

Biographical Encyclopedia of Astronomers

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Wilson, Alexander

Born Saint Andrews, Scotland, 1714

Died Edinburgh, Scotland, 16 October 1786

Alexander Wilson suggested that stars may be prevented from falling together under mutual gravitational attraction by their motion around a distant common center of gravity, but he is best known today for his observation that sunspots at the limb of the visible surface of the Sun appear to be saucer-shaped indentations, known as the Wilson effect

Wilson was the younger son of Patrick and Clara (née Fairfoul) Wilson. His father, the town clerk of Saint Andrews, Scotland, died when he was comparatively young, leaving Alexander to be raised primarily by his mother. After graduating with an MA from Saint Andrews University in 1733, he apprenticed to a surgeon and apothecary in Glasgow and then moved to London to take charge of an apothecary's shop. In 1742, Wilson conceived of a new method of casting printer's type and returned to Saint Andrews where he established a type foundry. In 1744 he moved the enlarged type foundry to near Glasgow and provided type for Messrs. Foulis, printers of University of Glasgow publications, especially for their editions of the Greek classics. Wilson married Jean Sharp in 1752

As a person of rather broad experimental interests and interested in astronomy since he was a student, Wilson began making reflecting telescopes in the late 1740s. In 1756, Glasgow University received a legacy of valuable astronomical instruments from Dr. A. Macfarlane of Jamaica and built an observatory to house them. In 1760, King George II appointed Wilson as the first professor of practical astronomy and observer at the University of Glasgow. Wilson published several astronomical papers in the *Philosophical Transactions of the Royal Society* dealing with the 1769 transit of Venus, the eclipses of Jupiter's first satellite, and the cross-wires in eyepieces

Wilson's best-known paper, which dealt with the nature of sunspots and what became known as the Wilson effect, appeared in the *Philosophical Transactions* in 1774. The paper was based on his observations of a very large sunspot in November 1769. Wilson noticed that just before the Sun's rotation carried the spot beyond the Sun's limb, the apparent width of the penumbra on the side of the spot remote from the limb was less than that on the side closest to the limb. When the spot later reappeared on the other limb of the Sun, the narrowing of the penumbra was obvious on the opposite side of the spot, but the spot regained its usual appearance as it moved away from the limb. Although this effect had been remarked upon by such earlier observers as Christoph Scheiner, Philippe de la Hire, Jacques Cassini, Leonard Rost of Nuremberg, and Pastor Schülen of Essingen, Wilson was the first to analyze the observation in a geometrical sense. He accounted for the observed saucer shape of the spot as an effect of perspective. He extended his reasoning to make a novel interpretation of the nature of the Sun. Arguing that the Sun was a dark body surrounded by a luminous atmosphere, Wilson suggested

that sunspots might be funnel-shaped holes in the Sun's atmosphere, and that the umbra of the sunspot was the hole at the bottom of the funnel near the surface of the darker solid body. Although Joseph de Lalande challenged Wilson's description, the idea was supported by William Herschel and was only displaced by spectroscopic studies a century later.

Reacting to Isaac Newton's question as to why the stars do not all fall together under the force of their gravity, Wilson suggested that this might be because they are in periodic rotation around some distant center of gravitation. A letter conveying this speculation was acknowledged by William Herschel in the latter's paper on the structure of the Universe

Wilson was interested in the variation of temperature with altitude in the Earth's atmosphere, which he studied using thermometers mounted on kites. He also worked on methods of determining the specific gravity of liquids and solids. Wilson resigned his position in 1784, and his second son, Patrick, succeeded him as a professor. One of the founders of the Royal Society of Edinburgh, Wilson received a Gold Medal from the Royal Danish Academy and an honorary MD degree from Saint Andrews University. A lunar crater is named for him.

Roy H. Garstang

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