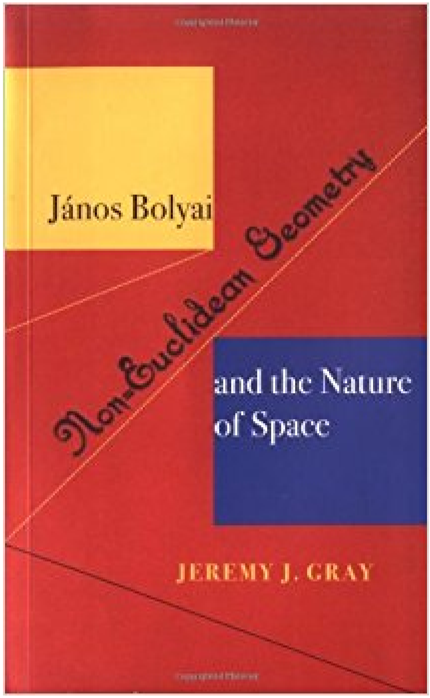
Janos Bolyai, Non-Euclidean Geometry, And The Nature Of Space



Synopsis

Janos Bolyai (1802-1860) was a mathematician who changed our fundamental ideas about space. As a teenager he started to explore a set of nettlesome geometrical problems, including Euclid's parallel postulate, and in 1832 he published a brilliant twenty-four-page paper that eventually shook the foundations of the 2000-year-old tradition of Euclidean geometry. Bolyai's "Appendix" (published as just that -- an appendix to a much longer mathematical work by his father) set up a series of mathematical proposals whose implications would blossom into the new field of non-Euclidean geometry, providing essential intellectual background for ideas as varied as the theory of relativity and the work of Marcel Duchamp. In this short book, Jeremy Gray explains Bolyai's ideas and the historical context in which they emerged, were debated, and were eventually recognized as a central achievement in the Western intellectual tradition. Intended for nonspecialists, the book includes facsimiles of Bolyai's original paper and the 1898 English translation by G. B. Halstead, both reproduced from copies in the Burndy Library at MIT.

Book Information

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Customer Reviews

Jeremy J. Gray is Professor at the Open University, UK.

I find Bolyai's paper quite hopeless to read; it's a strange choice for semi-popular publication. Gray's introduction is very pleasant and interesting and full of historical background, but his commentary on

Bolyai's actual paper is quite short and not always clear. He does comment extensively on Bolyai's squaring of the circle but this construction is too complicated to be very enjoyable. This result, and Bolyai's entire approach, depends on hyperbolic trigonometric formulae. He saw that such formulae should exist by finding a correspondence between a hyperbolic plane and a surface in hyperbolic space whose geometry is Euclidean (F-surface, horosphere). Today we may interpret this in terms of the half-space model. As our hyperbolic plane we can take a hemisphere centred at the origin and as the horosphere we can take a plane z=c. Lines on the hemisphere are of course intersections with planes perpendicular to the x-y-plane, and lines on the horosphere are Euclidean lines. Under vertical projection of one onto the other lines go to lines and angles are preserved. So a Euclidean right-angle triangle with one vertex at the z-axis correspond to a hyperbolic right-angle triangle with one vertex at the z-axis. And by rotating about the z-axis we see that the ratio of circumferences of the circles generated by the other two vertices is the same on both surfaces. This relates side lengths and thus gives a way of transferring Euclidean trigonometry to the hyperbolic plane. But in hyperbolic geometry the circumference does not grow linearly with the radius (but rather as the hyperbolic sine of the radius, as Bolyai shows later using the angle of parallelism formula), so Euclidean trigonometry does not transfer literally.

I bought several from other store before, but there were always some points that disappointed me. but this time, I am very satisfied with this product. Product arrived ahead of schedule. Shipped quickly, cases as described. Happy customer!! The best bargain for the money. just plain magic all year long. does exactly what it says for a great value

Classics) The Non-Euclidean Revolution Episodes in Nineteenth and Twentieth Century Euclidean Geometry (Anneli Lax New Mathematical Library) Euclidean Geometry and Transformations (Dover Books on Mathematics) Exploring Advanced Euclidean Geometry with GeoGebra (Classroom Resource Materials)