Abu Al-Wafa Encyclopedia Article

Abu Al-Wafa

Contents

Abu Al-Wafa

940-998

Persian Mathematician and Astronomer

Abu al-Wafa introduced the trigonometric functions of the secant and cosecant, and developed a method for computing sine tables. As an astronomer, he worked in a Baghdad observatory, where he created the first wall quadrant, a device used in observing the movement of heavenly bodies. He also wrote and translated a number of works.

His full name was Muhammad ibn Muhammad ibn Yahya ibn Isma'il ibn al'Abbas Abu al-Wafa al-Buzajani, and he is known variously to history as Abu al-Wafa, Abu al-Wafa al-Buzajani, Abu'l Wefa, and Abul Wefa. The details of his early life are unknown, and the first definitive date from his career is 959, when he began his work at the Baghdad observatory.

Though he is rightly credited for his invention of the wall quadrant, Abul Wefa did not—as some historians later claimed—discover the variation or inequality of the moon's motion. His work on lunar theory required the development of new trigonometric methods, and thus it was that he calculated tangent and cotangent tables. He also created the secant and cosecant functions, and employed a new means of calculating sine tables, as an aid to astronomical observation. In addition, he proved the generality of the sine theorem for spherical triangles.

Abu al-Wafa also made an invaluable contribution to scientific knowledge by translating ancient works of Euclid (c. 325-c. 250 B.C.) and Diophantus of Alexandria (c. 200-c. 284) into Arabic. These writings would eventually influence scholarship in Europe, where many of the Greek originals had been lost. Likewise some of Abu al-Wafa's commentaries on Euclid, Diaphanous, and al-Khwarizmi (c. 780-c. 850) have disappeared. In the realm of applied mathematics, he wrote works whose titles have been translated as *Book on What Is Necessary from the Science of Arithmetic for Scribes and Businessmen* and *Book on What Is Necessary from Geometric Construction for the Artisan.*