Arthur Lee Dixon

Arthur Lee Dixon (1867 – 1955) was a mathematician of the 19th and 20th century. He studied mathematics at Worcester College before he became a Tutorial Fellow at Merton College in 1898, a position he held for more than twenty years. In 1922 he was then appointed Waynflete Professor of Pure Mathematics. He would be the last mathematician to be elected to an Oxford Chair with life tenure. Dixon was also a Fellow of the Royal Society and became President of the London Mathematical Society in 1924, incidentally a position his older brother, Alfred Dixon, also a mathematician, would hold seven years later. Dixon remained an active mathematician until the end of his life, his last paper was published when he was 80 years old.

Dixon himself said that the biggest influence on his studies was Edwin Elliot, who worked on algebra, algebraic geometry, and elliptic functions. Elliot also was the first Waynflete Professor of Pure Mathematics and Dixon would go on to become his direct successor. He also claimed to have been inspired by Charles Dodgson, the mathematician nowadays known under the pseudonym Lewis Carroll, author of "Alice's adventures in Wonderland", who he met once.

Arthur Dixon's research was mainly concerned with analytic number theory, application of algebra to geometry, elliptic functions and hyperelliptic functions. Dixon published work on algebraic eliminants, building on the findings of Arthur Cayley, who left this subject incomplete. Elimination theory focuses on the elimination variables between polynomials in several variables. He was also interested in cubic surfaces, Bessel functions and Schur quadrics.

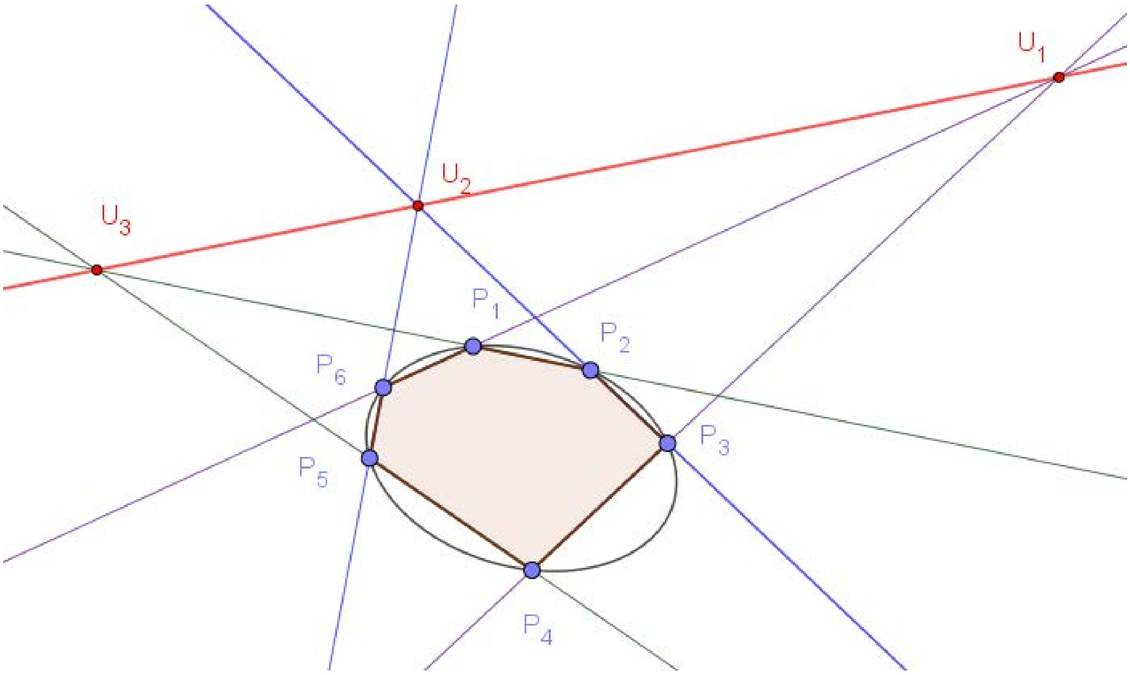
Pascal's Theorem

Dixon also published two articles focusing on results relating to Pascal's Theorem, "Pascal's theorem" [1] and "On a figure formed from the Pascal hexagon" [2]. While I will not go into the details of these results here, I find Pascal's Theorem quite surprising and beautiful, so I want to take this as an opportunity to briefly explain the theorem.

Say we are given a conic, so an ellipse, parabola, or hyperbola. In the picture below we have chosen an ellipse. Now fix six points, P_1, P_2, P_3, P_4, P_5, P_6, on the conic. We have a hexagon, which obviously has three pairs of opposite sides.

First suppose no opposite sides are parallel to each other. Consider the intersections of two opposite sides, denoted by U_1, U_2 and U_3 respectively. Here U_i is the intersection of two opposite sides, none of which passes through P_i. Then Pascal's Theorem states that these three points lie on a line, called the Pascal line.

If exactly one pair of opposite sides is parallel, then the remaining two points of intersection lie on a line, also parallel to the two parallel sides. We cannot have exactly two pairs of parallel opposite sides. If all three pairs of opposite sides are parallel lines, then there will be no Pascal line, as we have no points of intersection.



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References

[1] Dixon, A. L. *Pascal's theorem.* Messeng. Math. 37, 17.

[2] Dixon, A. L. *On a figure formed from the Pascal hexagon.* Messeng. Math. 37, 1.

[3] Weisstein, Eric W. *Pascals Theorem.* http://mathworld.wolfram.com/PascalsTheorem.html

[4] Chaundy, T. W. *Biographical Memoirs of Fellows of the Royal Society, Arthur Lee Dixon.* https://www.jstor.org/stable/769241?seq=1# page_scan_tab_contents

[5] MacTutor History of Mathematics archive. *Arthur Lee Dixon.* http://www-history.mcs.st-andrews.ac.uk/Biographies/Dixon_Arthur.html

[6] Fauvel, John. *Oxford figures:* 800 *years of the mathematical sciences.* Oxford University Press, 2000.