

Table of Contents

Part One: Introduction	1
Chapter I. The Four Arabic Books and the <i>Arithmetica</i>	3
§1. Authenticity of the Arabic Books	3
1. That the Arabic Books Belong to the <i>Arithmetica</i>	4
2. Concerning Their Place Within the <i>Arithmetica</i>	4
a. Placement of the Arabic Book IV	4
b. Basic Methods Used in the Arabic Books	5
c. Placement of the Four Arabic Books	7
§2. Diophantus in Islamic, and Byzantine, Times	8
1. Qusṭā ibn Lūqā and the <i>Arithmetica</i>	8
2. Islamic Mathematicians and the <i>Arithmetica</i>	9
a. Abū Kāmil	9
b. Al-Ḥazīn	10
c. Abū 'l-Wafā'	10
d. Al-Karajī	10
e. Ibn al-Haiṭam	11
f. Samaw'al ibn Yahyā	11
Appendix. Designation of the <i>Arithmetica</i> in Arabic	13
3. Mathematicians and the <i>Arithmetica</i> in Byzantium	14
a. The Time of Leon the Mathematician	14
α. The Seventh and Eighth Centuries	14
β. The Century of Leon	14
γ. From Leon to Planudes	16
b. The Time of Maximus Planudes	16
c. Oldest Greek Manuscripts Still Extant	18
α. Non-Planudean Class	18
β. Planudean Class	20

Chapter II. The Extant Arabic Text	21
§3. Description of the Manuscript	21
§4. Orthographical Remarks	23
1. Writing of the <i>hamza</i> ^h	23
2. Particular Endings	28
3. Numerals	28
4. Repeated, Erroneous Spellings	29
§5. Additions by Earlier Readers (or Copyists)	29
§6. On the Progenitor of Our Manuscript	36
§7. Grammatical and Lexicological Remarks	37
1. Numbers and Powers	37
A. Integers	37
a. Grammatical Peculiarities	37
b. Determination	38
B. Fractions	39
a. General Fractions	39
α . Expression	39
β . Determination	40
b. Aliquot Fractions and Related Cases	40
α . Expression	40
β . Decomposition of Some Fractions	41
γ . Grammatical Peculiarities Connected with Aliquot Fractions	41
C. Grammatical Number of a Mathematical Expression	42
a. Units	42
b. Multiple of a Power	42
c. Algebraic Polynomial Expression	43
D. Powers	43
a. The Greek Power-system	43
b. The Arabic Power-system	44
c. The Power-system in Our Text	44
α . x^5	45
β . x^8	45
d. Grammatical Determination of the Powers	46
α . Two Elements	46
β . Three Elements	46
2. Some Grammatical Remarks on Verbs	46
a. Verbal Persons Used	46
b. Jussives of Weak Verbs	46
c. The Verb <i>'adala</i>	47
α . Agreement of <i>'adala</i>	47
β . Agreement of the Auxiliary of <i>'adala</i>	47

Chapter III. Tentative Reconstruction of the History of the <i>Arithmetica</i>	48
§8. Formal Subdivisions of a Problem	48
1. Analysis and Synthesis	48
2. Subdivisions of a Problem	49
§9. Major, Unsystematic Supplements in the <i>Arithmetica</i>	50
1. Interpolated Problems in the <i>Arithmetica</i>	51
2. Alternative Resolutions (ἄλλως)	54
a. In the Greek Books	54
b. In the Arabic Books	54
3. Other Supplements	55
a. Corollaries	55
b. Remarks	56
c. Additional Computations	56
Appendix. A Comparison Between al-Karajī's Version and the Extant <i>Arithmetica</i>	57
§10. Errors in the Problems of the Arabic Books	60
§11. Quality of the Translation	65
1. Imperfections in the Translation	65
2. General Character of the Translation	67
§12. Genealogy of the Mashhad Manuscript	68
1. Earliest Additions	68
2. The Major Commentary	68
a. Additions Originating with the Major Commentary	68
α. Additions in the Analysis	69
β. Additions in the Synthesis	69
b. Value of This Commentary	70
c. Possible Authorship of the Major Commentary	71
3. The Addition of the Final Statements	72
4. The Arabic Diophantus	73
5. Genealogical Tree of the Mashhad Manuscript	74
§13. On the Missing Part of the <i>Arithmetica</i>	76
1. New Aspects of the Problem	76
2. The Announcement in the Greek Introduction	77
3. Diophantus and the Equation $Ax^2 + Bx + C = \square$	78
4. On Some Problems of a Diophantine Nature Found in Islamic Mathematics but Not in the Extant <i>Arithmetica</i>	81
a. Problems of Abū Kāmil	81
b. Problems of al-Karajī	82
5. Conclusion	83

Part Two: Translation	85
Book IV	86
Book V	126
Book VI	139
Book VII	156
Part Three: Mathematical Commentary	173
Book IV	175
Book V	223
Book VI	244
Book VII	261
Part Four: Text	281
Book IV	283
Book V	352
Book VI	374
Book VII	403
Part Five: Arabic Index	431
Appendix: Conspectus of the Problems of the <i>Arithmetica</i>	461
Bibliography	485
General Index	493