Wallace, William | Encyclopedia.com

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(*b*. Dysart, Scotland, 23 September 1768; *d*. Edinburgh, Scotland, 28 April 1843), *mathematics*.

Wallace had no schooling after the age of eleven, when he was apprenticed to a bookbinder; he subsequently taught himself mathematics and became a teacher at Perth. In 1803 he was appointed to the Royal Military College at Great Marlow and in 1819 became professor of mathematics at the University of Edinburgh, where he remained until his retirement in 1838. Wallace wrote many articles for encyclopedias and numerous papers in *Proceedings of the Royal Society of Edinburgh*, including some on mechanical devices. He also played a large part in the establishment of the observatory on Calton Hill, Edinburgh.

The feet of the perpendiculars to the sides of a triangle from a point *P* on its circumcircle are collinear. This line is sometimes called the pedal line but more often, incorrectly, the Simson line of the triangle relative to *P*. It was stated by J. S. Mackay that no such theorem is in Simson's published works. The result appears in an article by Wallace in Thomas Leybourn's *Mathematical Repository* (**2** [1799-1800], 111), and Mackay could find no earlier publication. In the preceding volume Wallace had proved that if the sides of a triangle touch a parabola, the circumcircle of the triangle passes through the focus of the parabola, a result already obtained by Lambert. To demonstrate this, Wallace showed that the feet of the perpendiculars from the focus to the sides of the triangle lie on the tangent at the vertex of the parabola. which is equivalent to saying that the pedal line of the triangle is the tangent at the vertex. The close connection of this theorem with the pedal line suggests that Wallace was led to the property of the pedal line from the parabolic property.

In 1804 the following result was proposed for proof in *Mathematical Repository* (n.s. 1. 22): IF four straight lines intersect each other to form four triangles by omitting one line in turn, the circumcircles of these triangles have a point in common. The proposer was “Scoticus” , which Leybourn later said was a pseudonym for Wallace. Two solutions were given in the same volume (170). Miquel later proved that five lines determine five sets of four lines, by omitting each in turn; and the five points, one arising from each such set, lie on a circle. Clifford proved that the theorems of Wallace and Miquel are parts of an endless chain of theorems: $2n$ lines determine a point as the intersection of $2n$ circles: taking one more line, $2n + 1$ lines determines $2n + 1$ sets of $2n$ lines, each such set determines a point, and these $2n + 1$ points lie on a circle.

BIBLIOGRAPHY

Two articles by J. S. Mackay in *Proceedings of the Edinburgh Mathematical Society*—**9** (1891), 83–91, and **23** (1905), 80–85—give the bibliography of Wallace's two theorems and later extensions and generalizations with scholarly thoroughness.

For a full account of Wallace's life, see the unsigned but evidently authoritative obituary in *Monthly Notices of the Royal Astronomical Society*, **6** (1845), 31–36.

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