Geometry In Ancient And Medieval India Ncpdev

This collective study focuses on a unique undated anonymous primary source on ornamental geometry featuring geometrical constructions and textual instructions in Persian. The chapters interpreting this fascinating medieval source are followed by a facsimile, transcription, English translation, and supplementary drawings.

Euclid was a mathematician from the Greek city of Alexandria who lived during the 4th and 3rd century B.C. and is often referred to as the "father of geometry." Within his foundational treatise "Elements," Euclid presents the results of earlier mathematicians and includes many of his own theories in a systematic, concise book that utilized a brief set of axioms and meticulous proofs to solidify his deductions. In addition to its easily referenced geometry, "Elements" also includes number theory and other mathematical considerations. For centuries, this work was a primary textbook of mathematics, containing the only framework for geometry known by mathematicians until the development of "non-Euclidian" geometry in the late 19th century. The extent to which Euclid's "Elements" is of his own original authorship or borrowed from previous scholars is unknown, however despite this fact it was his collation of these basic mathematical principles for which most of the world would come to the study of geometry. Today, Euclid's "Elements" is acknowledged as one of the most influential mathematical texts in history. This volume includes all thirteen books of Euclid's "Elements," is printed on premium acid-free paper, and follows the translation of Thomas Heath.

Euclid's Elements of Geometry was a book that changed the world. In a sweeping history, Benjamin Wardhaugh traces how an ancient Greek text on mathematics - often hailed as the world's first textbook - shaped two thousand years of art, philosophy and literature, as well as science and maths. Thirteen volumes of mathematical definitions, propositions and proofs. Writing in 300 BC, Euclid could not have known his logic would go unsurpassed until the nineteenth century, or that his writings were laying down the very foundations of human knowledge. Wardhaugh blasts the dust from Euclid's legacy to offer not only a vibrant history of mathematics, told through people and invention, but also a broader story of culture. Telling stories from every continent, ranging between Ptolemy and Isaac Newton, Hobbes and Lewis Carrol, this is a history that dives from Ancient Greece to medieval Byzantium, early modern China, Renaissance Italy, the age of European empires, and our world today. How has geometry sat at the beating heart of sculpture, literature, music and thought? How can one unknowable figure of antiquity live through two millennia?

The purpose of the project is to provide the most up-to-date survey on issues dealing with practical geometry and how it might have been applied in the design of medieval architecture. Chronologically, the topics cover a wide span - from early Medieval through Late Gothic. Geographically, the monuments under discussion range from Early Medieval Florence through Carolingian Germany, Crusader Cyprus, Romanesque France and Gothic England. The applications of both geometry and metrology are considered in this volume, often with illustrations generated by computer-assisted design (CAD) software. The project therefore offers recent scholarship in the field, as well as cutting-edge technology which helps propel the pursuit of such studies. To this end, the project is the first of its kind both in terms of its focus and its comprehensiveness. Such a project is sorely needed to introduce this highly specialized discipline to other historians of art, history, and science of the Middle Ages, as well as historians in most humanistic areas.

Platonic Geometry in Plans of Medieval Abbeys and Cathederals

The Britannica Guide to Geometry

Mathematical Thought from Ancient to Modern Times: Volume 1

Mathematics in History and Culture

A Treatise of Mathematics of Vedic Tradition : with Rationale in Terms of Modern Mathematics Largely Based on N.H. Phadke's Marāthī Translation of Līlāvatī

Companion Encyclopedia of the History and Philosophy of the Mathematical Sciences

Hypotheses about the Location and Layout of Important Settlement, Cult and Burial Sites in Scandinavia, According to Sacred Geometry and Number Symbolism, Mainly Attributed to Pythagorean and Neoplatonic Philosophy. A Study which Follows Up and Expands Hypotheses Advanced by Einar Pálsson

Gordon Strachan, author ofJesus the Master Builder (Floris Books), explores the magnificent structure of Chartres Cathedral, and examines the influences on the medieval master builders. Using Chartres as a starting point, Dr Strachan suggests that the origins of the Gothic style may lie in Islamic architecture. He goes on to consider how the experience of a particular architectural space affects us, and how sacred geometry works. Beautifully illustrated, this is an inspiring and informative book for anyone interested in religious architecture and spirituality.

Through Euclid's Window Leonard Mlodinow brilliantly and delightfully leads us on a journey through five revolutions in geometry, from the Greek concept of parallel lines to the latest notions of hyperspace. Here is an altogether new, refreshing, alternative history of math revealing how simple questions anyone might ask about space -- in the living room or in some other galaxy -- have been the hidden engine of the highest achievements in science and technology. Based on Mlodinow's extensive historical research; his studies alongside colleagues such as Richard Feynman and Kip Thorne; and interviews with leading physicists and mathematicians such as Murray Gell-Mann, Edward Witten, and Brian Greene, Euclid's Window is an extraordinary blend of rigorous, authoritative investigation and accessible, good-humored storytelling that makes a stunningly original argument asserting the primacy of geometry. For those who have looked through Euclid's Window, no space, no thing, and no time will ever be quite the same.

Ptolemy's Almagest is one of the most influential scientific works in history. A masterpiece of technical exposition, it was the basic textbook of astronomy for more than a thousand years, and still is the main source for our knowledge of ancient astronomy. This translation, based on the standard Greek text of Heiberg, makes the work accessible to English readers in an intelligible and reliable form. It contains numerous corrections derived from medieval Arabic translations and extensive footnotes that take account of the great progress in understanding the work made in this century, due to the discovery of Babylonian records and other researches. It is designed to stand by itself as an interpretation of the original, but it will also be useful as an aid to reading the Greek text.

The Encyclopaedia fills a gap in both the history of science and in cultural stud ies. Reference works on other cultures tend either to omit science completely or pay little attention to it, and those on the history of science almost always start with the Greeks, with perhaps a mention of the Islamic world as a trans lator of Greek scientific works. The purpose of the Encyclopaedia is to bring together knowledge of many disparate fields in one place and to legitimize the study of other cultures' science. Our aim is not to claim the superiority of other cultures, but to engage in a mutual exchange of ideas. The Western aca demic divisions of science, technology, and medicine have been united in the Encyclopaedia because in ancient cultures these disciplines were connected. This work contributes to redressing the balance in the number of reference works devoted to the study of Western science, and encourages awareness of cultural diversity. The Encyclopaedia is the first compilation of this sort, and it is testimony both to the earlier Eurocentric view of academia as well as to the widened vision of today. There is nothing that crosses disciplinary and geographic boundaries, dealing with both scientific and philosophical issues, to the extent that this work does. xi PERSONAL NOTE FROM THE EDITOR Many years ago I taught African history at a secondary school in Central Africa.

The Origin of Geometry in India

From the Roman Empire to the Sixteenth Century
with an Introduction on the Transmission of Euclid's Elements in the Middle Ages
Encounters with Euclid
Lilawati: Or A Treatise on Arithmetic and Geometry
Parmenides, Anaxagoras, and the New Astronomy
The Arts of Ornamental Geometry

This radical, profoundly scholarly book explores the purposes and nature of proof in a range of historical settings. It overturns the view that the first mathematical proofs were in Greek geometry and rested on the logical insights of Aristotle by showing how much of that view is an artefact of nineteenth-century historical scholarship. It documents the existence of proofs in ancient mathematical writings about numbers and shows that practitioners of mathematics in Mesopotamian, Chinese and Indian cultures knew how to prove the correctness of algorithms, which are much more prominent outside the limited range of surviving classical Greek texts that historians have taken as the paradigm of ancient mathematics. It opens the way to providing the first comprehensive, textually based history of proof.

Since precious few architectural drawings and no theoretical treatises on architecture remain from the premodern Islamic world, the Timurid pattern scroll in the collection of the Topkapi Palace Museum Library is an exceedingly rich and valuable source of information. In the course of her in-depth analysis of this scroll dating from the late fifteenth or early sixteenth century, Gülru Necipoğlu throws new light on the conceptualization, recording, and transmission of architectural design in the Islamic world between the tenth and sixteenth centuries. Her text has particularly far-reaching implications for recent discussions on vision, subjectivity, and the semiotics of abstract representation. She also compares the Islamic understanding of geometry with that found in medieval Western art, making this book particularly valuable for all historians and critics of architecture. The scroll, with its 114 individual geometric patterns for wall surfaces and vaulting, is reproduced entirely in color in this elegant, large-format volume. An extensive catalogue includes illustrations showing the underlying geometries (in the form of incised "dead" drawings) from which the individual patterns are generated. An essay by Mohammad al-Asad discusses the geometry of the muqarnas and demonstrates by means of CAD drawings how one of the scroll's patterns could be used co design a three-dimensional vault.

The field of geometry reflects a conglomeration of discoveries over time. Filled with detailed diagrams, this insightful volume offers serious students a comprehensive understanding of the fundamentals of geometry, including geometric shapes, axioms, and formulas. In addition, it covers some of the field's most illustrious minds, from Euclid to Wendelin Werner, figures who have helped produce the various branches of geometry as we know them today. This enlightening volume will help students understand the principles of geometry, and also the fascinating story behind the numbers.

Sheds light on the skills and techniques of the medieval military engineer, over a thousand year sweep.
Leonardo Pisano (Fibonacci)
The Book of Squares
A Report of the Commission on the Reorganization of Secondary Education, Appointed by the National Education Association
How Euclid's Elements Built the World
Geometry Civilized
Spanning a Period of Over Three Thousand Years, Containing Brief Accounts of Authors, Works, Characters, Technical Terms, Geographical Names, Myths, Legends and Several Appendices
The Book of Wonders

Medieval Europe was a meeting place for the Christian, Jewish, and Islamic civilizations, and the fertile intellectual exchange of these cultures can be seen in the mathematical developments of the time. This sourcebook presents original Latin, Hebrew, and Arabic sources of medieval mathematics, and shows their cross-cultural influences. Most of the Hebrew and Arabic sources appear here in translation for the first time. Readers will discover key mathematical revelations, foundational texts, and sophisticated writings by Latin, Hebrew, and Arabic-speaking mathematicians, including Abner of Burgos's elegant arguments proving results on the conchoid—a curve previously unknown in medieval Europe; Levi ben Gershon's use of mathematical induction in combinatorial proofs; Al-Mu'taman Ibn H?d's extensive survey of mathematics, which included proofs of Heron's Theorem and Ceva's Theorem; and Muhy? al-D?n al-Maghrib?'s interesting proof of Euclid's parallel postulate. The book includes a general introduction, section introductions, footnotes, and references. The Sourcebook in the Mathematics of Medieval Europe and North Africa will be indispensable to anyone seeking out the important historical sources of premodern mathematics.

For textual studies relating to the ancient mathematical corpus the efforts by the Danish philologist, 1. L. Heiberg (1854-1928), are especially significant. Beginning with his doctoral dissertation, Quaestiones Archimedeae (Copen hagen, 1879), Heiberg produced an astonishing series of editions and critical studies that remain the foundation of scholarship on Greek mathematical 4 science. For comprehensiveness and accuracy, his editions are exemplary. In his textual studies, as also in the prolegomena to his editions, he carefully described the extant evidence, organized the manuscripts into stemmata, and drew out the implications for the state of the text. 5 With regard to his Archimedean work, Heiberg sometimes betrayed signs of the philologist's occupational disease - the tendency to rewrite a text deemed on subjective grounds to be unworthy. 6 But he did so less often than his prominent 7 contemporaries, and not as to detract appreciably from the value of his editions. In examining textual questions bearing on the Archimedean corpus, he attempted to exploit as much as possible evidence from the ancient commentators, and in some instances from the medieval translations. It is here that opportunities abound for new work, extending, and in some instances superseding, Heiberg's findings. For at his time the availability of the medieval materials was limited. In recent years Marshall Clagett has completed a mammoth critical edition of the medieval Latin tradition of Archimedes,8 while the bibliographical instruments for the Arabic tradition are in good order thanks to the work of Fuat Sezgin.

In 1978, when the book Living Systems was published, it contained the prediction that the sciences that were concerned with the biological and social sciences would, in the future, be stated as rigorously as the "hard sciences" that study such nonliving phenomena as temperature, distance, and the interaction of chemical elements. Principles of Quantitative Living Systems Science, the first of a planned series of three books, begins an attempt to fulfill that prediction. The view that living things are similar to other parts of the physical world, differing only in their complexity, was explicitly stated in the early years of the twentieth century by the biologist Ludwig von Bertalanffy. His ideas could not be

published until the end of the war in Europe in the 1940s. Von Bertalanffy was strongly opposed to vitalism, the theory current among biologists at the time that life could only be explained by recourse to a "vital principle" or God. He c- sidered living things to be a part of the natural order, "systems" like atoms and molecules and planetary systems. Systems were described as being made up of a number of interrelated and interdependent parts, but because of the interrelations, the total system became more than the sum of those parts. These ideas led to the development of systems movements, in both Europe and the United States, that included not only biologists but scientists in other fields as well. Systems societies were formed on both continents.

This title was first published in 2000: Did the plan of medieval churches have any underlying symbolic meaning? This work re-opens the debate about the importance of geometry and symbolism in medieval architectural design and argues the case for attributing an intellectual meaning to the planning of abbeys and cathedrals. In challenging prevailing claims for the use of arithmetical rations in architectural design, notably those based on the square root of two, Dr Hiscock advances a perspective consisting of proportions derived from the figures of Platonic geometry - the square, the equilateral triangle and the pentagon - and provides evidence for the symbolic interpretation of these figures. The investigation further reveals whole series of geometric relationships between some of England's most celebrated Norman cathedrals, such as Norwich or Durham, together with a wide sample from the Continent, from Old St Peter's in Rome to Chartres Cathedral, and sets out a comprehensive design method in each case. Hiscock first demonstrates the proposition that the ideas of Christian Platonism, including number and geometry, remained current and were employed in the thought of the early Middle Ages. In particular, he argues that they can be associated with the leading persons in the 10th-century revival of monasticism and that they found expression in the "white mantle of churches" that spread across Western Europe at the end of the first millennium AD. The book then provides a detailed analysis of the geometric proportions of church plans between the 9th and 12th centuries in Germany, France and in England. This research seeks to demonstrate that a coherent sequence of geometric forms can be seen in thse plans, forms which correspond to the key figures of Platonic geometry as understood in the context of Christian Platonist thought. In conclusion, the author shows how the system of design proposed could be set out on site using the known working methods of medieval masons.

Circular of Information of the Bureau of Education, for

Principles of Quantitative Living Systems Science

Sacred Geometry, Sacred Space

The Story of Geometry from Parallel Lines to Hyperspace

The History of Mathematical Proof in Ancient Traditions

L?l?vat? of Bh?skar?c?rya

A Persian Compendium on Similar and Complementary Interlocking Figures. A Volume Commemorating Alpay Özdural

First published in 2004. Routledge is an imprint of Taylor & Francis, an informa company.
Here, at last, is the massively updated and augmented second edition of this landmark encyclopedia. It contains approximately 1000 entries dealing in depth with the history of the scientific, technological and medical accomplishments of cultures outside of the United States and Europe. The entries consist of fully updated articles together with hundreds of entirely new topics. This unique reference work includes intercultural articles on broad topics such as mathematics and astronomy as well as thoughtful philosophical articles on concepts and ideas related to the study of non-Western Science, such as rationality, objectivity, and method. You'll also find material on religion and science, East and West, and magic and science.
The Book of Squares by Fibonacci is a gem in the mathematical literature and one of the most important mathematical treatises written in the Middle Ages. It is a collection of theorems on indeterminate analysis and equations of second degree which yield, among other results, a solution to a problem proposed by Master John of Palermo to Leonardo at the Court of Frederick II. The book was dedicated and presented to the Emperor at Pisa in 1225. Dating back to the 13th century the book exhibits the early and continued fascination of men with our number system and the relationship among numbers with special properties such as prime numbers, squares, and odd numbers. The faithful translation into modern English and the commentary by the translator make this book accessible to professional mathematicians and amateurs who have always been intrigued by the lure of our number system.
The present volume provides a fascinating overview of geometrical ideas and perceptions from the earliest cultures to the mathematical and artistic concepts of the 20th century. It is the English translation of the 3rd edition of the well-received German book "5000 Jahre Geometrie," in which geometry is presented as a chain of developments in cultural history and their interaction with architecture, the visual arts, philosophy, science and engineering. Geometry originated in the ancient cultures along the Indus and Nile Rivers and in Mesopotamia, experiencing its first "Golden Age" in Ancient Greece. Inspired by the Greek mathematics, a new germ of geometry blossomed in the Islamic civilizations. Through the Oriental influence on Spain, this knowledge later spread to Western Europe. Here, as part of the medieval Quadrivium, the understanding of geometry was deepened, leading to a revival during the Renaissance. Together with parallel achievements in India, China, Japan and the ancient American cultures, the European approaches formed the ideas and branches of geometry we know in the modern age: coordinate methods, analytical geometry, descriptive and projective geometry in the 17th an 18th centuries, axiom systems, geometry as a theory with multiple structures and geometry in computer sciences in the 19th and 20th centuries. Each chapter of the book starts with a table of key historical and cultural dates and ends with a summary of essential contents of geometr y in the respective era. Compelling examples invite the reader to further explore the problems of geometry in ancient and modern times. The book will appeal to mathematicians interested in Geometry and to all readers with an interest in cultural history. From letters to the authors for the German language edition I hope it gets a translation, as there is no comparable work. Prof. J. Grattan-Guinness

(Middlesex University London) "Five Thousand Years of Geometry" - I think it is the most handsome book I have ever seen from Springer and the inclusion of so many color plates really improves its appearance dramatically! Prof. J.W. Dauben (City University of New York) An excellent book in every respect. The authors have successfully combined the history of geometry with the general development of culture and history. ... The graphic design is also excellent. Prof. Z. Nádenik (Czech Technical University in Prague)

The Practical Application of Geometry in Medieval Architecture
The Geometry of Creation
Reorganization of Science in Secondary Schools
A Companion to Sanskrit Literature
A Study in The Åsulbasūtras
Encyclopaedia of the History of Science, Technology, and Medicine in Non-Westen Cultures
The Medieval Military Engineer

A sweeping cultural history of one of the most influential mathematical books ever written Euclid's Elements of Geometry is one of the fountainheads of mathematics—and of culture. Written around 300 BCE, it has traveled widely across the centuries, generating countless new ideas and inspiring such figures as Isaac Newton, Bertrand Russell, Abraham Lincoln, and Albert Einstein. Encounters with Euclid tells the story of this incomparable mathematical masterpiece, taking readers from its origins in the ancient world to its continuing influence today. In this lively and informative book, Benjamin Wardhaugh explains how Euclid's text journeyed from antiquity to the Renaissance, introducing some of the many readers, copyists, and editors who left their mark on the Elements before handing it on. He shows how some read the book as a work of philosophy, while others viewed it as a practical guide to life. He examines the many different contexts in which Euclid's book and his geometry were put to use, from the Neoplatonic school at Athens and the artisans' studios of medieval Baghdad to the Jesuit mission in China and the workshops of Restoration London. Wardhaugh shows how the Elements inspired ideas in theology, art, and music, and how the book has acquired new relevance to the strange geometries of dark matter and curved space. Encounters with Euclid traces the life and afterlives of one of the most remarkable works of mathematics ever written, revealing its lasting role in the timeless search for order and reason in an unruly world.

In Science before Socrates, Daniel Graham argues against the prevalent belief that the Presocratic philosophers did not produce any empirical science and that the first major Greek science, astronomy, did not develop until at least the time of Plato. Instead, Graham proposes that the advances made by Presocratic philosophers in the study of astronomy deserve to be considered as scientific contributions. Whereas philosophers of the sixth century BC treated astronomical phenomena as ephemeral events continuous with weather processes, those of the fifth century treated heavenly bodies as independent stony masses whirled in a cosmic vortex. Two historic events help to date and account for the change: a solar eclipse in 478 BC and a meteoroid that fell to earth around 466. Both events influenced Anaxagoras, who transformed insights from Parmenides into explanations of lunar and solar eclipses, meteors, and rainbows. Virtually all philosophers came to accept Anaxagoras' theory of lunar light and eclipses. Aristotle endorsed Anaxagoras' theory of eclipses as a paradigm of scientific explanation. Anaxagoras' theories launched a geometrical approach to astronomy and were accepted as foundational principles by all mathematical astronomers from Aristarchus to Ptolemy to Copernicus and Galileo-and to the present day.

This book is the first complete study of the origin of geometry in India. In Ancient India, brick-built fire-altars (citi-s) were ordained for the Soma sacrifice, a Vedic rite, which led to the compilation of rule-books for making and arranging bricks. These volumes, called Åsulbasūtra-s, represent the first available texts of both geometry and mensuration, and were composed from 600 BCE, although the actual practice goes back to c. 1500 BCE. This book begins by detailing the history of geometry in Egypt, Mesopotamia, and Greece, and shows that geometry everywhere starts with brick-built structures, rather than the measurement of land. It emphasizes that geometry in India, unlike in Greece, was side-based rather than angle-based. The text is profusely illustrated.

More than a study of shapes and angles, geometry reflects an amalgamation of discoveries over time. This book not only provides readers with a comprehensive understanding of geometric shapes, axioms, and formulas, it presents the field's brilliant minds—from Euclid to Wendelin Werner and many in between—whose works reflect a progression of mathematical thought throughout the centuries and have helped produce the various branches of geometry as they are known today. Detailed diagrams illustrate various concepts and help make geometry accessible to all.

History, Culture, and Technique
Geometry
Euclid's Elements (the Thirteen Books)
A Modern Introduction to Ancient Indian Mathematics
Encyclopaedia of the History of Science, Technology, and Medicine in Non-Western Cultures
Circulars of Information of the Bureau of Education
Egyptian Influence an Sacred Geometry in Ancient and Medieval Scandinavia

This book provides an introduction to the transmission of Euclid's Elements of Geometry from the Middle East to the Latin West during the medieval period, and an annotated English translation of Book I of the Commentary of al-Nayrizi on Euclid's Elements.

In 1150 AD, Bhaskaracarya (b. 1114 AD), renowned mathematician and astronomer of Vedic tradition composed Lilavati as the first part of his larger work called Siddhanta Siromani, a comprehensive exposition of arithmetic, algebra, geometry, mensuration, number theory and related topics. Lilavati has been used as a standard textbook for about 800 years. This lucid, scholarly and literary presentation has been translated into several languages of the world. Bhaskaracarya himself never gave any derivations of his formulae. N.H. Phadke (1902-1973) worked hard to construct

proofs of several mathematical methods and formulae given in original Lilavati. The present work is an enlargement of his Marathi work and attempts a thorough mathematical explanation of definitions, formulae, short cuts and methodology as intended by Bhaskara. Stitches are followed by literal translations so that the reader can enjoy and appreciate the beauty of accurate and musical presentation in Lilavati. The book is useful to school going children, sophomores, teachers, scholars, historians and those working for cause of mathematics.

The flowering of Gothic architecture depended to a striking extent on the use of drawing as a tool of design. By drawing precise "blueprints" with simple tools such as the compass and straightedge, Gothic draftsmen were able to develop a linearized architecture of unprecedented complexity and sophistication. Examination of their surviving drawings can provide valuable and remarkably intimate information about the Gothic design process. Gothic drawings include compass pricks, uninked construction lines, and other telltale traces of the draftsman's geometrically based working method. The proportions of the drawings, moreover, are those actually intended by the designer, uncompromised by errors introduced in the construction process. All of these features make these drawings ideal subjects for the study of Gothic design practice, but their geometry has to date received little systematic attention. This book offers a new perspective on Gothic architectural creativity. It shows, in a series of rigorous geometrical case studies, how Gothic design evolved over time, in two senses: in the hours of the draftsman's labor, and across the centuries of the late Middle Ages. In each case study, a series of computer graphics show in unprecedented detail how a medieval designer could have developed his architectural concept step by step, using only basic geometrical operations. Taken together, these analyses demonstrate both remarkable methodological continuity across the Gothic era, and the progressive development of new and sophisticated permutations on venerable design themes. This rich tradition ultimately gave way in the Renaissance not because of any inherent problem with Gothic architecture, but because the visual language of Classicism appealed more directly to the pretensions of Humanist princes than the more abstract geometrical order of Gothic design, as the book's final chapter demonstrates.

The Purpose Of This Book Is To Draw The Attention Of Students And Teachers Of Mathematics To The Historical Continuity Of Indian Mathematics, Starting From The Sulba Sutras Of The Vedas Up To The 17Th Century. The Book Includes Proofs, Not Presented So Far, Of The Propositions Stated In The Well-Known Treatise Vedic Mathematics By Sri Bharati Krishna Teertha. It Also Introduces To The Modern Reader The Work Of Aryabhata, Brahmagupta, Bhaskara And Madhava.

Textual Studies in Ancient and Medieval Geometry

Ptolemy's Almagest

Ad Quadratum

Architectural Drawing and the Dynamics of Gothic Design

Euclid's Window

Geometry in Ancient and Medieval India

5000 Years of Geometry

Traces the development of mathematics from its beginnings in Babylonia and ancient Egypt to the work of Riemann and Godel in modern times

This book is a geometrical survey of the Sanskrit and Prakrt scientific and quasi-scientific literature of India, beginning with the Vedic literature and ending with the early part of the 17th century. It deals in detail with the Sulbasutras in the Vedic literature, with the mathematical parts of Jaina Canonical works and of the Hindu Siddhantas and with the contributions to geometry made by the astronomer mathematicians Aryabhata I & II, Sripati, Bhaskara I & II, Sangamagrama Madhava, Paramesvara, Nilakantha, his disciples and a host of others. The works of the mathematicians Mahavira, Sridhara and Narayana Pandita and the Bakshali Manuscript have also been studied. The work seeks to explode the theory that the Indian mathematical genius was predominantly algebraic and computational and that it eschewed proofs and rationales. There was a school in India which delighted to demonstrate even algebraical results geometrically. In their search for a sufficiently good approximation for the value of pie Indian mathematicians had discovered the tool of integration. Which they used equally effectively for finding the surface area and volume of a sphere and in other fields. This discovery of integration was the sequel of the inextricable blending of geometry and series mathematics.

Is the display of number and geometry in medieval religious architecture evidence of intended symbolism? This book offers a new perspective in the retrieval of meaning from architecture in the Greek East and the Latin West, and challenges the view that geometry was merely an outcome of practical procedures by masons. Instead, it attributes intellectual meaning to it as understood by Christian Platonist thought and provides compelling evidence that the symbolism was often intended. In so doing, the book serves as a companion volume to The Wise Master Builder by the same author, which found the same system implicit in plans of cathedrals and abbeys. The present book explains how the architectural symbolism proposed could have been understood at the time, as supported by medieval texts and its context, since it is context that can confer specific meaning. The introduction locates the study in its critical context and summarizes Christian Platonism as it determined the meaning of number and geometry. The investigation opens with the recurrent symbolism of the dome and the

cube as heaven and earth in the Byzantine world and moves to the duality of the temple and the body in the East and West as reflections of Plato's universal macrocosm and human microcosm. The study then examines each of the figures of Platonic geometry in the architecture of the West against the background of their mathematics and metaphysics, before proceeding to their synthesis with the circle, as seen in circular and polygonal structures, the divisions of circles in Christian art, and their display in window tracery, culminating in the rose window. In view of the multivalency of the symbolism, the investigation establishes systematic occurrences of it, which strongly suggest patterns of thought underlying systems of design. The book concludes with a series of test cases, which show the after-life of the same symbolism as it overlapped with the Renaissance.

This book presents William Clifford's English translation of Bernhard Riemann's classic text together with detailed mathematical, historical and philosophical commentary. The basic concepts and ideas, as well as their mathematical background, are provided, putting Riemann's reasoning into the more general and systematic perspective achieved by later mathematicians and physicists (including Helmholtz, Ricci, Weyl, and Einstein) on the basis of his seminal ideas. Following a historical introduction that positions Riemann's work in the context of his times, the history of the concept of space in philosophy, physics and mathematics is systematically presented. A subsequent chapter on the reception and influence of the text accompanies the reader from Riemann's times to contemporary research. Not only mathematicians and historians of the mathematical sciences, but also readers from other disciplines or those with an interest in physics or philosophy will find this work both appealing and insightful.

Science before Socrates

On the Hypotheses Which Lie at the Bases of Geometry

The Topkapi Scroll

Volume One

The Symbol at Your Door

Geometry and Ornament in Islamic Architecture

The Commentary of al-Nayrizi on Book I of Euclid's Elements of Geometry

This lavishly illustrated book provides an unusually accessible approach to geometry by placing it in historical context. With concise discussions and carefully chosen illustrations the author brings the material to life by showing what problems motivated early geometers throughout the world. Geometry Civilized covers classical plane geometry, emphasizing the methods of Euclid but also drawing on advances made in China and India. It includes a wide range of problems, solutions, and illustrations, as well as a chapter on trigonometry, and prepares its readers for the study of solid geometry and conic sections.

A Companion to Sanskrit Literature, the first work of its kind, covers a period of nearly 3500 years from the Vedic age down to the modern times. It seeks to acquaint the reader, within a brief compass, with the contents of outstanding works and authors in Sanskrit literature, followed by up-to-date bibliographies. It presents brief accounts of the important character in well-known poems, dramas and prose works have also been given. Important geographical names, with their modern identification as far as practicable, have also been laid down. Common technical terms, used in the different branches of Sanskrit literature, have been briefly explained, Prominent figures in myths and legends have been dealt with. In a number of appendices, various kinds of useful information about Sanskrit literature including sciences, sports and pastimes, etc. in ancient and medieval India have been set forth. It is an indispensable vade mecum for the general readers, the specialists and researchers. It is like a capsule taking the reader through the vast firmament of Sanskrit literature upto remote ages.

Sourcebook in the Mathematics of Medieval Europe and North Africa

Number and Geometry in Religious Architecture of the Greek and Latin Middle Ages

The Wise Master Builder: Platonic Geometry in Plans of Medieval Abbeys and Cathederals

Chartres

How an Ancient Greek Geometry Text Shaped the World