account of how such processes become unconscious and why they appear to be determined. Perrault’s theory probably influenced Leibniz and, even more significantly, Georg Stahl. In the conclusion to the paper I discuss the importance of Perrault’s conception of the embodied soul for eighteenth-century pathology.

Résumé. Alors que les historiens de la médecine ont souligné l’importance continue de l’âme dans la physiologie du 17e siècle, il n’est pas reconnu, généralement, qu’il y a eu des discussions systématiques du rôle de l’âme physiologique, même après que Descartes, et Malebranche l’aient bannie de la science. Dans cette étude, on examine des études importantes de l’âme physiologique par des membres fondateurs de l’Académie des Sciences qui étaient

John P. Wright, Department of Philosophy, University of Windsor, Windsor, Ontario N9B 3P4.

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des médecins—Cureau de La Chambre et Claude Perrault. Ces penseurs ont tous les deux soutenu que l’âme est diffuse à travers tout le corps et qu’elle manifeste une forme de connaissance dans toutes ses actions. Cureau, comme aristotélicien, défendait la thèse que tous les processus vitaux requéraient une certaine forme de production active d’images de la part de la faculté végétative ou naturelle. Il défendait l’idée que les processus vitaux doivent eux-mêmes se concevoir comme des réponses passionnées organisées à travers des structures innées constituées dans l’organisme lui-même. Si l’âme végétative (comme l’âme sensitive) raisonne par l’intermédiaire d’une espèce d’association d’images, elle réalise cela sans aucune connaissance des finalités de ses actions. À la différence de Cureau, la conception de son successeur, Claude Perrault, sur l’âme «incorporée» a été développée en réponse à la nouvelle physiologie de Descartes. Comme ce dernier, il pensait que les processus corporels doivent se présenter en termes mécanistes. Toutefois, il rejetait la théorie cartésienne du corps comme automate et il insistait sur le fait que le mécanisme soit guidé par une âme. Perrault défendait l’idée que cette âme est constamment en train de raisonner pour réaliser certains buts. En réponse à la conception cartésienne d’après laquelle l’âme est toujours consciente de ses propres actions, il présenta une description systématique de la manière dont ces processus deviennent inconscients et de la raison pour laquelle ils apparaissent déterminés. La théorie de Perrault influença probablement Leibniz et, de manière encore plus significative, Georg Stahl. Dans la conclusion de l’étude, on examine l’importance de la conception de Perrault de l’âme «incorporée» pour la pathologie du 18e siècle.

Conceptions of the soul have played a major role in the history of medical theorizing in the western world. This is not, as we are likely to think today, because of the interference of religion in our scientific culture. Rather, up to the beginning of the nineteenth century, medical thinkers staked out their own scientific views in physiology and pathology through discussions of the role of the soul in the body. Indeed, when we look back at the seventeenth-century origins of our own mechanistic medicine we find a conception of the soul—I mean the Cartesian conception which identifies the soul with the conscious mind—which continues to dominate our thinking about human nature. Far from being unwittingly influenced by religion, traditional medical thinkers developed conceptions of the soul, God and nature in order to express their own views concerning a correct scientific medicine.

The belief that there is a central life force within the animal organism which strives toward health and adaptation has played a central role in traditional western medicine. This life force is generally referred to as the soul or nature. Among major twentieth-century medical writers only Carl Jung and his followers have attempted to explore this principle under its traditional guise as "the soul." But even the Jungians have failed to appreciate the important role that this conception has played in our medical tradition. In this paper I attempt to fill in a part of this history at a very key turning point in western medicine.
1. SEVENTEENTH-CENTURY CRITICS OF THE EMBODIED SOUL

While much has been written about the seventeenth-century dispute arising from the claim made by Rene Descartes (1594-1650) that non-human animals are pure automata which have no souls, little attention has been paid to a more fundamental dispute related to his denial that any form of soul is responsible for life functions—either in human beings or other animals. In his Description of the Human Body, published posthumously along with his Treatise of Man in 1664, Descartes claimed that there were two reasons why his predecessors mistakenly believed that the soul is responsible for all bodily functions including “moving the heart and the arteries, digesting food in the stomach.” In the first place they generalized from the fact that some bodily movements—namely, voluntary ones—are under the control of the soul, to the view that all were. In the second place, according to Descartes, thinkers had attributed all motions to the soul because they were ignorant of anatomy and mechanics. Descartes himself held that the only function which should be attributed to the soul was thought, and denied that the thinking processes of the organism were in any way involved in the production of the basic functions of life. He proposed to explain all these functions through the application of the principles of his new mechanical physics.

Over 10 years later, Descartes’ influential follower Nicolas Malebranche (1638-1715) was still attacking contemporaries who, he said, attach the word “soul” to “the idea of producer and guardian of the body.” These people think that “their soul produces in them all that is absolutely necessary for the preservation of their lives.” Malebranche argued that our soul “does not form our body, it does not digest our food, it gives no movement and heat to our blood.” The soul cannot be involved in these processes because “it does not even know how the body it animates is composed.” Malebranche does not deny that there is intelligence to be found in animal bodies; however, “this intelligence is not material; it is as distinct from animals, as the intelligence that arranges the wheels of a watch is distinct from the watch.” For Malebranche, the intelligence, knowledge and even the force which drives the bodies of men and animals is to be found in the Deity who constructed these bodies.

I have elsewhere called the kind of dualism expressed in these discussions by Descartes and Malebranche “function dualism.” These pioneers of the mechanical philosophy divorced the life functions of the organism from its thought functions. They denied that the complex operations which go on in an animal organism require any sort of knowledge or intelligence in the organism itself. There is nothing like our conscious apprehending or knowing processes required for the maintenance of life in our bodies. Indeed, as the extreme view that
non-human animals are automata illustrates, they believed that all the basic functions of life preservation—including those required for animals to survive in an external environment—could take place without even the lowest form of sensory knowledge.

It is therefore of some interest to note that there were thinkers of the day who argued systematically for the view which Descartes and Malebranche rejected—the view that basic life functions take place with knowledge and even a form of reasoning. In this paper I shall discuss the views of the soul of two leading French physicians of the second half of the seventeenth century. Both were founding members of the Academy of Sciences and active in the French Academy. The first, Marin Cureau de La Chambre (1594-1669), was called one of the most “illustrious” seventeenth-century followers of Aristotle by a famous younger contemporary, Pierre Bayle. He wrote books on digestion, on light, on the passions, on reason in animals, on physiognomy, and on other topics. He was born two years earlier than Descartes and while he outlived him by 19 years there is no indication that Cureau took any interest in Descartes’ ideas. Cureau was physician to both Louis XIII and XIV, and clearly a very influential figure in his own day. His younger friend, Claude Perrault (1613-88), is best known for his work in the practice and theory of architecture (he was the architect of the famous colonnade of the Louvre and translator of Vitruvius) and his work in comparative anatomy (he died from an infection he incurred while performing the dissection of a camel). Perrault was also involved in a famous dispute about the circulation of sap in plants. Unlike Cureau, Perrault was clearly writing in the context of the Cartesian philosophy and accepted the view that the body operates through mechanical principles. Yet, he denied that the body is an automaton and insisted that its operations are directed by a soul. Perrault’s views on the soul had an important influence on later medical writers as well as on the philosopher Leibniz.

2. A SEVENTEENTH-CENTURY ARISTOTELIAN ACCOUNT OF THE EMBODIED SOUL

Cureau’s *Le Système de l’Ame* was published in 1664, the same year as the French edition of Descartes’ *Treatise of Man*. Any question concerning the pious origins of Cureau’s discussion of the soul should be quickly dispelled by a glance at the frontispiece of the book, which depicts her as a rather voluptuous woman! This vivid portrayal of the guiding principle of the human body contrasts in an interesting way with the stark images of the mechanical woman which appear in Descartes’ *Treatise of Man*. In the Preface to his book Cureau explained the iconography of his frontispiece. The following details are
relevant to our topic. The soul is represented as a woman “because her primary function is to conceive.” She is placed on clouds to show that “all of her actions are based on phantasmes,” that is to say the products of her imagination. Moreover, “she holds a mirror in which she looks at herself because she can see nothing without the images which she forms. . . .” Cureau notes that the “little bit of light which illuminates her is that of the instinct with which she is provided.” Finally, the “system of the world” which surrounds the soul is supposed to represent her different parts of faculties: the planets represent her mobile faculties—understanding and will; the fixed stars represent her immobile faculties—those such as the senses which are located in specific organs.  

Following Aristotle, Cureau attributed the basic life processes to a “vegetative soul” or “vegetative faculty.” He also used the Galenic name, “the natural faculty” (System of the Soul, p. 162). This faculty is distinguished from the intellectual faculty and the senses. A central aim of Cureau’s discussion is to show that, like the other two, it is a knowing faculty. For Cureau, unlike the Cartesians, knowledge and life are intimately related. He wrote that “everything which is living knows and all that which knows is living” (p. 217).

Cureau is opposed to the view of the Schools which regarded knowing as something passive. For him, it is an active representational process in which the forms or images in things are apprehended. He explained the act of knowing on the analogy with the activity of painting. The soul forms a portrait of the thing that she knows. In his discussion of the understanding Cureau cites Aristotle’s dictum that the understanding is potentially all things and that in a certain sense it becomes what it knows (p. 12-18). This is true in a more limited way for the senses and the natural faculty: they also become the things they know in the process of responding actively to their own proper objects (p. 217).

Cureau argued that the great variety of actions performed by the vegetative faculty and the regularity with which they are performed shows that “there is some knowledge which regulates and conducts such a beautiful economy” (p. 160). Cureau gives various lists of these actions which include the formation of the parts of the body in the mother’s womb, the beating of the heart and arteries, and the separation of excrements. In arguing that knowledge is involved in such physiological processes he stressed that certain fluids are selected for particular purposes. He wrote that the vegetative soul “distinguishes the humours one from the other in so far as it attracts and retains the beneficial ones and expels the harmful ones” (p. 161). This purposeful behavior is particularly observable in the operations of the natural faculty in the disease process:
One is not able to have a more certain sign of its knowledge, than when, in diseases, it chooses the days to attack, it discerns and separates the humours which have caused them, and often, surprised by their malignancy, it loses courage and abandons itself to their violence. [p. 163]

The fact that the organism does not always exhibit intelligence and wisdom plays a central role in Cureau's argument that this natural knowledge is supplied by the individual soul of the organism rather than God. He wrote against supporters of the Scholastic doctrine that God acts directly in producing the physiological operations of our bodies. He acknowledged that the "marvellous order and justice" generally exhibited by the animal body gives credence to such a view (p. 163). At the same time there are significant exceptions. If the Divine Wisdom performed these actions herself we would have to impute to her "the disorders into which the vegetative soul falls, the malformed foetuses, which it produces, the false crises which it brings about, and the harmful transports of humours in which it excites in diseases" (p. 169). It is the "error and disorder" into which the natural faculty falls which proves that it is under the control of the individual soul of the organism, not God (p. 172). Cureau concluded that just as God has "given over the will of men to liberty" so He has left a certain "sort of freedom to natural agents to perform the functions to which they are directed" (p. 171).

According to Cureau, God only supplies the power or potentiality to have natural knowledge and to perform actions in accord with such knowledge; the actual knowledge and its application belong to the individual organism. The fact that God has given us reason does not negate the fact that it is we who reason. Similarly, the soul itself produces the natural actions "by means of the powers which the Divine Wisdom has Provided" (p. 166-67).

Cureau carefully distinguished natural knowledge from sensual knowledge. The natural faculty often corrects the mistakes of the senses as when we vomit some harmful food which has appealed to the sense of taste (p. 162). The senses cannot distinguish the sting of a bee from the prick of a needle, but the ensuing inflammation in the former case indicates that the natural faculty is able to discern the difference and react to the venom of the bee sting (p. 161, 209). Yet, at the same time, Cureau wanted to draw parallels between natural and sensual knowledge: he wrote that "the vegetable soul senses in its own way, that is to say it knows by the actions which it performs, just as the senses know by their own actions" (p. 208).

Like that of the senses, the knowledge of the natural faculty involves two components (p. 211-12). One is of the passing objects which constantly change; in the case of the natural faculty these are supplied by the changing internal states of the body. In the second volume of his
Charactères des Passions (1645) he had described this mode of knowledge as "obscure and confused" since it gives only a general view of the object. However, he fails to elaborate on what he means by this, as Claude Perrault was to do so later.

The other component of natural knowledge is instinctive. Cureau notes that when the body chooses certain ways and means to attack the acute diseases which infect it, it is applying instinctive knowledge (p. 212). Cureau has a sophisticated theory of instinct which he worked out in the 1740s in a dispute he was engaged in concerning the existence of reason in non-human animals. While he acknowledged that the behavior of animals derives from instinct, he argued that instinct itself involves a rudimentary form of reasoning.

According to him, instinct is a secret cause which operates by way of "primitive and original images" which are born with the organism (p. 211-12). When stimulated by some internal or external object the imagination produces a series of connected images which tend toward a certain goal. When it applies itself to one of these images the others follow like links in a chain (p. 194-95). However, the sensible or vegetative soul has no apprehension of the goal to which they tend. He gives the example of the swallow who, when affected by certain humors (we would say hormones) is stimulated through images formed in the imagination to collect mud to form a nest, to apply the mud in such and such a way, to line her nest with feathers, etc. While these images are directed to an overall goal of reproduction, this goal is not known to the swallow. She does not know that mud becomes hard when it dries, that feathers will keep her eggs and offspring warm, etc. The bird only has an immediate knowledge of these various actions and an inclination to perform them (p. 196).

In a similar way the instinctual operations which the natural faculty performs in accordance with the natural images with which it is provided are chosen, not because they are known to result in some ultimate benefit to the organism, but rather as a result of an immediate inclination. Through instinct, the soul knows "the days to attack" the poisons which invade the body (p. 212). It knows "the humours which conform to the parts, it attracts and retains them; it discerns the poisons; and all the symptoms which it excites when it senses them, are so many efforts and attacks which it makes against them" (p. 214). While we might say that natural knowledge involves a form of "practical knowledge" of the "estimative faculty" which judges things beneficial or harmful (p. 197), this judgment is made without any operation of the understanding.

Cureau regards the kind of apprehension involved in the operations of the natural faculty as a primitive kind of sensibility. He noted that physicians are constantly speaking of the irritation of the parts of the
body (p. 210). However, this irritation takes place without the nervous system being involved in any way as is shown by the fact that if one stimulates the embryonic fluid prior to the differentiation of the parts of the animal "it draws together and pulls back" (p. 208-209). Cureau thought that we should consider that literal meaning of the word irritation, because the natural faculty has its own sort of passions which parallel those of the senses. For example, fever is to the natural faculty what anger is to the sensitive faculty, and physicians correctly think in terms of nature being irritated or appeased. Moreover,

Love appears in the inclinations which she has for things which conform to her; hate in the aversions for things which are contrary; courage in the attacks which she makes against diseases; fear in the surrender to which their violence often makes her fall; in short, she is irritated, she is appeased; and fever is to her what anger is to the sensitive soul. [p. 210-11]

Cureau notes that the fact that the natural faculty acts by way of passions is another indication that it acts knowingly; for the appetitive part of our nature cannot be moved without some form of apprehension.

What Cureau calls natural knowledge appears as a kind of active passionate response of the living soul to certain changes which she apprehends in her internal environment.

Cureau maintains that the vegetative soul is spread throughout the body. The organ of natural knowledge is the semi-immaterial "spirits" which are to be found in all parts of the body (p. 218). In support of this view Cureau adds to his previous account by noting that the natural faculty is affected by custom in the performance of its operations. He notes the way the stomach becomes accustomed to certain foods, the way it becomes hungry at certain times, the way that diseases which have already been experienced become "easier and less perilous" (p. 220). Cureau argues that to be affected in this way the natural faculty must have a memory and that this memory must be retained in the peripheral parts of the body. Another example he gives is of a lute player who, even though he has forgotten his pieces, immediately remembers them when his hands begin to move on the strings of his instrument (p. 221). This shows that the memory is in fact in his fingers.

Cureau’s account of the embodied soul is significant for what it leaves out, as well as what it includes. As we have seen, all descriptions of bodily processes are in humoral terms and the basic principles of operation are the Galenic ones of attraction and repulsion. There are no systematic attempts to give mechanical explanations of bodily processes. Also striking is Cureau’s lack of explanation of the fact that the natural operations of the soul are unconscious. He does not appear to find any problem with the idea that the natural knowledge which he
ascribes to the soul of a human being is not known to the person who has the soul.

3. CLAUDE PERRAULT'S RATIONALIST ACCOUNT OF THE EMBODIED SOUL

Let me now turn to the physiological ideas of Cureau de La Chambre's younger contemporary Claude Perrault. These were developed in his *Essais de physique*, which was published in two parts in 1680 and 1688. As I suggested earlier, unlike the physiology of Cureau, that of Perrault was written in dialectical opposition to the views of Descartes and the Cartesians. In his essay entitled "Of the Mechanics of Animals" Perrault addressed those "who have heard it said that most animals are pure machines." On the one hand he followed the lead of Descartes in adopting mechanical descriptions of bodily processes. He acknowledged that the "organs of the body are . . . true machines" and that the "dispositions which these parts have to one another" are no different than those "in pure machines." On the one hand, Perrault opposed the Cartesians when he argued that these organs need to be "moved and directed by the soul." Perrault defined an "animal" as a being which has feeling ("sentiment") and 'which is capable of exercising the functions of life by a principle which is called a soul" (*Oeuvres diverses*, II, p. 329).

In another essay, "Of the External Senses," Perrault set out more clearly some of his reasons for thinking that mechanism is not sufficient for explaining motions of animal bodies. While Perrault admitted that there are many things in nature of which we are ignorant, he claimed that our failure to explain the movements of an animal purely through mechanical principles involves more than just ignorance. It is not easy to give a mechanical explanation of the principles involved in the motions of plants or those produced by a magnet. But it would be wrong to attribute a soul to them. The motions of animals, on the other hand, exhibit a "prudence and discretion which it is not easy to attribute to a machine." While "a machine acts necessarily and follows a certain order" which depends on the structures of its parts, an animal gives every appearance that it is making use of these structures in such a way that it is the master of them. In order to explain its motion we need to ascribe feeling and knowledge to it (II, p. 513-15). When he makes these claims Perrault has in mind primarily the outward behavior of animals; but it soon becomes obvious that it applies to their internal behavior as well.

In order to understand Perrault's account of the relation between soul and body we need to consider briefly his doctrine of "spirits." In his essay "Of the External Senses" he asked how two substances so different from each other as soul and body can be linked. While
Perrault expressed some sympathy with the view of "some ancient philosophers"—a view which had been adopted by Cureau de La Chambre—a view which had been adopted by Cureau de La Chambrey—that "spirits" are a kind of intermediate between immaterial and material substance, he appears to have agreed with Descartes when he wrote that "a body however subtle is always a body" (II, p. 518). In Descartes' hydraulic model of the motion of animal bodies, the "animal spirits" were composed of nothing but "extremely small bodies which move very quickly." These fluids, which flow through the nerves, only cause perceptions in the human mind insofar as they affect a certain part of the brain. For Perrault, on the other hand, because the spirits are the most mobile parts, they can most easily be affected by the soul and most easily affect it. He concluded that the soul is more directly linked to the spirits than to any other part of the body (II, p. 518).

This close link between the soul and the spirits is related to a view which Perrault did share with Cureau de La Chambre, namely, that the soul both perceives and acts in the peripheral parts of the nervous system. He objected to the established view—strongly supported by Descartes—that the soul has its principal seat in the brain and that all cognitive functions take place there. Perrault thought that current accounts were unsuccessful in explaining how impressions pass through the nerves to and from the brain for sensation and motion to take place. According to him, the brain is fundamentally a gland which secretes spirits, and the reason why sensation and motion are interrupted when a nerve is tied is that the spirits can no longer replenish the peripheral organs (I, p. 265-67). He even rejected the Cartesian view which linked memory to traces formed in the substance of the brain—pointing out that a viper can find its way back to a hole even though it has had its head removed. Our soul is not in our bodies as "one is in a house." It is spread throughout the body and "engaged in all of our actions" (I, p. 271-73).

Perrault agreed with Descartes' view that "knowledge or perception is a modification of the soul... which happens to it" in virtue of changes in motion in the part of the body to which it is conjoined. However, lying behind this agreement is an even more significant disagreement than that which I considered in the last paragraph. For Perrault thought that since the soul is a knowing being "it ought first and foremost to know" the movements of the particles to which it is united (II, p. 518). Just as we might ask why we do not perceive the firings of neurons in our brains, so Perrault asked why there is no perception of the motions of the fine particles of which the spirits are composed. This is a problem which did not arise for Descartes who warned against thinking of the corporeal image which is formed in our brain in vision as if "there were yet other eyes in our brain with which
we perceive it." Rather, according to him, certain motions in the brain "are ordained by nature" to make the mind have certain sensations. For Perrault, on the other hand, the fact that sensations are caused by the motions of the spirits implies that the soul should have knowledge of them. Thus, he raises the question why "the motions which are made within us in the digestion of food and the distribution of nutrient, no less than in the contraction and relaxation of muscles appear to be imperceptible" (II, p. 518-19).

Perrault held not only that the soul has knowledge of these internal processes, but that it performs them in the light of this knowledge. In order to reconcile these claims with the fact that we lack such knowledge he made a distinction between two kinds of knowledge, that which is "obscure and confused" and that which is "clear, explicit, and distinct (claire, expresse, & distincte)." The former is generally employed for the internal operations of the soul, while the latter accompanies our outward actions (I, p. 273). The actions of the soul which are performed with the confused thoughts are performed without attention or reflective knowledge. Perrault wrote that "it is only reflection which they lack which makes them different from the things we do with explicit thought" (II, p. 548).

Perrault held that the majority of human actions—even outward ones—are done without reflection. But the essential difference between natural functions such as digestion and outward actions such as motions of a limb is that it is impossible to reflect on the former. There are, he wrote, certain thoughts "which are necessarily unknown to us" (II, p. 519). His explanation of this is that through long practice they have become entirely habitual. Habit, he claimed, causes a certain forgetfulness. For example, one forgets the rules of grammar one has used to learn a foreign language after, with long practice, one comes to understand and speak it. Again, one might forget the fingering chart ("la Tablature") one has used to learn certain pieces on a musical instrument, or even what a fingering chart is, when one comes to learn to play those pieces with facility. Through habit we cease to be able to have explicit thoughts of what we needed to know in order to learn these skills. Yet Perrault clearly thought that habitual actions such as speaking a language or playing a musical instrument are still done with knowledge and thought. What habit destroys is the power to reflect on that knowledge and thought, and to attend to the process by which our souls perform those actions (I, p. 279).

Perrault extrapolated from the facts of the learning of skills in adults to form an hypothesis about the operation of natural functions in infants. His account is truly remarkable. He wrote that "in the first years of its life" an infant has to give "a great deal of attention to the study of the artifice and uses of all its muscles—to adjust its breath for
its voice and its body heat for the digestion of food." Babies appear to be completely stupid, since they have hardly any "explicit thoughts" for the external world. But their organs of reasoning are in fact completely intact. What is really going on is that "their thoughts are occupied in the direction of the natural functions...." They have "explicit" thoughts directed to the internal operations of their bodies. However, once these operations come to be performed with sufficient ease through habit they no longer have to reflect on them. Thereafter they are able to direct explicit thoughts to external things (I, p. 276-79).

Perrault never described in detail the thoughts of the infant as it learns to control the operation of his body; however, he conceived of them in general terms as being like the thoughts an engineer might have as he learns by trial and error to operate some complicated piece of machinery: "the direction of an army or a state is in no way more difficult than that of the functions of a living being." Babies must learn "the properties and uses of an infinity of different parts of the machines of which they are composed"; they develop an "adroitness and facility" through exercise and habit. Perrault stressed "the reasoning, the management and the wisdom" which the soul of the infant must exercise in learning to control its natural processes (I, p. 277). He thought that humans and other animals have to master their internal environments at the beginning of life, in the same way as they later have to master their external environments.

Perrault conceives of the operations of the soul in the body as a kind of practical reasoning. In an essay entitled "On the Movements of Our Eyes" he sought for the "true cause" of the fact that our eyes operate together (II, p. 586). He claimed that the correct explanation is found by those who consider "the utility of this uniform movement, which prevents our two eyes from seeing objects double" (II, p. 586, my italics). The sort of explanation he gave of this phenomenon is unlike that of those who seek final causes in physics, for it requires an agent capable of knowing the goal. An infant learns through trial and error that she must move her feet one after another in order to walk from one place to another. The same is true for other goals, including those achieved through our natural functions. Perrault's explanation here differs markedly from that of Cureau de La Chambre, for, as we have seen, Cureau held that the soul acts instinctively and hence without any knowledge of the goal of its actions. Moreover, for Cureau, the actions which the soul chooses are innate and not learned.

While Perrault held that the soul acts with thought when it reasons, his conception of thinking differs markedly from that of Descartes. For the latter, "we cannot have any thought of which we are not aware at the very moment when it is in us." Thus, Descartes is committed to the view that we must have an immediate consciousness of all reasoning which is carried out by the soul. While he did not deny that
reasoning can affect our habits, he attributed the resulting changes in behavior to changes in the structures of our brains.\textsuperscript{26} The habits are carried out purely mechanically. For Perrault, on the other hand, habitual reasonings continue to be performed by the soul. The knowledge and thought involved in such reasonings is carried out without any form of reflex thought. While Perrault does not use the word, it seems reasonable to say that, for him, in performing habitual actions the soul acts \textit{unconsciously}.

Perrault’s account of thought is closely connected with his reflections on the biological utility of consciousness. He stressed that thoughts become "obscure and confused" when the soul no longer needs to attend to them. Once the internal operations of our soul are mastered she can turn to the external environment which constantly requires her "care and application" (II, p. 519). The reason we continue to have explicit thoughts for what is external is that we must constantly examine it in order to avoid what is harmful or discover what is appropriate. Here, we are constantly confronted with new and potentially harmful objects. In short, we need to attend to what is outside of us in order to survive. We are able to forego explicit thoughts in controlling the internal operations of our bodies because the attention that they require at the beginning of life is no longer needed for our survival.

By placing consciousness—what he calls "explicit thoughts"—in this biological framework Perrault broke significantly with the Cartesian tradition. As I pointed out at the beginning of this paper, Descartes had argued that survival functions can take place without any thought or consciousness on the part of the organism itself. For Descartes, consciousness is not necessary for animal survival. It takes place only in human beings who are able to modify and build on their basic survival functions.\textsuperscript{27}

According to Perrault, the soul forms resolutions at the beginning of life to perform certain functions which are required for our preservation. These resolutions come, through habit, to be continued with an "obscure volition" which cannot normally be overcome by our conscious will. Hence, they have the appearance of being necessary. Perrault argued that an infant recognizes the utility of keeping his heart beating regularly and so forms "a resolution not to interrupt it." The fact that we cannot now voluntarily break that resolution has clear survival value. Such volitions are "directly concerned with our conservation and it happens very rarely that our explicit will can master them" (I, p. 278).

Nevertheless, Perrault stressed that an action such as the beating of the heart is "in its nature absolutely free" and is performed by an organ which is completely under the control of the will (I, p. 277). He thinks that the obscure volition with which we operate our hearts is not unlike
the resolution formed by someone who has a precious object which he has decided to hold on to, even at the risk of his life; if he tries to overcome this resolution when he is attacked by robbers he cannot let go of the object in his hand. The difficulty he has here is not due to any change in the structure or his organs, but rather in the firmness of his original resolution (I, p. 278).

Perrault maintained that actions which Descartes considered to be reflex are in fact under the control of the soul. In his Passions of the Soul Descartes had argued that the fact that our eyelids close in spite of our will is a sign that they close mechanically:

If someone suddenly thrusts his hand in front of our eyes as if to strike us, then even if we know that he is our friend, that he is doing this only in fun, and that he will take care not to harm us, we still find it difficult to prevent ourselves from closing our eyes. This shows that it is not through the mediation of our soul that they close, since this action is contrary to our volition, which is the only, or at least the principal, activity of the soul.

For Descartes, the only action of our soul which takes place here is the conscious effort to keep our eyes open. What lies outside of this conscious effort of the will is purely automatic and mechanical. However, in his discussion of this same example, Perrault stresses that the closing of our eyelids is itself performed by the soul—though, of course, with an “obscure” volition. He appeals to the story of a Roman gladiator who was in fact able to keep his eyes open when he wished, when objects were thrust in his face. Extrapolating from this case, Perrault noted that people would find it strange “if it happened one day that a man had the power of stopping the movement of his heart, or was able to suspend at will” his digestive processes. Yet he thought that such a thing “is not entirely impossible” (I, p. 277-78).

For Perrault, the link between the soul and the body is originally based on the reason and will of the individual organism. The soul/body union depends on the soul’s reasoning and decision-making powers. These operate in both the conscious and unconscious processes of the body. Perrault’s soul is constantly reasoning in order to perform actions which are conducive to the survival of the union of which it forms a part. Again, the contrast with Descartes’ theory is striking. According to Descartes, the voluntary movement of some part of one’s body is based on the fact that certain bodily motions are “joined by nature” to certain desires. When I desire to look at a certain distant object my pupils widen; however, I cannot make them widen by merely desiring that they widen. Similarly, in his Meditations, Descartes argued that the sensation which is felt by a healthy person when the nervous system is stimulated in a certain way is “of all possible sensations” that which is most conducive to preservation. These links between the soul and body, however they may be varied
by custom and will, are originally formed by God or Nature.\textsuperscript{30} For Descartes, it is God or Nature—not the individual soul—which links mind and body in a way that is conducive to the survival of the organism.

We have seen that, in the final analysis, there are also fundamental differences between Perrault's account of the embodied soul and that of Cureau de La Chambre. Unlike Cureau and earlier Aristotelian thinkers, Perrault placed the natural functions of the body under the control of the rational soul. He gave a systematic account of the way, through custom and habit, the operations of the soul cease to be conscious—that is, cease to be performed through reflective thought. In adopting the new mechanical description of bodily processes Perrault was clearly siding with the moderns. At the same time, he was providing a unified account of mind and body which treated the whole human being as a free and rational agent.

The importance of Perrault's account of the operation of the soul in the body is not generally recognized today.\textsuperscript{31} The philosopher Leibniz knew Perrault when he was in Paris in the 1670s; at the end of 1675 or the beginning of 1676 Leibniz commented in his notebook on "the opinion of Mr. Perrault... that the soul is spread throughout the body."\textsuperscript{32} There are important parallels between Leibniz's account of unconscious perceptions and Perrault's "obscure and confused thoughts." Leibniz held that the soul constantly represents the state of the body and that consciousness only arises when such representations become objects of attention and reflection.\textsuperscript{33} Moreover, Leibniz held that habit plays an important role in making bodily perceptions unconscious.\textsuperscript{34} On the other hand, in a later dispute with the German medical theorist Georg Stahl, Leibniz rejected the view, maintained by Perrault, that the soul actively excites movements in the body for its conservation. On this central issue Perrault's views were identical with those of Stahl.\textsuperscript{35} Indeed, Perrault has traditionally been considered a major influence on Stahl.\textsuperscript{36} Perrault's views also had a direct influence on the eighteenth-century Edinburgh physician William Porterfield.\textsuperscript{37}

4. CONCLUSION: IMPLICATIONS OF PERRAULT'S THEORY FOR PRACTICE

In a brief discussion of pathology, Perrault pointed out that, in many cases where disease occurs, the fault is not in the structure of the organs, but rather in the failure of the soul to employ these structures in a way that will rid the body of its "corrupted humours" (II, p. 551). Perrault conceived of disease as resulting from the failure of the soul to properly regulate the body. Just as calamitous events in the external world often arouse fear, and subsequent actions which are harmful and contrary to our ordinary intentions, so "the soul is prone to
madness, fury, and delirium in its internal thoughts. . . . In this irrational state it is transformed so that it does things which are contrary to the benefit and utility of the animal." Unlike his predecessor Cureau de La Chambre, Perrault conceived of the passionate response of the soul as essentially harmful insofar as it overturns reason.

Perrault does not address the question of the implications of his theory for medical practice. However, nearly 100 years later, in his lectures to Edinburgh medical students, William Cullen attacked Perrault and Stahl (as well as a number of other medical thinkers) on precisely this ground. Cullen argued that either one treats the animal economy as a deterministic system or "the whole of the Practice of Physic falls to the ground" (fol. 161). His central complaint against the proponents of what he called "the Stahlian system" was that they opposed any radical interference in the disease process and tended to rely on the self-healing power of the organism itself. Cullen wrote that their practice

is timid & weak, for fear of interfering with the operations of Nature. It is universally agreed that Bleeding is a powerful Remedy in Inflammatory Disease & yet the Stahlians do not admit it. . . . Also they reject Vomiting in Fevers, so generally practiced by all physicians. . . . Lastly, no remedy, is so generally acknowledged as the Peruvian Bark in Intermittents: yet, such is the baneful influence of the Stahlian system on the Practice, that they reject this, & profess to cure Intermittents without it. [Fol. 165.]

Our own perspective on eighteenth-century therapeutics might incline us to be rather more sympathetic than Cullen with those, like Perrault and Stahl, who believed in calming the soul, so that she can find her own way to combat diseases. It is reassuring to learn from Cullen that this system was tacitly accepted by many of his contemporary physicians without their even knowing it (fol. 167).

APPENDIX

*The Frontispiece to Cureau de La Chambre's Le système de l'âme*

Cureau's icon of the soul stands in an established tradition which uses feminine images to represent science and scientific ideas. See the fascinating study in Londa Schiebinger, *The Mind Has No Sex* (Cambridge, Mass.: Harvard University Press, 1989), chapter 5. She writes that "Boethius's image of philosophy as a woman is the predominant image of philosophy for more than ten centuries" (p. 134). Of special interest for Cureau's icon is the portrayal in Cesar Ripa's *Iconologia* (1618) which, according to Schiebinger, was "the Renaissance bible of iconography." The figure holds a mirror which "symbolizes the study of appearances leading to knowledge of essences" (p. 122-23). It is also interesting to note that there is an established
The frontispiece of Cureau de La Chambre’s *Le Système de l’âme*. In his Preface Cureau says that the figure is “a whim of the engraver who claims to express with his needle all that I have written here about the nature of the soul.” He goes on to describe the symbolism of this image of the embodied soul in some detail. See p. 39.
One of the figures created by Louis de la Forge in order to illustrate the mechanical model developed in Rene Descartes' *L'homme*. The diagram is supposed to show how different objects may be represented to the mind merely because the pineal gland is displaced slightly and the spirits enter from different places on the gland.
tradition linking nakedness with the revelation of truth. Writing of the frontispiece to Lamery's *Course of Chemistry*, Schiebinger notes that "the fact that her breasts are bared affirms the truth of the secrets she is about to reveal" (p. 126). She contrasts the philosophy of Descartes with that of Boethius: "Personification is excised from his (Descartes') philosophy, as the feminine principle is banished from his world" (p. 148). In the light of this remark it is interesting to note that, in depicting the body machine, the illustrators of Descartes' *Treatise of Man* used both male and female images.

The history of the depiction of the soul as one gender or the other needs a careful study. The depiction of the soul as feminine goes back to Plato's *Timeas* where the world soul is referred to as the "ruler and mistress" of the world (Schiebinger, p. 134). Cureau's own justification for treating the soul as feminine, tied up with the analogy of producing ideas to giving birth, goes back to Socrates' portrayal of himself as a midwife.

What follows is a complete translation of the portion of Cureau's Preface to *Le système de l'âme* which relates to the frontispiece:

Do not ask me the purpose of the figure which is at the beginning of this work; it is a whim of the engraver who claims to express with his needle all that I have written here about the nature of the soul. For he says that he has represented her as a woman because her primary function is to conceive; that he has given her wings in order to indicate the speed with which she acts; that he has placed her on clouds to show that all of her actions are based on phantasmes; that she holds a mirror in which she looks at herself because she can see nothing without the images which she forms, and that she herself is a mirror in which all that is in the universe is represented; that the light which surrounds her indicates her spirituality, her natural shape and the parts of her which are not attached to her body, by means of which she carries out all her spiritual actions; that she is between the heavens and the earth to show that her nature occupies the place between the angels and the animals: that shadows indicate the ignorance into which she is born: and that the little bit of light which illuminates her is that of the instinct with which she is provided. That finally, the system of the world which consists of the places of the stars, the planets, and the elements, represents the system of the soul—in which there are the fixed faculties, the wandering ones, and the celestial and material ones. But to speak truly, if the engraver believed that his figure gave enlightenment to my work, I also think that my words give it to his figure.

NOTES

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Descartes' views on both subjects were first presented in Part 5 of his *Discourse on the Method of Rightly Conducting One's Reason and Seeking the Truth in the Sciences*. The history of the first dispute has been discussed by Lenora Rosenfield in her *From Beast-Machine to Man-Machine* (New York: Octagon Books, 1968). But, it seems to me that she does not recognize the extent to which Descartes' contemporaries retained the traditional view of a nutritive soul and to which his immediate successors opposed his view that the body is an automaton (cf. p. 25, 63). For an account of the nutritive soul in some of Descartes' contemporaries see Walter Pagel, "The Reaction to Aristotle in Seventeenth-Century Biological Thought," in E. A. Underwood, ed., *Science, Medicine, and History*, 2 vols. (London: Oxford University Press, 1953), vol. 1, p. 489-509, esp. p. 498-509.


See my Appendix, and page 37.


Cureau, *System of the Soul*, Preface, unnumbered pages xiii and xiv. I have given the complete translation of Cureau's explanation of the diagram in the Appendix.

De *anima*, ii, 4; 415a.

Cureau moves freely between talk of faculties and souls; see, for example, *System of the Soul*, p. 162-63, 166-67.

Cureau wrote: "In fact, Plato believed that the soul of the world had this care; Avicenna gave it to a particular intelligence; and after these opinions had been banished from the Schools, most philosophers were constrained to acknowledge God as the sole and immediate cause of these movements and of the order which are to be found in them" (*System of the Soul*, p. 164).

Cureau can be seen to be extending to the vegetative faculty the opposition to Averroism which characterized the work *On Immortality* of the sixteenth-century Italian Aristotelian Pompanazzi. Like Pompanazzi, he can be seen as opposing "the universalist and collectivist views of the older tradition" and, at the same time
making the soul “a natural inhabitant of an orderly universe”: see J. H. Randall, Jr.’s Introduction to this work in Ernst Cassirer et al., eds., The Renaissance Philosophy of Man (Chicago: University of Chicago Press, 1948), p. 257.

17 Quoted in Diamond, “Marin Cureau de La Chambre,” p. 46-47. Diamond is interested in Cureau’s account of outward behavior and seems unaware of the significance of the passage he is quoting here for Cureau’s doctrine of the vegetative soul.


19 In allowing an “irritation” which was independent of sensation and the nervous system, Cureau was accepting Galenic doctrine. For Galen, however, irritation was a function of “natural faculties” which operate independently of soul. See Owsei Temkin, “The Classical Roots of Glisson’s Doctrine of Irritation,” Bulletin of the History of Medicine, 38 (1964): 297-328, esp. 312. It is interesting to note that Cureau also held that there is a “motive power (which) resides in the muscles, when they have the appropriate structure and temperament; this power is independent of the influence of the nerves themselves” (p. 476; cf. Diamond, “Marin Cureau de La Chambre,” p. 52). For Cureau’s work appeared 13 years earlier than that in which Glisson is supposed to have first espoused the concept of “irritability.”

It seems likely that Cureau’s observations on the embryo were derived from William Harvey’s De generatione animalium which was published in 1662. On Harvey’s observations see Walter Pagel, “Harvey and Glisson on Irritability with a Note on Van Helmont,” Bulletin of the History of Medicine, 51 (1967): 497-514, esp. 507, n. 29.


21 Darmon, Les corps immatériaux, esp. p. 20.

22 Rene Descartes, Passions of the Soul, in Philosophical Writings, vol. 1, p. 331-32, Article 10.

23 Merely by entering “the pores of the brain which direct the spirits” into the nerves “they produce in the [pineal] gland a particular movement which is ordained by nature to make the soul feel this passion” (Passions, Art. 36; Philosophical Writings, vol. 1, p. 342).

24 Optics, Discourse 6; Philosophical Writings, vol. 1, p. 167. Italics are mine. This work was first published along with the Discourse on the Method in 1637.


26 See his Passions of the Soul, Art. 50, Philosophical Writings, vol. 1, p. 348.


28 Descartes, Passions of the Soul, Art. 13, Philosophical Writings, vol. 1, p. 333.

29 Descartes, Passions of the Soul, Art. 44, Philosophical Writings, vol. 1, p. 344.

30 Descartes, Meditations on First Philosophy, Meditation 6, Philosophical Writings, vol. 1, p. 344.

31 But see Hermann, Claude Perrault, p. 193-98.

32 Hermann, Claude Perrault, p. 196. Leibniz’s knowledge of this doctrine would have to have been from conversation, since Perrault’s views were not yet published.
33 See, for example, Leibniz’s letter to Arnauld of 9 October 1687 in Gottfried Wilhelm Leibniz, *Philosophical Papers and Letters*, edited by L. E. Loemker, 2nd ed. (Dordrecht, Holland: Reidel, 1969), p. 338-40. Of course, as this discussion shows, Leibniz connected this doctrine with a wider metaphysical theory.


35 See, for example, Rather and Friedrichs, “The Leibniz-Stahl Controversy,” p. 34, n. 20-21. This dispute had its roots in Leibniz’s theory of pre-established harmony, which denies that there is any causal influence of the soul on the body.

36 On the authorities for this view see Hermann, *Claude Perrault*, p. 196-97.
