

SCIENCE AND DIVINE PHILOSOPHY IN THE
SEVENTEENTH CENTURY EUROPE

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When the Church accused Galileo for supporting Copernican astronomy which was alleged to violate the Scripture, he defended himself against the charge and asserted that the Bible taught how to go to heaven, not how the heavens go. This remark heralded the differentiation of science from religion in the years to come.

The seventeenth century marks an important era in the history of ideas. It was a time of great activity in many fields of culture, *e.g.*, literature and philosophy, and science in Europe. Though Shakespeare (1564-1616) was at the fag end of his life, Milton (1608-1674) and Moliere (1622-1673) had their full spans in the seventeenth century itself. In philosophy, we have in England the precursor of the empirical movement, Francis Bacon (1561-1626), and in France, Descartes (1596-1650), the father of the rationalist movement. In Netherlands, Spinoza (1632-1677) in a short span of life endeavoured to work out a standpoint from which religion, morality, and science could be viewed in their proper perspective. In Germany, Leibnitz (1646-1716) like Descartes was a scientist and philosopher both. In philosophy Leibnitz advocated 'pre-established harmony in the universe' while in science he made one of the greatest contributions by creating the infinitesimal calculus (simultaneously with Newton but quite separately). Galileo (1564-1642) had numerous achievements to his credit like the principles of motion and discovery of the Jupiter's satellites, to name only a few. After Galileo, we have back in England, Newton (1642-1726) who due to his most fundamental creations and researches in various areas is called the father of modern science.

THE MYSTERIOUS SPIRITS

William Harvey (1578-1657) published his discovery of circulation of blood in 1628. Its most important consequence was the impulse to substitute mechanical and chemical for 'spiritual' explanations of vital action. The seventeenth century saw 'spirits' abolished in most regions of internal anatomy. 'In the torrential rush of blood there was simply no room for them in the veins of arteries'.¹

The 'spirits' however stayed in the universe. Kepler discovered the laws of planetary motion in 1609 and 1619. But he felt that because the planets did not move as they should—uniformly in circles—there were 'moving spirits' in the planets. A force was also imagined by him, emanating from the sun, which he traced in part to magnetism. Later, the Cartesian theory of vortices banished from the planetary theory the 'moving spirits'.

Earlier to the seventeenth century, the study of nature was linked to the concept of Providence. Both Francis Bacon and Descartes had eliminated the preoccupation of science with final causes. Yet they could not separate hard science from divine philosophy. Bacon presented his experimental method as a more pious means of reading the book of God's work than the philosophizing of the scholastics. He also saw in the application of scientific knowledge a means of restoring the dominion over nature which man had lost at the Fall.²

One of the obsessions of Physics still was the perpetual motion and of chemistry (alchemy) the transmutation of base metals into gold and the elixir of life. Ideas were more real than material things. The concept of physical or bodily materiality was lacking. Religions had selected those features from Aristotle which best suited them and had produced a scholastic theology. Mechanics and embryology were hampered so long as they were mixed with Aristotelian philosophy since science is deeply influenced by the spirit of the time and has 'reflected the values, ambitions, fears, and hopes of the society in which it grew'.³

SCIENTIFIC ATTITUDE

Milton sang, 'How charming is divine philosophy' (Comus) and hailed 'holy light, offspring of Heaven, first-born' (Paradise Lost). Likewise Newton, Leibnitz, Descartes, and most scientists of that century believed in the Divine; they were even religious. They saw in the passiveness of matter (as expressed by Newton in the laws of motion) 'a need of a God to move it or to link it with the human will'. Descartes thought that mind is not extended in space; mind and matter are mutually exclusive. But it was the acceptance of the 'scientific' attitude which was the dominant characteristics of the atmosphere of the seventeenth century. Although the rationalists could account for the persistent problems of philosophy concerning God, soul, and immortality, empiricism rejected them as spurious.⁴

Bacon gave the cry of 'stick to facts'. For both Bacon and Descartes, the vital question was, by what method could sure knowledge be founded. For both of them, experimental science as opposed to the scholasticism of the universities, was the principal hope. Bacon said, 'but men must know, that in this theatre of man's life it is reserved only for God and angels to be lookers on', and further 'Men must pursue things which are just in present and leave the future to the divine Providence' (*Advancement of Learning*).

Descartes also said in the same vein that he wished, "to induce intelligent men to try to advance further by contributing each according to his inclination and ability, to the necessary experiments and also by publishing their findings. Thus the last would start where their predecessors had stopped, and by joining the lives and works of many people, we would proceed much farther together than each would have done by himself".⁵

But while Bacon carried contempt for theory further than it can go, Descartes carried distrust of the senses, like the distrust of *a priori* dogma, to its logical conclusion. It was perhaps Descartes who first brought into science abstraction as it is now understood. Copernicus had given an impressive illustration of the fact that science cannot always trust to the senses, but must go behind them and that what is seen is capable of more than one interpretation.⁶

INTERACTION

Actually, there was no separation of science and theology in the seventeenth century but at best a differentiation. Some believed in the existence of two truths instead of one and thought that the two *viz.* the truth of philosophy known by reason, and the truth of theology known by faith were essentially opposed to each other. St. Thomas in the thirteenth century had demarcated the provinces of philosophy and theology. In the seventeenth century, science and practical arts gained prominence. Theology too came under their impact and became 'secular', in the sense that it was practised by laymen and its orientation was towards the study of this world. The divine attributes and issues like omnipresence, omnipotence, providence, infinity, and creation went through critical studies and change of conceptual framework.

Theological concerns were frequently expressed in terms of secular knowledge. The 'infinite' of Aristotle became the mathematical infinite, either as the incalculable or the quantitatively indefinite. The Absolute Infinite was taken as absolutely unlimited, excluding only absolute nothing, as the Universe of Possibilities open to the omnipotence of God. Space and time were deemed created with the world. Space and time, as per Newton, became each absolute and separate from anything else. Reality came to be recognized more and more as a term to be applied exclusively to the external world. Physical meaning came to be attached to a more literal understanding of omnipresence to the extent that Newton could virtually identify space with the divine 'sensorium' (a clearing house of mind).

Some of the basics of science were also expressed in theological terms. Newton distinguished experimental facts from philosophical queries. For Newton, God had created the world fully fashioned in its present form, and only then had the laws of mechanics come into operation to sustain the cosmic machine.⁷ Newton's universal law of gravitation was ultimately groomed in the omnipresence and will of a deity who was 'very well skilled in mechanics and geometry'. He wrote that gravity must be caused by an agent, but whether the agent be material or immaterial 'I leave it to my readers'.

Descartes justified the conservation of linear motion in terms of constancy of God. He was of the view that there was one mechanical world of matter and motion, and another spiritual world which included the soul of man, the two worlds being largely separate, connected only through the Pineal gland in the case of man.⁸

THE NEW IDEALS

Epistemological ideals emerged as a consequence of interaction of science and divine philosophy and they became the ideals for both. Description of nature was to be given in a universal rather than symbolic language. Nature had to be conceived as homogeneous in contrast to sublunar/superlunary dichotomy of Aristotelian cosmos. The homogeneity, absoluteness, and infinitude of Newtonian space came as a reflection of what was understood by God's omnipresence and eternity.

Science accepted two more ideals : mathematicization and mechanization. If only mathematical models could be constructed as limiting cases of physical reality, they could acquire explanatory power. The medieval philosophers on the contrary thought that the ideal case even if mathematically represented was incommensurable with the real world. Mechanization came on the insistent demand for knowledge by experiment and construction. Projection of mechanical models on to nature corresponded to the view that the world could be understood by knowing how it had been constructed. Science carried on its efforts to establish its claim to an independent investigation of natural phenomena by observational and experimental methods unhampered by fear of theological interference.⁹

ROBUST HOPE FOR PROGRESS

We revert to Francis Bacon for his leadership in creating scientific attitude and optimism. He thought that some of the consequences of the Fall of Man could be repaired by the application of science to the common uses of mankind. He had envisaged considerable progress in the arts and crafts. The Royal Society is stated to have taken up Bacon's projects but by the end of seventeenth century they confessed themselves 'thwarted in their design to perpetuate a series of useful inventions'.¹⁰

The conception of Leibnitz that this is the best of all possible worlds then became popular as evidenced in the dictum 'Whatever is, is right' given by Alexander Pope¹¹ (1688-1744) :—

“All nature is but art unknown to thee,
All chance, direction which thou canst not see ;
All discord, harmony not understood ;
All partial evil, universal good ;
And, spite of pride, in erring reason's spite,
One truth is clear, Whatever is, is right.”

(An Essay on Man)

Although the idea of technological progress could not take shape, the idea of progress in general remained to stay, with science partially spiritualized.

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