

SCIENCE IN MEDIEVAL CIVILIZATIONS

Topic 3

Impact of the Condemnation of the Aristotle's Works

Both the translation of the Aristotle's works into Latin and the foundation of the European universities have brought the great improvements into the Medieval Latin Science. Their impact was even greater if one takes into an account that both these achievements have occurred simultaneously. However, according to Duhem, a decisive point in the development of the modern science was actually the condemnation of the Aristotle's works by the Bishop of Paris and the former Sorbonne Chancellor Etienne Tempier (d. 1279) in 219 articles proclaimed on the 7th March 1277, whose example was followed in the same year by the Archbishop of Canterbury and the former Oxford Franciscan John Peckham (c. 1230-1292). It should be highlighted that the mentioned condemnations had represented the continuation of the earlier condemnations of 1210 and 1270, which had also occurred at the University of Paris, and which had primarily been directed against the Aristotle's commentators rather than against his works. Thus, while the former one had condemned the works of the 2nd Century Greek peripatetic philosopher Alexander of Aphrodisias and his notion on pantheism or presence of God in all created things, the later aimed at the works of the above mentioned Spanish Islamic philosopher Averroes and his notions of the eternity of the Universe, the mortality of the soul, and God as the "Unmoved Mover" (cf. Woods, 2005).

Although the mentioned condemnations occurred because of the theological reasons, and were widely opposed and even overturned in 1325 by the followers of Thomas Aquinas, some of whose works had been condemned as well, they still had an enormous impact on the development of natural philosophy. The bishop's articles dealt primarily with the Aristotle's teachings on the eternity of the World, the double truth, one in theology and one in philosophy, and the limitations of the God's absolute power by the natural laws, which were in the direct opposition with the dogmas of the Creation, the teaching role of the Church, and the God's almightiness. This condemnation gave freedom to the medieval natural philosophers to question other Aristotle's teachings as well. By trying to bring them into the accordance with the Catholic dogmas, they were developing their own theories which were more or less independent from Aristotle. Through the examination of the original medieval documents, Duhem has managed to prove that on this track they had formulated completely new explanations of the concepts of place, time, infinity, void and the plurality of the worlds (cf. Duhem, 1985).

According to Crombie the two major contributions of the Medieval Latin Science have both resulted from the 1277 condemnation of the Aristotle's works. The first one was the idea that

SCIENCE IN MEDIEVAL CIVILIZATIONS

Topic 3

the role of science was to enable humanity to subordinate Nature, while the second one was the notion that neither the God's actions neither the human's speculations could have been constrained with any scientific or philosophical theory. Although both these ideas were based on the Bible as an undoubted authority, they had eventually managed to cause the notion of relativity of the existing scientific theories and the possibility of their replacement with the more successful ones (cf. Crombie, 1959).

At the University of Paris the Aristotelian Peripatetic physics with its rejection of a vacuum as completely impossible, was changed with a notion that Divine Omnipotence could make all things possible, although science still had to prove its existence. Thus from 1280s onward it was officially taught that, although the laws of the Nature were certainly opposed to the production of an empty space, the realization of such an empty space was not contrary to reason. An equivocal use of the word "emptiness" was the cause of several misunderstandings. While the Aristotelians rejected the notion of "emptiness of being" (which cannot be other than "nothing" and is a mere entity of reason), while the other ones were talking of the notion of "emptiness of matter" (which is a privative notion of emptiness and is a physical reality).

The mentioned notion eventually gave rise to dynamics (cf. Lindberg, 1980). The Italian Franciscan and the later saint Bonaventura (c. 1221-1274) has gone even a step further by stating that religion was superimposed to science only in the matters of the faith, but not in the problems of Nature (cf. Kalin, 1997). The French philosopher and later Bishop of Lisieux Nicolas Oresme (c. 1320/25–1382), even stated that in discussing various marvels of Nature, there is no reason to take recourse to the heavens, the last refuge of the weak, or demons, or to our glorious God as if He would produce these effects directly, more so than those effects whose causes we believe are well known to us (cf. Numbers, 2003).

At the same time across the Channel, the former University of Paris student, the Franciscan friar, and the future Bishop of Lincoln, Robert Grosseteste (c. 1175-1273), at the University of Oxford has advocated a new understanding of the Aristotelian dual path of the scientific reasoning, meaning from particular observation towards general laws, and vice versa, from general laws towards particular observations, which he called "composition and resolution," by emphasizing the role of mathematics in understanding Nature, and thus established the so-called Oxford Franciscan School of the scholastic philosophy and the natural theology whose ideas continued right until Galileo Galilei and his experiments at the University of Padua in the 17th Century. Another University of Paris student and Oxford Franciscan Roger Bacon (c. 1214-

SCIENCE IN MEDIEVAL CIVILIZATIONS

Topic 3

1294) has attacked the scholastic dependence on the ancient authorities, at the same time demanding that instead of reading books philosophers should direct their interests towards Nature, which could be explained only through the experience, which comes with the observation and the experimentation, and has thus created the empirical scientific method. The above notions were evaluated in his works *Opus Majus* (Great Work), *Opus Minus* (Less Work), and *Opus Tertium* (Third Work). He used the notion of the utility in order to judge sciences, and has thus claimed that the practical sciences are superimposed to the theoretical sciences, because the later are instrumental in achieving the goals of the former. Special emphasis was given to mathematics, as the only science leading to rigorous proofs and truths, which he perceived to be of a great instrumental value due to its quantification possibilities, and has thus called it “a gate and a key” to all the other sciences including theology (cf. Fisher and Unguru, 1971).

Yet another Oxford Franciscan Duns Scotus (c. 1266-1308) has further broadened the above mentioned division between theology and philosophy by claiming that the truths of faith are valid only for the Catholics, but the truths of reason are valid for all humans (cf. Kalin, 1997). Finally, the last from the group of the Oxford Franciscans, William Occam (c. 1287-1437) has definitely divided theology and philosophy by declaring that religion depends on the revelation, while science depends on the experience, which makes them mutually incompressible. He also postulated his own principle of the heuristic scientific reasoning which states that the simplest explanation of a certain problem should also be the selected explanation, and which is today under the name “Occam's Razor” used as one of the main ways of deciding between various possible hypothesis and theories in modern science (cf. Kalin, 1997).

The main difference between the Paris and the Oxford philosophical-theological schools was in their attitude towards the Aristotelian-Thomistic concept of analogy. While the Aristotelian way of Albertus Magnus and Thomas Aquinas prevailed at the University of Paris and as such became the official teaching of the Church at the Council of Trent (1545-1563), the Platonic path of Robert Grosseteste and Roger Bacon prevailed at the University of Oxford and with its emphasis on the mathematical formulas in the natural sciences created the methodological premises of the modern sciences. By rejecting the Aristotelian-Thomistic teaching on analogy, the 13th Century Oxford Franciscan School had to find its own principles on which to base the understanding of the Universe. In this respect, its method of scientific research was brought back to the level of the ancient Ionian philosophers, although with the more advanced measuring instruments and mathematical tools. On this track, the Aristotelian-Thomistic notion

SCIENCE IN MEDIEVAL CIVILIZATIONS

Topic 3

of a matter as an incomplete and partial reality had to be changed with the Oxford understanding of it as a complete substance, which had a profound influence on the later natural philosophers. In conclusion one could say that in Oxford a new scientific way of mathematical thinking originated in response to the old theological way of analogical thinking in Paris. Thus, while Duns Scotus resolved the analogy of being in a multiplicity of univocals, William of Ockham dissolved the reality of universals into pure names by denying them a real existence outside of the mind. The mentioned notions continued to have an influence on the formation of the Galilean and Newtonian science as a basis of the modern natural science.

According to Grant, it was precisely the above mentioned division between the faith and the reason, the Church and the State, the religion and the science that was a decisive prerequisite for the occurrence of the Renaissance in the Latin West. The best proofs of it are the above mentioned examples of the Byzantine Empire, in which Church was subordinated to the State, and the Muslim East, in which religion controlled all aspects of life, and which both had never experienced such a change, despite their better starting positions regarding the accessibility of the ancient sources. Although the mentioned division had originated already in the Bible (“Give to emperor what is emperor’s and to God what is God’s”, Mt 22:21) it has developed in its full expression only during the Middle Ages (cf. Baum, 2005).

Kaynak: Atalic, B. (2014). Middle Ages, Science in the. Interdisiplinary Encylopedia. Eriřim: <http://inters.org/middle-ages-science>