

Contents

Part I Chinese Astronomical Canons and Calendars

1 Preliminary Observations	3
The State of the Art	3
Methodological Orientations	6
Computistics and Predictive Astronomy	10
The Chinese Calendar, A Paradoxical Object	19
The Calendar and Its Calculations	21
The Difficulty of Access to Astronomical Knowledge	22
The Surface and Deep Calendrical Structures	23
Two Notions of Time	23
The Double History of the Chinese Calendar	25
Sources for the History of the Calendar (Surface Structure)	25
Sources for the History of the Calendar (Deep Structure)	27
Numbers	27
The Key Ideas of Astronomical Canons	29
Political and Cultural Factors: An Example	32
The Reforms of Astronomical Canons	33
The Bureau of Astronomy	40
The Names of Astronomical Canons	43
2 General Description of the Chinese Calendar	47
Limitation and Scope	47
The Fundamental Components of the Chinese Calendar	47
The Day	47
The Solar Year	48
The Twenty-Four Solar Breaths	49
The Seventy-Two Seasonal Indicators	51
The Five Phases	52
The Lunar Year	53
Lunar Months, Ordinary and Intercalary	53
The Structure of the Lunar Year	54

The Percentage of Full and Hollow Months	55
Local Patterns of Full and Hollow Months	55
The Astronomical Months and the Lunisolar Coupling.	56
The Beginning of the Lunar Year	59
Dynastic Eras and Concordance Tables	60
Cycles and Pseudo-Cycles	61
Definitions	61
The Denary Cycle.	61
The Duodecimal Cycle	62
The Inverted Tree	64
The Sexagenary Cycle.	64
Various Uses of the Sexagenary Cycle.	66
The Nine Color Palaces	67
The Planetary Week	70
The Twenty-Eight Mansions.	72
The <i>Jianchu</i> Pseudo-Cycle with Reduplications	73
The <i>Nayin</i> Cycle with Reduplications	74
Other Aspects of the Chinese Calendar	75
Festivals and Annual Observances.	75
Irregular Years	77

Part II Calculations

3 Numbers and Calculation	83
Modes of Representation of Numbers	83
Various Zeroes, Non-written and Written.	91
The Astronomical Zero and the Zero-Circle.	96
The History of Zero Revisited	99
Numerical Constants.	101
The Epoch.	104
The Superior Epoch	105
The Lunar Year and Its Support Year	106
The Emerging Year	107
The Number of Years from the Superior Epoch	107
Changes of Origin	108
Number of Support Days.	108
Binomial Representations	109
Fractional Representations of Time.	110
Mean and True Elements.	112
Definitions	112
Historical Aspects	112
Notation and Terminology	113
Fundamental Lunisolar Elements	114
The Last Solar Breath of a Lunar Year	115
The Numbering of New Moons	115

The Lunisolar Shift	115
Introduction	115
The Epact	116
The Intercalary Remainder (<i>Runyu</i>)	116
The Monthly Epact and the Intercalary Month	116
Consequences	118
Pathological Calendars	118
4 Mean Elements	121
Mean Elements in Practice	121
Metonic Constants	121
Metonic Calculations	122
Justifications	124
Non-metonic Canons	126
Calculation Variants	128
5 True Elements (618–1280)	131
Introduction	131
True Solar Breaths	132
Some Peculiarities Leading to Simplifications	132
A Technical Term: The <i>ruqi</i>	134
A General Mode of Calculation of the <i>ruqi</i>	134
Another Mode of Calculation	136
The Calculation of the <i>ruqi</i> from Mean Solar Breaths	136
Another Technical Term: The <i>ruli</i>	139
The <i>ruli</i>	139
Tables and Interpolation Techniques	140
Solar Tables	141
Lunar Tables	144
The Solar Correction	146
Further Remarks on the Solar Correction	150
The Lunar Correction	151
Calculations Without Tables	153
6 Later Astronomical Canons (1281–1644)	155
The Supremacy of the Inception Granting Canon	155
The Two Last Chinese Astronomical Canons	156
Units of Time	157
The Epoch	157
Concordances with Julian Dates	158
The Reform of the Shift Constants	159
Mean Elements	160
Justifications	160

True Lunar Phases	161
True New Moons	161
True Lunar Phases	164
Notes	164
The Horary System of the <i>Datong Li</i>	168
The Durations of Day and Night	170
The Epoch of the Great Unification Canon	171
7 Mo and Mie Days: Theory	173
Introduction	173
Definitions	175
Immediate Consequences of the Definitions	176
Calculations Techniques (<i>Mo</i> and <i>Mie</i> Days)	176
First Step	177
Second Step	178
Third Step	178
Fourth Step	178
First Step	178
Second Step	179
Third Step	179
Fourth Step	179
Justifications	179
Supplementary Results	184
Justifications	184
The Hypothetical Indian Origin of <i>Mo</i> and <i>Mie</i> Days	185
 Part III Examples of Calculations	
8 The Quarter-Remainder Canon	191
Importance	191
Fundamental Parameters	191
The Calculation of the Calendar of the Year 119	192
Initial Calculations	192
Another Procedure	193
Other Solar and Lunar Elements	195
The General Structure of the <i>Sifen Li</i>	202
 9 The Luminous Inception Canon	207
Importance	207
Fundamental Parameters	207
The Calendars of the Years 450 and 451	208
The Manuscript Calendars of the Years 450 and 451	212
A Partial Translation of the Manuscript Calendar of the Year 450 Guidelines	213

Translation	214
Notes	215
The Two Lunar Eclipses of the Year 451	218
10 The Manifest Enlightenment Canon	221
Importance	221
Fundamental Parameters	221
The Calculation of the Calendar of the Year 877	222
Former Studies	222
The Mean Elements of the Year 877	223
The True Elements of the Year 877	224
True New Moons	230
The Calendar of the Year 877	232
A Printed Almanac of the Year 877	236
General Presentation	236
Some More Details	238
11 The Great Unification Canon	241
Its Importance	241
Fundamental Parameters	241
The Calendar of the Year 1417	242
The Intercalary Character of the Year 1417	242
The Mean Elements of the Year 1417	242
The True Moons Phases of the Year 1417	243
The Determination of the Intercalary Month	245
Other Moon Phases	246
Cycles and Pseudo-Cycles	249
Justifications	249
A Calendar for the Year 1417	251
Presentation	251
Monthly Structure	253
Translations	254
12 <i>Mo</i> and <i>Mie</i> Days: Practice	259
Preliminary Remarks	259
The <i>Mo</i> Days of the Year Jiading 11 (1218)	259
The <i>Mie</i> Days of the Second Kind of the Year Qianfu 4 (877)	261
The <i>Mo</i> Days of the Year Yongle 15 (1417)	262
The <i>Mie</i> Days of the Year Yongle 15 (1417)	263
Afterthoughts	265
Appendix A: The Sexagenary Cycle	269
Appendix B: The Twenty-Four Solar Breaths	271

Appendix C: The Seventy-Two Seasonal Indicators	275
Appendix D: Official Astronomical Canons	279
Appendix E: Time Constants	285
Appendix F: Solar Constants	289
Appendix G: Lunar Constants	293
Tables of the Chinese Calendar and Bibliography	297
Primary Sources	307
Secondary Sources	325
Glossary	363
Author Index	371
Subject Index	375

Astronomy and Calendars – The Other Chinese
Mathematics

104 BC – AD 1644

Martzloff, J.-C.

2016, XXXV, 471 p. 33 illus., Hardcover

ISBN: 978-3-662-49717-3