THOUGHT EXPERIMENTS IN LATE MEDIEVAL DEBATES ON ATOMISM

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Introduction

As is well-known, medieval natural philosophy, which commentators often write off as “empiricism without observations,” made wide use of thought experiments as a tool of investigation or falsification. From analogies or hypotheses warranted by imagination and God’s absolute power, medieval philosophers tried to define the precise realm of validity of Aristotelian concepts, and to modify them from inside. By invoking God’s absolute power, these philosophers also managed to reach a level superior to that of common experience. In this context, a thought experiment is best understood as an imaginary scenario whereby empirical concepts are applied to unobservable phenomena. It allows to visualise a quasi-empirical situation, possibly leading to the discovery of new laws of nature. Hence, it has both a heuristic role and a metaphysical meaning since it reaches a stable phenomenon beyond the mutability of accidents. One of these stable but unobservable objects I would like to talk about here is the atom, or point, or indivisible, that is, an extensionless entity which is the ultimate constituent of a body. As is well-known, atomism enjoyed a revival amongst a minority of natural philosophers and theologians in the first part of the 14th century. However, because of their inability to properly resolve some mathematical arguments and thought experiments, these thinkers are not highly thought of by scholars in the history of medieval science and philosophy. Yet, as I would like to argue, this reputation might not be entirely deserved. I would like to examine

1 Grant, God and Reason, 160.
2 A first approach of the medieval status of thought experiments is given in King, “Mediaeval Thought-Experiments,” 43–64. The importance of God’s power in scientific knowledge is sometimes related to the condemnation of 1277. This was Duhem’s position, challenged by Koyré. See respectively Duhem, Études, vol. 2, 411 sqq., and Koyré, Études d’histoire, 37–92. The connection between this condemnation and medieval science is still under discussion. On this topic, see Bianchi, Il vescovo e i filosofi, 122–132.
two atomist thought experiments and different ways in which their opponents tried to respond to them. By examining these responses, I hope to clarify the epistemic status of thought experiments. Thus, is a thought experiment an argument or an actual experiment? How can an imaginative experiment be verisimilar and bring about new knowledge of nature (assuming it can), and finally, what can it teach us about the medieval conception of science? For this, I will first present two atomist thought experiments, and successively examine two kinds of response.

1. Two Indivisibilist Thought Experiments

The main problem for medieval defenders of atoms or indivisibles was how to deal with a natural but imperceptible object. In order to make this entity manifest and to explain its properties, several tools were used: particularly analogies with sensible things, and thought experiments. The aim was to defend the necessity of atoms in the composition of a continuum, and even, as was the case for some of these medieval atomists, to defend the necessity of an infinite number of actual entities in the continuum. Thought experiments seemed to be useful as a way of refuting divisibilism and introducing such novel and unusual objects as points or actual infinity.

1.1. Henry of Harclay and the Promotion of Indivisibilism

The Oxford Chancellor Henry of Harclay (ca. 1270–1317) is generally regarded as the originator of medieval atomism. Among his many arguments, I would like to discuss two thought experiments in favour of atomism.

The first one, a ratio communis according to a later opponent, examines the contact between a sphere and a plane:

Again, a sphere moved over a plane touches the plane only at a point. For whether in a plane or a straight line, a circle or a sphere, there is nothing common but a point, and contact is in virtue of some common thing. But a sphere touching a plane in that manner can move continuously over a plane, therefore it can touch the plane continuously, point after point. Consequently such a line as it describes with its motion is composed of points.\(^3\)

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\(^3\) This argument from *Henry of Harclay* is quoted by Adam Wodeham *Tractatus de indivisibilitibus*. See ibid., q. 1, a. 2, § 4, 95. On Harclay’s argument, see Murdoch, “Henry of Harclay and the Infinite,” 220–261; Dales “Henry of Harclay on the Infinite,” 295–301.