

Contents



Acknowledgements	xi
Preface to the First Edition	xii
Preface to the Second Edition	xvii
1 The History of Mathematics: Alternative Perspectives	1
A Justification for This Book	1
The Development of Mathematical Knowledge	3
Mathematical Signposts and Transmissions Across the Ages	12
2 Mathematics from Bones, Strings and Standing Stones	23
Beginnings: The Ishango Bone	23
Knotted Strings from South America: The Inca <i>Quipu</i>	28
The Emergence of Written Number Systems: A Digression	41
Mayan Numeration	49
3 The Beginnings of Written Mathematics: Egypt	57
The Urban Revolution and its African Origins	57
Sources of Egyptian Mathematics	59
Number Recording Among the Egyptians	61
Egyptian Arithmetic	63
Egyptian Algebra: The Beginnings of Rhetorical Algebra	76
Egyptian Geometry	81
4 The Beginnings of Written Mathematics: Babylonia	91
Sources of Babylonian Mathematics	95

The Crest of the Peacock

The Babylonian Number System	96
Babylonian Algebra	108
Babylonian Geometry	113
5 Egyptian and Babylonian Mathematics: An Assessment	125
6 Ancient Chinese Mathematics	130
Background and Sources	130
The Development of Chinese Numerals	140
Chinese Magic Squares (and Other Designs)	148
Mathematics from the <i>Chiu Chang</i>	156
7 Special Topics in Chinese Mathematics	178
The 'Piling-up of Rectangles': The Pythagorean Theorem in China	180
Estimation of π	188
Solution of Higher-order Equations and Pascal's Triangle	197
Indeterminate Analysis in China	205
Chinese Mathematics: A Final Assessment	211
8 Ancient Indian Mathematics	215
A Restatement of Intent and a Brief Historical Sketch	215
Maths from Bricks: Evidence from the Harappan Culture	221
Mathematics from the <i>Vedas</i>	224
Early Indian Numerals and Their Development	239
Jaina Mathematics	249
Mathematics on the Eve of the Classical Period	256
9 Indian Mathematics: The Classical Period and After	264
Major Indian Mathematician-Astronomers	265
Indian Algebra	272
Indian Trigonometry	280
Kerala Mathematics	286
Other Notable Contributions	294

10 Prelude to Modern Mathematics:	
The Arab Contribution	301
Historical Background	301
Major Arab Mathematicians	304
The Arab Role in the Rise and Spread of Indian Numerals	311
Arab Arithmetic	316
Arab Algebra	324
Arab Geometry	333
Arab Trigonometry	338
The Arab Contribution: A Final Assessment	344
Reflections	349
The History of Mathematics: Alternative Perspectives	349
Mathematics from Bones, Strings and Standing Stones	357
The Beginnings of Written Mathematics: Egypt	369
The Beginnings of Written Mathematics: Babylonia	377
Ancient Chinese Mathematics	385
Special Topics in Chinese Mathematics	389
Ancient Indian Mathematics	395
Indian Mathematics: The Classical Period and After	406
Prelude to Modern Mathematics: The Arab Contribution	417
Bibliography	425
Name Index	441
Subject Index	447