
Contents

<i>List of Frontispieces</i>	<i>page</i> xii
<i>List of Figures</i>	xiii
<i>List of Tables</i>	xiv
<i>List of Calendar Functions</i>	xvi
<i>Abbreviations</i>	xxiv
<i>Mathematical Notations</i>	xxvi
<i>Preface</i>	xxxix
The Ultimate Edition	xxxv
Calendrical Tabulations	xxxvii
The Cambridge University Press Web Site	xxxvii
The Authors' Web Page	xxxvii
Acknowledgments	xxxviii
References	xxxix
<i>Credits</i>	xli
<i>License and Limited Warranty and Remedy</i>	xlii
1 Calendar Basics	1
1.1 Calendar Units and Taxonomy	4
1.2 Fixed Day Numbers	10
1.3 Negative Years	15
1.4 Epochs	15
1.5 Julian Day Numbers	16
1.6 Unix Time Representation	19
1.7 Mathematical Notation	20
1.8 Search	23
1.9 Dates and Lists	25
1.10 Mixed-Radix Notations	27
1.11 A Simple Calendar	29
1.12 Cycles of Days	33
1.13 Simultaneous Cycles	35
1.14 Cycles of Years	39
1.15 Approximating the Year Number	46
1.16 Warnings about the Calculations	47
References	49

I Arithmetical Calendars

2	The Gregorian Calendar	55
	2.1 Structure	55
	2.2 Implementation	59
	2.3 Alternative Formulas	63
	2.4 The Zeller Congruence	67
	2.5 Holidays	69
	References	71
3	The Julian Calendar	75
	3.1 Structure and Implementation	75
	3.2 Roman Nomenclature	77
	3.3 Roman Years	81
	3.4 Olympiads	82
	3.5 Seasons	83
	3.6 Holidays	84
	References	85
4	The Coptic and Ethiopic Calendars	89
	4.1 The Coptic Calendar	89
	4.2 The Ethiopic Calendar	91
	4.3 Holidays	92
	References	93
5	The ISO Calendar	95
	Reference	97
6	The Icelandic Calendar	99
	References	102
7	The Islamic Calendar	105
	7.1 Structure and Implementation	105
	7.2 Holidays	108
	References	109
8	The Hebrew Calendar	113
	8.1 Structure and History	114
	8.2 Implementation	119
	8.3 Inverting the Molad	125
	8.4 Holidays and Fast Days	128
	8.5 The Drift of the Hebrew Calendar	133
	8.6 Personal Days	134
	8.7 Possible Days of the Week	137
	References	139
9	The Ecclesiastical Calendars	143
	9.1 Orthodox Easter	145

	<i>Contents</i>	ix
9.2	Gregorian Easter	147
9.3	Astronomical Easter	150
9.4	Movable Christian Holidays	150
	References	152
10	The Old Hindu Calendars	155
10.1	Structure and History	155
10.2	The Solar Calendar	158
10.3	The Lunisolar Calendar	160
	References	166
11	The Mayan Calendars	169
11.1	The Long Count	170
11.2	The Haab and Tzolkin Calendars	171
11.3	The Aztec Calendars	177
	References	181
12	The Balinese Pawukon Calendar	185
12.1	Structure and Implementation	185
12.2	Conjunction Days	190
	References	192
13	Generic Cyclical Calendars	195
13.1	Single Cycle Calendars	195
13.2	Double Cycle Calendars	198
13.3	Summary	200
II Astronomical Calendars		
14	Time and Astronomy	203
14.1	Position	204
14.2	Time	206
14.3	The Day	212
14.4	The Year	219
14.5	Astronomical Solar Calendars	226
14.6	The Month	227
14.7	Rising and Setting of the Sun and Moon	240
14.8	Times of Day	245
14.9	Lunar Crescent Visibility	249
	References	253
15	The Persian Calendar	257
15.1	Structure	257
15.2	The Astronomical Calendar	259
15.3	The Arithmetical Calendar	261
15.4	Holidays	265
	References	266

16	The Bahá'í Calendar	269
	16.1 Structure	269
	16.2 The Arithmetical Calendar	271
	16.3 The Astronomical Calendar	273
	16.4 Holidays and Observances	277
	References	278
17	The French Revolutionary Calendar	281
	17.1 The Original Form	283
	17.2 The Modified Arithmetical Form	284
	References	286
18	Astronomical Lunar Calendars	289
	18.1 The Babylonian Calendar	289
	18.2 Astronomical Easter	292
	18.3 The Observational Islamic Calendar	293
	18.4 The Classical Hebrew Calendar	297
	18.5 The Samaritan Calendar	300
	References	302
19	The Chinese Calendar	305
	19.1 Solar Terms	306
	19.2 Months	309
	19.3 Conversions to and from Fixed Dates	316
	19.4 Sexagesimal Cycle of Names	318
	19.5 Common Misconceptions	321
	19.6 Holidays	322
	19.7 Chinese Age	324
	19.8 Chinese Marriage Auguries	325
	19.9 The Japanese Calendar	326
	19.10 The Korean Calendar	327
	19.11 The Vietnamese Calendar	329
	References	330
20	The Modern Hindu Calendars	335
	20.1 Hindu Astronomy	341
	20.2 Calendars	347
	20.3 Sunrise	351
	20.4 Alternatives	354
	20.5 Astronomical Versions	358
	20.6 Holidays	362
	References	371
21	The Tibetan Calendar	375
	21.1 Calendar	375
	21.2 Holidays	379
	References	382

Coda 385

III Appendices

A Function, Parameter, and Constant Types 389

 A.1 Types 389

 A.2 Function Types 394

 A.3 Constant Types and Values 409

B Cross References for Functions and Constants 415

C Sample Data 445

 References 467

D Lisp Implementation 469

 D.1 Basics 469

 D.1.1 Lisp Preliminaries 469

 D.1.2 Basic Code 474

 D.1.3 The Egyptian and Armenian Calendars 476

 D.1.4 Cycles of Days 477

 D.1.5 Akan Calendar 478

 D.2 The Gregorian Calendar 479

 D.3 The Julian Calendar 484

 D.4 The Coptic and Ethiopic Calendars 489

 D.5 The ISO Calendar 490

 D.6 The Icelandic Calendar 491

 D.7 The Islamic Calendar 493

 D.8 The Hebrew Calendar 494

 D.9 The Ecclesiastical Calendars 502

 D.10 The Old Hindu Calendars 503

 D.11 The Mayan Calendars 505

 D.12 The Balinese Pawukon Calendar 510

 D.13 General Cyclical Calendars 513

 D.14 Time and Astronomy 513

 D.15 The Persian Calendar 535

 D.16 The Bahá'í Calendar 538

 D.17 The French Revolutionary Calendar 541

 D.18 Astronomical Lunar Calendars 543

 D.19 The Chinese Calendar 549

 D.20 The Modern Hindu Calendars 557

 D.21 The Tibetan Calendar 570

 References 572

Index 575

Envoi 617

About the Cover 618