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Obituary

L. J. Mordell

(28 January, 1888 to 12 March, 1972)

L. J. Mordell reached the age of 84, working till the end and publishing not so long ago an important book on Diophantine equations. With him passes away one of the most distinguished mathematicians of this century. In particular, his work in number theory has been outstanding.

Originally a citizen of the United States of America, Mordell early this century assumed British nationality. Since 1907 he studied at the University of Cambridge, England, and he finally became a Life Fellow of St. John's College, having been a lecturer at Birkbeck College, University of London, from 1913 to 1923, a professor of pure mathematics at Manchester University from 1924 to 1945, and finally the Sadleirian Professor of pure mathematics at the University of Cambridge from 1945 to his retirement in 1953 when he reached the age of 65. After this date he stayed for shorter or longer periods at a great number of different universities in Europe, America, Africa, and Asia. Altogether he lectured at rather more than 170 places!

Mordell's first outstanding work was concerned with Poincaré's conjecture on the finite basis of the rational points of algebraic curves of positive genus. He succeeded in proving this conjecture for $p = 1$, using a method of descent. His method was later generalised by A. Weil to prove the conjecture for general $p \geqslant 1$, and this work by Mordell and Weil formed the basis for Siegel's proof that there are only finitely many lattice points on algebraic curves of genus $p \geqslant 1$.

In the early 1930's Mordell became interested in Minkowski's geometry of numbers and the related problems from Diophantine approximations. One of his results was a very simple arithmetic proof for Minkowski's theorem on lattice points in convex bodies. Other work of this time dealt with theta functions and with definite integrals.

But perhaps the most important results by Mordell while at Manchester were concerned with nonconvex problems in the geometry of numbers, thus opening up an entirely new discipline for research.

In 1938 H. Davenport had obtained the exact minima of products

$$\left| \prod_{h=1}^{3} (a_h x + b_h y + c_h z) \right|$$

of three linear forms at lattice points $(x, y, z) \neq (0, 0, 0)$ when either all three forms are real, or when just one form is real and the other two forms are complex conjugate. Davenport's proofs were rather complicated, although he later replaced them by very elegant ones; they were at least in their final form of an arithmetic kind. At the time of this work, Davenport was at Manchester University, in Mordell's department.

Mordell, in 1940, succeeded in obtaining a much simpler approach to Davenport's results. Firstly, by means of a very elegant transfer principle, he could reduce these three-dimensional results to two-dimensional problems

$$|f(x, y)| \leq 1,$$

where $f(x, y)$ is a real binary cubic form, either with three real linear factors, or with one real linear factor and two complex conjugate linear factors. Secondly, he found a simple geometric method for solving these two-dimensional lattice-point problems.

Here it was of particular importance that this method could be extended to very general nonconvex lattice point problems in the plane, in particular to regions with symmetry properties. On this foundation by Mordell, the modern geometry of numbers of general point sets in n dimensions has been built up, as can be seen, e.g., in the latest book on geometry of numbers by Lekkerkerker.

A third important domain of research by Mordell dealt with ternary cubic Diophantine equations. His results were brought to a certain conclusion by the investigations of B. Segre.

Of equal importance to Mordell's own work was that which he encouraged in the members of his research group, first at Manchester and later at Cambridge. A great deal of progress in the different branches of number theory took its origin from here.

Mordell was an excellent lecturer. When he talked about deep and difficult problems, he succeeded in giving the impression that he was dealing with very obvious questions!

K. Mahler
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