

The Treatise of man (De homine) by René Descartes

René Descartes's *Treatise of man* (*De homine*, 1662;¹ *Traité de l'homme*, 1664²) was never intended to stand as a work on its own. It was one part of a much larger work, *Le monde* (*The world*). Although this was finished around 1633, Descartes did not publish it himself because he was alarmed by the Italian Inquisition's condemnation of Galileo Galilei that year. Some time after Descartes's death in 1650, his French manuscript, copies of which had circulated among his friends and correspondents, was edited and published. The first version was a Latin translation (*De homine*) by Florentius Schuyl in 1662, the second the now better known 'original' French version (*Traité de l'homme*) edited by Descartes's self-appointed literary executor Claude Clerselier in 1664. In the seventeenth century the 1662 Latin version was probably much more widely read than the French text.

There were problems for the editors of both versions. Firstly, there were differences between the manuscripts: Clerselier in Paris claimed that his version was Descartes's own, that the others were 'corrupt' and that Schuyl had been 'misled' by them. However, a more important difficulty was raised because it was clear that the text was intended to be illustrated – Descartes refers to figures and to features within these labelled by letters. But no set of figures accompanied the manuscripts.

Both editors have left quite detailed accounts in their long prefaces – little treatises in themselves. Here I consider only Schuyl, the editor of the Latin *De homine*. Schuyl (1619–69) was a professor of philosophy in the town of 's-Hertogenbosch in the Netherlands, the country in which Descartes was living during the writing of *Le monde*. Two of the author's friends had copies of the manuscript that they supplied to Schuyl, and with one of these were included two sketches of illustrations apparently in Descartes's own hand. These Schuyl included. One of them (Figure 1) represents the medial and lateral rectus muscles in the orbit, which deflect the eye nasally and temporally. The other figures Schuyl had to have made and, since he mentions no one else, one supposes that he designed them himself.

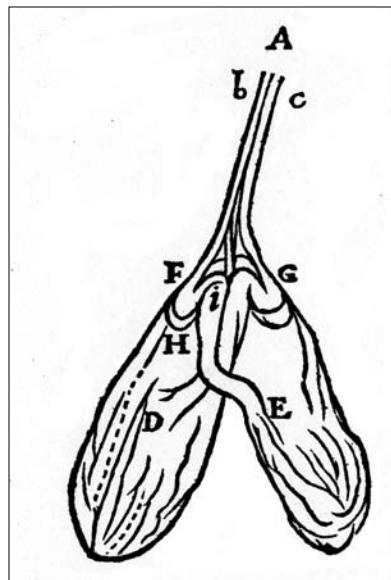


FIGURE 1 An illustration of the eye muscles from Descartes's own sketch.

Descartes was interested in trying to understand the relationship of the soul to the body, which he believed to be mediated by the brain and nervous system. He was greatly influenced in his attempts to explain neural mechanisms by the engineering developments of the seventeenth century, particularly the hydraulic automata that had been installed at Versailles. Descartes did not invent the idea of hydraulic inflation as an explanation for muscle contraction, but he greatly elaborated it and developed a hydro-mechanical theory of how the soul controlled the contraction of muscle through the intermediary of the pineal and the cerebral ventricles; in parallel he produced an explanation of how it received, through the nerves from the periphery, signals that gave rise to sensation.

The book in which Descartes's theories are set out was very influential – although the motor part of the theory was disproved only a few years later by Jan Swammerdam in Holland and Jonathan Goddard in London, who demonstrated that muscle volume did not increase during contraction as the inflation theory required. However, this did not in the least prevent widespread belief in the inflation theory and, indeed, it was the subject of a number of talks at the new Royal Society in the 1660s.

According to the motor part of Descartes's theory, the shortening of muscle was brought about by the transfer into it of fluid ('animal spirits'), the bulk of which derived from the collapse of the antagonistic muscle as it lengthened. The transfer was primed by the injection of a small quantity of 'spirits' from the cerebral ventricle; the 'priming' fluid was switched into the correct pathway by the pineal. The resulting inflation caused the muscle to expand in width and shorten in length.

Descartes was the first to point out specifically that, to bring about movement, the shortening of the agonist must be accompanied by simultaneous lengthening of the antagonist muscle. This arrangement presupposes what

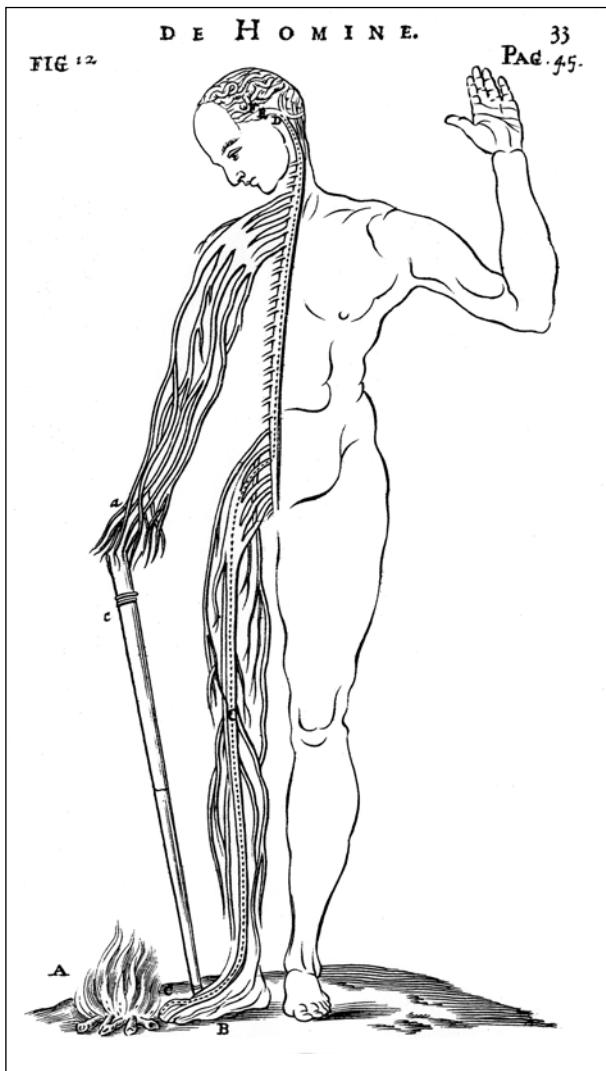


FIGURE 2 Schuyl's interpretation of Descartes's explanation of the withdrawal of the foot from a noxious stimulus.

Sir Charles Sherrington was later to call 'double reciprocal innervation'. Figure 1 illustrates Descartes's mechanism that was supposed to bring this about, and shows the supposed valves to regulate the flow of spirits between the medial and lateral recti when the eye moves horizontally. This diagram is one of the two based on Descartes's own sketches as opposed to being drawn *post hoc* according to someone else's understanding of his text.

The adumbration of reflex action is well illustrated by reference to Figures 2 and 3:

If the fire is close to the foot, the little particles of the fire which, as you know move very rapidly, are able to move with them the skin of the foot that they touch and thus, pulling the little thread c, c [the

REFERENCES

- 1 Descartes R. *De homine figuris et latinitate donatus a Florentio Schuyl*. Leyden: P Leffen & F Moyardum; 1662.



FIGURE 3 Enlargement of the head (from Figure 2), showing the supposed pores D, E, controlled by valves opened by the pull of the thread (dotted line) ascending from the periphery.

dotted line in the figure running up the body from the right foot] that you see attached to it, they immediately open the pores d, e at the end of the thread just as by pulling one end of a rope one instantly rings the bell hanging at the other end.³

The text continues by explaining how the animal spirits are directed from the cerebral ventricle:

Partly into those muscles that serve to pull the foot away from the fire, partly to those that turn the head and eyes to look at the fire and partly to those that extend the hands and turn the body to protect itself.³

Here Descartes comes very close indeed to describing a set of reflex actions with their afferent limb (the thread), efferent limb (the hydraulic system to inflate the muscles) and central mechanism (the pores in the cerebral ventricle and the actions of the pineal to direct the fluid to the correct muscle nerves). He then diverts to consider the senses before explaining 'more precisely how the spirits follow their paths through the pores in the brain and how these pores are arranged'.³ The next chapters fulfil these promises. Although the motor 'inflation' hypothesis was quickly disproved, it would be more than two and a half centuries before better explanations of the physiology of the nervous system became available.

IML Donaldson, Honorary Librarian, RCPE
(email i.m.l.d@ed.ac.uk)

- 2 Descartes R. *L'homme et un traité de la formation du foetus du mesme auteur*. Paris: C Angot; 1664.
- 3 Translations from Descartes 1662 (ref. 1), p. 32, and 1664 (ref. 2), p. 27–8.