Biographical Encyclopedia of Astronomers

Grosseteste, Robert

Born Stowe, Suffolk, England, after circa 1168

Died Lincoln, England, 9/10 October, 1253

Some scholars consider the work of Robert Grosseteste to mark the beginnings of modern experimental science.

Although Robert Grosseteste, or "Greathead," was born into the poorest class of feudal society, he received formal education from his earliest years. Evidence for the first five and a half decades of his life is scanty We know that he worked in the employ of Bishop William de Vere of Hereford until the latter's death in 1198. The cathedral school of Hereford was a renowned center for study in the liberal arts, theology, law, and the natural sciences; some of its masters were acquainted with Arabic learning. The period of Grosseteste's life between 1198 and 1225 is subject to a controversy that has broad implications for understanding his place in history. According to a hypothesis first advanced by Daniel Callus in 1955, upon leaving Hereford, Grosseteste became a master of arts at the University of Oxford. When studies were suspended there between 1209 and 1214, he immigrated to Paris. When the University of Oxford reopened, Grosseteste was made head of its schools and subsequently became its first chancellor. In 1986, the late Sir Richard Southern challenged this account, claiming that Grosseteste never studied or taught outside England. Moreover, according to that eminent British historian, Grosseteste's association with Oxford University began only around 1225. He thus spent his most formative years at provincial schools.

While the Callus account considers Grosseteste to be part of the mainstream of Scholastic education, centered as that was on theological concerns as defined at the University of Paris, Southern's revisionist interpretation regards him as a somewhat eccentric thinker whose interests were shaped by the English scientific tradition (with forerunners such as Adelard of Bath, Daniel of Morley, and Alfred of Shareshill). For Callus and his followers, then, Grosseteste was a conservative theologian who cultivated some scientific interests on the margins of his career. For Southern, on the other hand, Grosseteste was a scientist turned theologian, moreover, whose "English mind" (thus the subtitle of Southern's book) inevitably led him into controversy with the pope.

From 1225 onward, documentary evidence for Grosseteste's life becomes more abundant. In 1225, he was made deacon at Abbotsley, in the diocese of Lincoln This was the first step in an ecclesiastical career that would, in 1235, raise him to the level of Bishop of Lincoln. Between circa 1229 and 1235, Grosseteste lectured to the Franciscans at their study house in Oxford. After his appointment as bishop, pastoral care for the people in his diocese became one of Grosseteste's principal occupations; nevertheless, some of his most important philosophical and theological works date from this period as well. Early in 1253, Bishop Grosseteste learned that Pope Innocent IV had bestowed an important ecclesiastical office in his diocese upon one

of the pope's own nephews, unqualified for the job. Furious, Grosseteste refused to obey the pope's order, a decision that is again subject to vastly different interpretations. In Southern's view, this makes Grosseteste a kind of proto-reformer, and one who failed tragically. For a Catholic scholar such as James McEvoy, Grosseteste's courageous reaction convinced the pope of the failings of his own *curia*.

Robert Grosseteste was a man of unusually wide-ranging interests. His scientific writings on astronomy and its practical applications for calculating the ecclesiastical calendar, meteorology, comets, the tides, the understanding of natural laws in terms of geometry, and light and optics were mostly composed before 1235. The method displayed in some of them has won him acclaim as the inventor of experimental science. But once again this claim, made by A. C. Crombie in 1953, is deeply disputed. Grosseteste did not, however, limit himself to science in his early years. Already before 1230, he compiled a highly original index of theological sources that attests to his detailed and broad knowledge of the field, apart from showing acquaintance with works of Greek, Roman, and Arabic provenance. He also wrote extensively on Scripture

Many of these interests and sources—natural science, Arabic learning, scriptural studies, theology, Aristotelian physics—flow together in Grosseteste's philosophical masterpiece, the short treatise *De luce* (On Light). *De luce* contains Grosseteste's principal contribution to astronomy: an account of the origin of the universe through the self-diffusion of light. The treatise begins with the assertion that light is the first form of corporeality. Following an Arabico-Jewish tradition of thought, Grosseteste holds that matter itself is dimensionless, being extended in space only in conjunction with this form of corporeality. At the beginning of the universe, then, light rushed out from a single point, carrying matter with it. Light spread itself instantaneously and equally in all directions, until matter became so thin that no further rarefaction was possible. At this point, the process came to a halt, forming the

sphere of the first firmament. In a series of original mathematical propositions on relative infinities, Grosseteste shows that only an infinite "plurification" of light could yield the finite dimensions of the universe.

However, light's power of self-diffusion was not exhausted by the formation of the outermost sphere, and the matter below it remained susceptible to greater rarefaction. The process of self-propagation therefore reversed, with light now traveling inward from the first firmament toward the center of the universe. This process came to a standstill when, again, the matter that light carried with it reached the limits of its possible rarefaction and congealed, as it were, in the second sphere. Since the matter below the second sphere was denser than that below the first, the process of self-diffusion could then start again from the second sphere Gros-seteste himself describes this bellows-like movement as an "assembling which disperses" (*congregatio disgregans*): As light carried matter with it, it dispersed it, but only to assemble it into bodies of increasing density whenever the process of dispersal reached its natural limits. This alternating movement of expansion and contraction occurred nine times, engendering the nine celestial spheres of the universe, with the earth at its center.

On the one hand, the cosmogony of the *De luce* sketches the outlines of an ambitious scientific project: that of comprehending the origin and structure of the universe by means of the

mathematical laws that govern the self-diffusion of light. On the other hand, De luce has far-reaching theological implications. Standing in the Augustinian tradition of light metaphysics, Grosseteste literally took the biblical statement according to which "God is light" (1 John 1:5). His cosmogony was, then, an attempt to understand the creative dynamism through which God became, and remains, present in the universe.

Philipp W. Rosemann

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