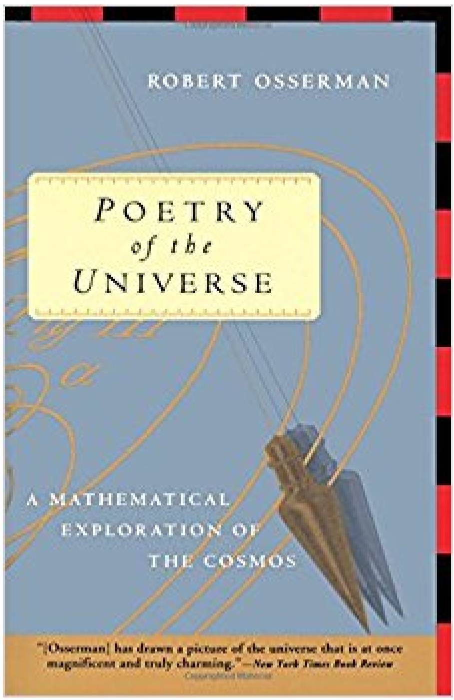
Poetry Of The Universe: A Mathematical Exploration Of The Cosmos



Synopsis

In the bestselling literary tradition of Lewis Thomas's Lives of a Cell and James Watson's The Double Helix, Poetry of the Universe is a delightful and compelling narrative charting the evolution of mathematical ideas that have helped to illuminate the nature of the observable universe. In a richly anecdotal fashion, the book explores the leaps of imagination and vision in mathematics that have helped pioneer our understanding of the world around us.

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Customer Reviews

This short, delightful book is essential reading for those educated in the liberal and fine arts who have never had the opportunity to appreciate the beauty of mathematics and physics. Osserman, a Stanford University professor who developed a math and physics course for humanities majors, manages to convey some of the fascination of these two fields without getting involved in technical details and without talking down to his audience. His seamless development leads the reader almost effortlessly from the early efforts of the ancients to measure the earth through the open problems in modern cosmology. Strongly recommended.Harold D. Shane, Baruch Coll., CUNYCopyright 1995 Reed Business Information, Inc. --This text refers to an out of print or unavailable edition of this title.

With nary an equation to confuse, a Stanford math professor clearly distills for a general readership the seminal ideas behind the notion that space has curvature and is not flat as ordinary humans perceive it. Osserman has been working up to this book through his classes for humanities majors, and the result is as lucid, comprehensible, and engaging as will be found in this category of scientific writing. He begins with ancient measurements of the earth, in which Euclid's geometry figures critically, but reaches cruising speed in his presentations of the nineteenth-century German mathematicians Carl Friedrich Gauss and Georg Friedrich Riemann. They are the best-known inventors of non-Euclidean geometry, whose commonest concept is that not all angles of all triangles add up to 180; the sum depends on the curvature of the surface in question. The ramifications cascade from there, into the shape of the retroverse, as the author tags our celestial view back into time and on toward invented abstract multidimensional shapes dubbed manifolds. Libraries know the popularity of sagas on observational astronomy and particle physics, and this examination of the mathematical component, specifically the species of geometry, fits well within their compass. A warm invitation to the aesthetics of math on the largest scale. Gilbert Taylor --This text refers to an out of print or unavailable edition of this title.

This book about the development of non-Euclidean geometry.It is a great book on its subject and a must read, though challenging, (the unreferenced footnotes at the back of the book- which are a great addition- does not help in reading this book), the effort is well worth it.One of the most important ideas contained in this book is on p. 192, which is a footnote to p. 104 in the main text. It is too long quote in full but the jest is:"Taken together with other efforts throughout the 1920's, both observational and theoretical, to try to establish first the reality and second the meaning of de Sitter's 1917 prediction of a redshift-distance relation, they constitute a body of work that makes all the more mysterious the myth of Hubble's sudden discovery of the relation in 1929."Having said that Osserman does not go where Morris Kline goes re: "Non-Euclidean Geometries and Their Significance," which is found in Kline's "Mathematics for the Nonmathematician" and "Mathematics- The Loss of Certainty," et. al., both are recommended.From the front cover piece of "Mathematics- The Loss of Certainty ... refutes the myth that mathematics is a body of unshakable truths about the physical world and that mathematical reasoning is exact and infallible," regarding the significance of the development of Non-Euclidean geometries in the 1800's. "For two thousand years the entire intellectual world accepted the Greek doctrine that the axioms of Euclidean geometry and of mathematics in general, were truths about the physical world, truths so clear and so evident that no one in his (or her) right mind could question them." ("Nonmathematician" p. 452-453).Kline also says: "Gauss had the intellectual courage to create non-Euclidean geometry but not the moral courage to face the mobs, for the scientists of the early nineteenth century lived in the shadow of Kant whose pronouncement that there could be no geometry other than Euclidean geometry ruled the intellectual world. Gauss’s work on non-Euclidean geometry was found among his papers after his death." See also: Lobachevski; Bolyai and Riemann.Finally Kline again: "The implication of non-Euclidean geometry, namely, that man may not be able to acquire truths, affects all thought." ("Nonmathematician" p. 476).The point is, Osserman’s book is a great exposition on the development non-Euclidean geometry.John Wheeler’s sentence should also be included: "Matter and energy tell space how to curve and space tells them how to move," is in a lot of books on Gravity.

OssermanÃ¢Â Â™s study in physics delineating the poetry of imaginative inspiration---so vital to mathematics---floods the mind. Math and art join for eruptive results being both asymmetrical and symmetrical. Poetry of math is delineated with (Osserman, 136) Ã¢Â ÂœGravity is geometryÃ¢Â Â• though erudite many claimed this was Ã¢Â ÂœnonsenseÃ¢Â Â• and termed the thought of such as Ã¢Â ÂœVoodoo Physics.Ã¢Â Â• In OssermanÃ¢Â Â™s Ã¢Â ÂœMathematical Exploration of the CosmosÃ¢Â Â• you will find mystery and imagination coupling along with expansion/contraction of the cosmos. Explosive theories explained simply and once read it may close or open doors to a universe denied to the inflexible. Required reading for anyone involved in science, physics, astrophysics or mathematical geometry! Truly this is a delightful little text quite big on knowledge.

This is a story of shape and form. The Poetry of the Universe answers two related questions: What is the shape of the universe and what do we mean by the curvature of space?During the great period of global exploration the Europeans placed rigorous demands on maps, demands that stretched the capabilities of mathematicians. Robert Osserman offers a striking parallel between that endeavor and our modern efforts to unravel the form and structure of the universe.Osserman’s description of the evolution of abstract geometries is fascinating. We learn about the remarkable contributions of the combined genius of Euler, Gauss, Lobachevsky, Bolyai, Riemann, Minkowski, and Einstein to our new understanding of cosmology. Gradually, Osserman brings us full circle from the problem of representing a spherical (or elliptical) earth on a Euclidian flat map to the more difficult problem of representing an expanding universe characterized as a hypersphere.This is a good little book and I can recommend it to a wide audience. Osserman conveys the beauty and excitement of mathematics without delving into equations. In parallel, he provides expanded footnotes in an appendix for the mathematically inclined. I suggest reading the appendix after completing each chapter, mathematically inclined or not.In keeping with his title, he offers pertinent, often poetic quotes in each chapter such as: Euclid alone has looked on Beauty bare. Pure mathematics is, in its way, the poetry of logical ideas. The most distinct and beautiful statement of any truth must take at last the mathematical form. (By Edna St. Vincent Millay, Albert Einstein, and Henry David Thoreau.)

This is a charming book, with a graceful pace and engaging illustrations. The transparency and accessibility of this book are a gift to the reader, who is brought through complex material in a gentle way. I suspect that technically advanced readers may find some of the material fairly elementary, but may still find pleasure in the beauty of this book.I should here confess that as a math major I took a course from Professor Osserman on linear algebra about 30 years ago. His teaching style then mirrored his writing style in this book--calm, understated, confident.Additionally, I probably never thanked him at the time for giving me a great math experience during that course. (For non-mathematicians who haven't had such an experience, let me assure you that there is exhilaration in struggling with an initially complicated mathematical idea that suddenly becomes crystal clear.)So, belatedly, if you're reading this review, Professor, THANK YOU!