

The Human Machine

René Descartes (1596-1650)

A French philosopher, "the father of modern philosophy", scientist and mathematician, whose philosophical conclusion, "Cogito; ergo sum" (Je pense, donc je suis; I think, therefore I am), is the best-known quotation in all philosophy and which revolutionized the ways of thinking. Being a mathematician Descartes decided to apply the so certain-seeming methods of mathematical reasoning to philosophy.

"Good sense is of all things in the world the most equally distributed, for everybody thinks he is so well supplied with it, that even those most difficult to please in all other matters never desire more of it than they already possess."

(from *Le Discours de la Méthode*, 1637)

A Great and Difficult Thing, Michael Hawkins

(...) René Descartes provided, in his "Treatise on Man", what is now perhaps the most familiar account of the challenges associated with explaining the relations between the body and the soul and his formulation of the problems has served as the starting point for most historical inquiries. **The bodies of humans and brutes according to Descartes were complex machines** whose many actions and physiological functions were caused by the mechanical motions of their parts following 'from the mere arrangement of the machine's organs every bit as naturally as the movements of a clock or other automaton follow from the arrangement of its counter-weights and wheels.' Having only a corporeal existence, brute animals were just complex physical automata driven by the mechanical force of their passions. Humans, however, had both **a corporeal and incorporeal existence**. They had an incorporeal soul lodged within the body that was believed responsible for all acts of reason and that acted as the 'fountain keeper' directing mechanical forces according to its own dictates. Humans, therefore, were driven both by physical bodily forces and the incorporeal inclinations of their immortal soul.

[*'A Great and Difficult Thing': Understanding and Explaining the Human Machine in Restoration England*, Michael Hawkins in: *Bodies/machines* by Iwan Rhys Morus (Editor), Berg Publishers, 2002, p.15-16]

<http://www.science.uva.nl/~seop/entries/pineal-gland/#2.1>

2. Descartes' Views on the Pineal Gland

Today, René Descartes (1596-1650) is mainly known because of his contributions to mathematics and philosophy. But he was highly interested in **anatomy and physiology** as well. He paid so much attention to these subjects that it has been suggested that "if Descartes were alive today, he would be in charge of the CAT and PET scan machines in a major research hospital" (Watson 2002, p. 15). (...)

2.1 The Treatise of Man

In the *Treatise of man*, Descartes did not describe man, but **a kind of conceptual models of man**, namely creatures, created by God, which consist of **two ingredients, a body and a soul**. "These men will be composed, as we are, of a soul and a body. First I must describe the body on its own; then the soul, again on its own; and finally I must show how these two natures would have to be joined and united in order to constitute men who resemble us" (AT XI:119, CSM I:99). Unfortunately, Descartes did not fulfil all of these promises: he discussed only the body and said almost nothing about the soul and its interaction with the body.

The bodies of Descartes' hypothetical men are nothing but machines: "I suppose the body to be nothing but a statue or machine made of earth, which God forms with the explicit intention of making it as much as possible like us" (AT XI:120, CSM I:99). The working of these bodies can be explained in purely mechanical terms. Descartes tried to show that such a mechanical account can include much more than one might expect because it can provide an explanation of "the digestion of food, the beating of the heart and arteries, the nourishment and growth of the limbs, respiration, waking and sleeping, the reception by the external sense organs of light, sounds, smells, tastes, heat and other such qualities, the imprinting of the ideas of these qualities in the organ of the 'common' sense and the imagination, the retention or stamping of these ideas in the memory, the internal movements of the appetites and passions, and finally the external movements of all the limbs" (AT XI:201, CSM I:108). In scholastic philosophy, these activities were explained by referring to the soul, but Descartes proudly pointed out that he did not have to invoke this notion: "it is not necessary to conceive of this machine as having any vegetative or sensitive soul or other principle of movement and life, apart from its blood and its spirits, which are agitated by the heat of the fire burning continuously in its heart—a fire which has the same nature as all the fires that occur in inanimate bodies" (AT XI:201, CSM I:108).

The pineal gland played an important role in Descartes' account because it was involved in sensation, imagination, memory and the causation of bodily movements. Unfortunately, however, some of Descartes' basic anatomical and physiological assumptions were totally mistaken, not only by our standards, but also in light of what was already known in his time. (...)

In Descartes' description of the role of the pineal gland, the pattern in which the animal spirits flow from the pineal gland was the crucial notion. He explained perception as follows. The nerves are hollow tubes filled with animal spirits. They also contain certain small fibers or threads which stretch from one end to the other. These fibers connect the sense organs with certain small valves in the walls of the ventricles of the brain. When the sensory organs are stimulated, parts of them are set in motion. These parts then begin to pull on the small fibers in the nerves, with the result that the valves with which these fibers are connected are pulled open, some of the animal spirits in the pressurized ventricles of the brain escape, and (because nature abhors a vacuum) a low-pressure image of the sensory stimulus appears on the surface of the pineal gland. It is this image which then "causes sensory perception" of whiteness, tickling, pain, and so on. "It is not [the figures] imprinted on the external sense organs, or on the internal surface of the brain, which should be taken to be ideas—but only those which are traced in the spirits on the surface of the gland H (where the seat of the imagination and the 'common' sense is located). That is to say, it is only the latter figures which should be taken to be the forms or images which the rational soul united to this machine will consider directly when it imagines some object or perceives it by the senses" (AT XI:176, CSM I:106). It is to be noted that the reference to the rational soul is a bit premature at this stage of Descartes' story because he had announced that he would, to begin with, discuss only the functions of bodies without a soul.

Imagination arises in the same way as perception, except that it is not caused by external objects. Continuing the just-quoted passage, Descartes wrote: "And note that I say 'imagines or perceives by the senses'. For I wish to apply the term 'idea' generally to all the impressions which the spirits can receive as they leave gland H. These are to be attributed to the 'common' sense when they depend on the presence of objects; but they may also proceed from many other causes (as I shall explain later), and they should then be attributed to the imagination" (AT XI:177, CSM I:106). Descartes' materialistic interpretation of the term 'idea' in this context is striking. But this is not the only sense in which he used

this term: when he was talking about real men instead of mechanical models of their bodies, he also referred to 'ideas of the pure mind' which do not involve the 'corporeal imagination'.

Descartes' mechanical explanation of memory was as follows. The pores or gaps lying between the tiny fibers of the substance of the brain may become wider as a result of the flow of animal spirits through them. This changes the pattern in which the spirits will later flow through the brain and in this way figures may be "preserved in such a way that the ideas which were previously on the gland can be formed again long afterwards without requiring the presence of the objects to which they correspond. And this is what memory consists in" (AT XI:177, CSM I:107).

Finally, Descartes presented an account of the origin of bodily movements. He thought that there are two types of bodily movement. First, there are movements which are caused by movements of the pineal gland. The pineal gland may be moved in three ways: (1) by "the force of the soul", provided that there is a soul in the machine; (2) by the spirits randomly swirling about in the ventricles; and (3) as a result of stimulation of the sense organs. (...)

The Governor and The Telegraph, Elizabeth Green Musselman

(...) Popular texts through the first half of the nineteenth century reinforced the idea that the nerves acted not only as a route for sensations from the outside world, but also as the conduit for the mind's direction of the body. The popular and scientific literature on the nervous system considered its directive capacity to be of primary importance. For physician John Elliot, for example, the human body was

a machine composed of bones and muscles, with their proper appendages, for the purpose of motion at the instance of its intelligent principle; from this principle nerves, or instruments of sensation, are likewise detached to the various parts of the body, for such information as may be necessary for determining it to those motions of the body which may be most conducive to the happiness of the former, and preservation of both.

(...) Fact gatherers and machines needed supervisors. Analogously, the body needed the mind.

[The Governor and The Telegraph: Mental Management in British Natural Philosophy, Elizabeth Green Musselman in: Bodies/machines by Iwan Rhys Morus (Editor), Berg Publishers, 2002, p. 81]

John Elliot

Wikipedia 03/11/2008: John Elliot (? – 22 July 1787) was a physician and scientist in eighteenth-century London who was the first person to conjecture that different parts of the retina respond to particular colours of light. However, he was obsessed with Mary Boydell, daughter of the publisher John Boydell, and in 1787 was arrested for attempting to murder her. Although acquitted of attempted murder, he starved himself to death while awaiting trial for assault in Newgate Gaol.
