

The Universal History of Numbers: From Prehistory to the Invention of the Computer

By Georges Ifrah

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A riveting history of counting and calculating from the time of the cave dwellers to the late twentieth century, The Universal History of Numbers is the first complete account of the invention and evolution of numbers the world over. As different cultures around the globe struggled with problems of harvests, constructing buildings, educating their citizens, and exploring the wonders of science, each civilization created its own unique and wonderful mathematical system.

Dubbed the "Indiana Jones of numbers," Georges Ifrah traveled all over the world for ten years to uncover the little-known details of this amazing story. From India to China, and from Egypt to Chile, Ifrah talked to mathematicians, historians, archaeologists, and philosophers. He deciphered ancient writing on crumbling walls; scrutinized stones, tools, cylinders, and cones; and examined carved bones, elaborately knotted counting strings, and X-rays of the contents of never-opened ancient clay accounting balls. Conveying all the excitement and joy of the process of discovery, Ifrah writes in a delightful storytelling style, recounting a plethora of intriguing and amusing anecdotes along the way.

From the stories of the various ingenious ways in which different early cultures used their bodies to count and perfected the use of the first calculating machine-the hand-to the invention of different styles of tally sticks, up through the creation of alphabetic numbers, the Greek and Roman numeric systems, and the birth of modern numerals in ancient India, we are taken on a marvelous journey through humankind's grand intellectual epic.

We meet those who only count to four-anything more is "a lot"; discover the first uses of counting fingers and toes; learn of the amazing ability of abacus users to calculate with brilliant efficiency; and ponder the intriguing question: How did many cultures manage to calculate for all those centuries without a zero? Exploring the many ways civilizations developed and changed their mathematical systems, Ifrah imparts a unique insight into the nature of human thought-and into the ways our understanding of numbers and how they shape our lives has slowly changed and grown over thousands of years.

In this illuminating and entertaining work, you'll learn about:

- The earliest calculating machine--the hand
- Tally sticks--accounting for beginners
- How the Sumerians did their sums
- Greek and Roman numerals
- The invention of alphabetic numerals
- The achievements of the Mayan civilization
- India and the birth of modern numbers
- Indo-Arabic numerals and how they reached the West
- The final stage of numerical notation

Praise for The Universal History of Numbers

"Let us start the year with a bang. Georges Ifrah is the man. This book, quite simply, rules. . . . It is outstanding, and not least because it has been written from first principles, for people like you and me, curious but by no means expert . . . a mind-boggling and enriching experience."-The Guardian

"Pursuing the invention of numbers across civilizations, Georges Ifrah has written the grand story of human ingenuity. . . . His amazing undertaking, describing humankind's relationship with numbers from Paleolithic times to the computer age, spans the world from Mayan ruins to Indian museums, from Egyptian hieroglyphics to Greek philosophers to Chinese libraries."-Le Figaro

"Follow the astonishing path of Georges Ifrah, the Indiana Jones of arithmetic . . . who decided in 1974 to begin the search for his Grail, the origin of numbers. Journeying over mountains and across valleys, he discovered how-from Mayan to Chinese, from Indian to Egyptian-humankind has juggled numbers."-Express

"Ifrah's book amazes and fascinates . . . It is nothing less than thehistory of the human race told through figures."-International Herald Tribune

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Editorial Review

Amazon.com Review
The title doesn't lie. Mathematician Georges Ifrah's masterpiece, *The Universal History of Numbers*, is a wonderfully comprehensive overview of numbers and counting spanning all the inhabited continents as far back in time as records will allow us to look. Beyond the ancient Babylonians, Sumerians, and Indians, Ifrah takes us farther south into Africa to examine an early decimal counting system and into ancient Mexico to reconstruct what we can of the Mayan calendar and numerical system. The 27 chapters are chiefly organized by culture, though there are some cross-cultural overviews of topics like letters and numbers.

The author's aim was grand: "to provide in simple and accessible terms the full and complete answer to all and any questions ... about the history of numbers and counting, from prehistory to the age of computers." This led him to wander the world for 10 years, studying and learning; this scholastic pilgrim has returned with amazing stories to tell. Toward the end of the book, Ifrah makes the book truly universal by refuting alien-intervention theories of cultural origins--surely our benefactors would have given us an efficient decimal counting system, zero and all, before helping us build pyramids and such. Such charming ideas, combined with such rigorously researched facts, make *The Universal History of Numbers* a uniquely important and fascinating volume. --*Rob Lightner*

From Kirkus Reviews
Ifrahs monumental follow-up to From One to Zero (1993) goes from one to (almost) infinity as he meticulously reviews the numbers and reckoning systems of countless tribes and cultures in a dazzling scholarly performance. ``Performance'' is the operative word here, for not only does Ifrah enumerate the words and symbols used for arithmetic, but he also explains how to use each system, providing illustrations, diagrams, riddles, and puzzles. Indeed, nearly every page displays handsome numerals, counting devices, and illustrations of their use. Ifrah takes the human body as the aboriginal point of reference for most counting systemsfingers and toes producing systems using 5, 10, or 20 as a base. But 12, 60, and 360 have also been used, usually by cultures that attached more importance to the sky than to their anatomy. Ifrah gives special credit to the Mayans for their extraordinary adeptness at astronomical measurements, which calculated the length of the solar year as 365.242 days and the month at 29.53086 days. He commends India for the invention of zerothe placeholder in counting systems that use positional notation to indicate the different values, for instance, of 1, 10, and 100. A recurring theme is the intimate relation between number systems and written language. Just as the invention of alphabets allows the generation of myriad words, advanced number systems can use a limited number of symbols to represent any large number. A quibble or two: Ifrah frequently asserts that our brains cannot instantly number a collection of more than four objects, though psychologists maintain we can recognize up to seven objects without counting. And since many statements on the origins of systems and borrowings across cultures are speculative, they are subject to change in light of recent discoveries. A must for any libraryand a wonderful gift for anthropologists, ethnographers, cultural historians, and quiz kids. (Over 150 b&w drawings) (Book-of-the-Month Club selection; History Book Club selection; Quality Paperback Book Club selection) -- *Copyright ©1999, Kirkus Associates, LP. All rights reserved.*

Review
"A story where numbers and calculation serve as the thread tying together humanity's intellectual epic. The story of how-from the hand (the first calculator) to the computer, from notches cut on reindeer bones by prehistoric man to the binary system underlying today's information sciences-humankind has counted,

classified, compared and calculated everything." -- *Le Point*

"Georges Ifrah is the man, and this book, quite simply, rules. Forgive the gibbering lapse into the demotic, but more considered responses would hardly do justice to this book's scope, learning, and depth... It is outstanding, and not least because it has been written from first principles, for people like you and me, curious but by no means experts. It is a mind-boggling and enriching experience." -- *The Guardian*

"Ifrah's book amazes and fascinates by the scope of its scholarship. It is nothing less than the history of the human race told through figures." -- *International Herald Tribune*

"Ifrah, known in France as the Indiana Jones of numbers, has traveled to Cairo, Baghdad, Beijing and Philadelphia, visited the ruins of Pompei and the Mayan pyramids of Quiringua collecting information and evidence on customs, past and present, in the history of numbers.... To this teacher, numbers are poetry." -- *El Pas*

"The French are known for their interest in writing, but the stellar success of Georges Ifrah's Universal History of Numbers shows they are also passionate about math. Dive into the least anticipated-and most captivating-of bestsellers.... Its success reveals humankind's fascination with the mystery of numbers." -- *Le Nouvel Observateur*

Users Review

From reader reviews:

Kelly McDowell:

The book The Universal History of Numbers: From Prehistory to the Invention of the Computer can give more knowledge and information about everything you want. Exactly why must we leave a good thing like a book The Universal History of Numbers: From Prehistory to the Invention of the Computer? Some of you have a different opinion about reserve. But one aim which book can give many details for us. It is absolutely correct. Right now, try to closer with your book. Knowledge or information that you take for that, it is possible to give for each other; it is possible to share all of these. Book The Universal History of Numbers: From Prehistory to the Invention of the Computer has simple shape however you know: it has great and big function for you. You can appearance the enormous world by open up and read a book. So it is very wonderful.

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