Biographical Encyclopedia of Astronomers

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d'Aurillac, Gerbert

Born Aurillac, (Cantal), France, circa 945

Died Rome, (Italy), 12 May 1003

Gerbert was a man ahead of his time. Europe did not see such a great contribution to science again for several hundred years

Gerbert was born sometime between 940 and 950 in or near Aurillac, France, to what has often been politely described as "humble parents" or an obscure and poor family. His rise to power was extraordinary in an age when royal blood meant nearly everything in terms of professional advancement. It is a credit to Gerbert's tremendous intellect, which was, unfortunately at the time, often equated with magic and the devil. The exact year of his birth is unknown, though some give 945. What is certain is that he was apprenticed to the Church early, beginning his training at the monastery in Aurillac. In 967, Gerbert was taken to Spain by Boreal, Count of Barcelona, to study under the Arabian teachers, possibly at Cordova and Seville In 971, Boreal and Octo (Hatto), Bishop of Vich, took Gerbert with them on a mission to Rome, where he attracted the attention of Pope John XIII and Emperor Otto I. The latter employed Gerbert as an instructor to Prince Otto II. In 972, Otto I sent Gerbert back to his native France with Archdeacon Garamnus, who taught Gerbert logic. He was to teach at the cathedral school in Reims for Archbishop Adalbero. Very soon, Gerbert was composing Adalbero's letters for him. His fame as a scholar and preeminent teacher was quickly established, and Gerbert's school in Reims gained considerable attention The text of the debate, presided over by Otto II, was recorded by a certain Otric, a master at Magdeburg, who debated Gerbert in 980 at Ravenna. The text of the debate survives to this day, and it is clear that Gerbert prevailed. Otto II was so pleased with the result that he appointed Gerbert in 983 as Abbot of Bobbio, which was reportedly famous not only for scholarship but also for its esteemed library. However, his stay was short-lived. Otto II died on December 7, 983, leaving Gerbert, who had ruffled feathers during his year at Bobbio, to flee to France, where he again took up a post at Reims. In 991 he was temporarily elevated to Archbishop of Reims, a post held by his long-time friend Adalbero, who died on 23 January 989. Gerbert was relieved of his duties on 1 July 995. He returned to Italy and Otto III, where, in 998, Pope Gregory V appointed him Archbishop of Ravenna. On the death of Gregory V, Gerbert was elected to the papacy on 18 February 999 and adopted the name Sylvester. His reign as pope was filled with church and political duties, and it is not clear whether he made any significant scientific advances during his reign. He died soon after his confidant Otto's death.

There are some who would argue that Gerbert's greatest contribution to astronomy was his teaching. This may indeed be true, for extant writings of both Gerbert and his contemporary Pierre Richer describe in detail his teaching style Gerbert reportedly used what are now commonly called "visual aids" in his teaching. Richer reports that all of Gerbert's aids were self-constructed, as they would have had to be in the 10th century. Utilizing Richer's and Gerbert's writings, O. Darlington has compiled a description of some of Gerbert's techniques. His instructions assumed that the world was round and utilized a great deal of knowledge inherited from the Greeks. The latter fact is probably due to his Moorish training, as Arabic teachers were the keepers of Greek knowledge for the majority of the Middle Ages. Gerbert was also a champion of the spherical Earth concept, which had been believed by many learned

Greeks and Arabs, but not often by Europeans. Richer relates how Gerbert would use a wooden sphere of the world, slanting it by two poles on the horizon in order to show the relation of the constellations to the poles (presumably also utilizing a star chart for reference). He apparently drew a horizon line on the sphere to demonstrate the rising and setting of the stars and to better illustrate the reality of observation. Richer also notes that Gerbert proved that the rising and setting of stars was a movement in an oblique direction that covered the various areas of the world. Gerbert reportedly divided his spheres into 60° rather than 360°; his lateral lines were thus equal to six modern degrees. Gerbert's polar circle, then, appeared at 26°, which is off from the actual mark of just over 23°. However, his location of the tropics was nearly exact, and his equator was exact. This is likely due to the fact that the Earth is not spherical but oblate, which would mean an increase in error with an increase in latitudinal line. Gerbert also used spheres to describe the paths of the planets and constructed what could be considered an early version of a three-dimensional planisphere.

Gerbert made numerous other advances, including the one for which he is best remembered: The introduction of Arabic numerals to Europe (an early version of the numerals we use today). He initiated methods of Arabic mathematics into his teaching and thus into Europe itself, and modified the Roman abacus in order to utilize a decimal point. The stones he used on the abacus were called calculi. His revision meant that complex mathematics like multiplication and division were no longer solely the domain of specialists.

Ian T. Durham

Alternate name

Pope Sylvester II

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