

Vojtěch Čejka, “Descartova mechanistická fyziologie a Harveyho objev krevního oběhu”. Diplomová práce. Posudek vedoucího práce.

This diploma thesis examines Descartes' theory of the circulation of the blood and the action of the heart in his manuscript *Le Monde*, explaining the reasons for his adoption of circulatory theory and his preference for an expansive, diastolic principle of circulation. The theory is discussed in relation to other theories of the heart and blood—especially those of Aristotle, Galen and Harvey—and in relation to Descartes' own philosophical commitment to mechanistic explanations in the wider natural sphere, together with his commitment to the plenum.

The author's conclusions, based on careful attention to the historical context, are, to my mind, interesting and sometimes original. In the fifth chapter the author offers a detailed and perceptive account of the general significance of circular motion in Descartes' plenistic physics, where movement of a body out of any place must be immediately followed by movement of another body into that place to prevent the emergence of a vacuum. This predisposes Descartes to postulate circular and spiral motion both in his theory of the heavens, and in his explanation of terrestrial and organic phenomena. The circulation of the blood thus becomes assimilated to a necessary and universal feature of Descartes' particular version of the mechanistic paradigm (pp. 84-85). The author also argues that Descartes' explanation of the heart's action is fully consistent with the purity of his mechanistic principles and is not infected—as some such as Georges Canguilhem have argued—by resort to any occult principle (pp. 44-46). The author shows that when Descartes talks of a 'dark heat' or 'fire without light' in the heart, he is not appealing to a quasi-vitalistic principle, but rather assimilating the causality of the heart's motion to other natural phenomena, such as the fermentation of wine or the warmth of rotting hay—phenomena which are to be ultimately explained in a mechanistic way, as is borne out by Descartes' later work, *Principles of Philosophy* (Book IV, section 92). More generally, the author shows how Descartes is responsive to a wide range of influences in his natural philosophy, characterising the circulatory theory as a “*složitá asambláž antických a novověkých představ*” (p. 59). Among these influences is, significantly, Aristotle, who emphasized the causal importance of the heart's inner heat or glow (ζár) (p. 14), and Galen who also treated diastolic motion as the active phase of the heart's cycle (pp. 16-17). The author, therefore, calls into question standard assumptions such as that Descartes' natural philosophy is implacably opposed to Aristotelianism and tradition, or that he is simply mechanizing Harvey's findings.

The erudition of the thesis is to be commended. It displays a level of knowledge of the primary and secondary literature that goes well beyond what is to be expected at this level. The author's arguments and conclusions are not founded on a narrow or one-sided choice of secondary texts, but on a wide range of

literature in French, English and Czech. In addition, the author deals not only with the contemporary secondary literature, but shows a good knowledge of older classic texts such as Emanuel Rádl's *Dějiny biologických teorií novověku* (1905-1913), Thomas Kuhn's frequently overlooked study *The Copernican Revolution* (1957), and Koyré's *Du monde clos à l'univers infini* (1962).

I would pose the following questions for discussion at the defence:

(i) The author writes as follows: “[Lucretius] hledá argument pro prázdno jako nutnou podmínku pohybů ve světě, zatímco [Descartes] jako důsledek neexistence prázdna a podmínku pohybů spatřuje kruhové pohyby, přesuny částic v kerubu.” (p. 83) I would like to ask how Lucretius' and Descartes' differing attitudes to atoms, or corporeal indivisibles might have determined these contrasting views of the significance of motion outlined in the passage quoted. Relatively little attention is given in the thesis to Descartes' rejection of atomism and the important role of the infinite divisibility of matter which flows from his geometrical conception of *res extensa*.

(ii) In the section “Proč Descartes zavádí mechanicismus; Příklad hoření” (pp. 27-29), the author makes a good case for treating the intelligibility and economy of mechanistic explanations as features that recommended such explanations to Descartes. The author might be asked to consider whether Descartes' endorsement of mechanism also stems from his determination to make appeal only to efficient causation in physical explanations because of his view that final causes are inscrutable.

(iii) The author takes Descartes' assertion in the *Discourse on Method* that God himself places the fire without light into the human body to mean that God, as the origin of all motion, established the initial motion and laws of nature at the creation such that chains of communication of bodily motion would later produce the fire without light in individual human embryos (p. 45). If this is the case, would the author accept that Descartes is using deliberately misleading language? Would the author also accept that because of Descartes' doctrine of the continual creation or conservation of the world by God, His action is directly involved in bodily motions in every point of time too, not just at the creation?

Jednoznačně navrhuji práci k přijetí. Doporučuji známku *výborně*.

doc. James Hill, PhD