

# Appendices

# Appendix A

## Inventory of Sanskrit table texts

The following inventory does not pretend to be a complete list of every surviving or known table text in Sanskrit astronomy. It is unlikely that any such list could ever be compiled, especially if the category of table text is taken to include every individual *pattra*, *koṣṭhaka* or *sāraṇī* written out by astronomers for their personal use. But the items shown here contain all the named and recognized table texts known to us, along with basic information about their date, authorship, and connections to other works.

Each listing contains the work's title as well as the following details, where available:

- epoch/composition date (Common Era dates have been converted or reconstructed from external sources)
- author
- geographical location, including latitude where known
- astronomical *pakṣa*, format, and/or “school” tradition to which the work belongs
- standard reference citations about the work
- commentators, with titles and dates of their commentaries where known
- other miscellaneous information

***Ananta sudhārasasāraṇī*** (ca. 1525 CE)

Ananta

(Pingree 1970–94, A1.40, A5.5; Pingree 2004, pp. 29–33)

***Karaṇakesarī*** Śaka 1603 (1681 CE)

Bhāskara

Saudāmikā (Gujarāt?  $\phi = 22^\circ$ ; 35,39)

Brāhmaṇapakṣa

(Pingree 1970–94, A4.328, A5.263; Pingree 1968, pp. 70–72; Montelle and Plofker 2013)

***Khagatarāṅgiṇī*** (1608 CE)

Goparāja

Saurapakṣa

(Pingree 2003, pp. 74–78)

***Khecarādīpikā*** Śaka 1571 (1649 CE)

Kalyāṇa

(Gujarāt/Rājasthān)

Brāhmapakṣa, mean-to-true

(Pingree 1970–94, A2.25; Pingree 1968, pp. 61–2; Pingree 1981, p. 43)

***Khecarasīghrasiddhi/Grahasāraṇī*** Śaka 1552 (1630 CE)

Gaṅgādhara

Kāśī

Gaṇeśapakṣa, mean-with-equation

(Pingree 1970–94, A2.82–85, A4.70, A5.65; Pingree 1981, p. 43; Pingree 1973, pp. 134–141)

***Khetakasiddhi*** Śaka 1500 (1578 CE)

Dinakara

Bāreḷya, (Bariya, Rewa Kantha, Gujarāt)

Brāhmapakṣa, mean-to-true

(Pingree 1970–94, A3.102–104, A5.139; Pingree 1968, pp. 51–3; Pingree 1973, pp. 101–112; Pingree 1981, p. 42; Pingree 2003, p. 65)

***Khetakautūhala*** (1619 CE)

Sūrajit

(Ahmadabad?)

(Pingree 2003, pp. 79–80)

*udāharaṇa* of 1628/9 CE (Khasmohor 5602)***Khetatarāṅgiṇī*** Śaka 1624 (1702 CE)

Āpadeva

Janasthāna, Mahārāṣṭra

Gaṇeśapakṣa, mean-with-equation

(Pingree 1970–94, A1.49–50, A3.15; Pingree 1981, p. 43)

***Khetamuktāvalī*** Śaka 1488 (1566 CE)

Nṛsiṃha

Nandigrāma, Gujarāt

Gaṇeśapakṣa, mean-to-true

(Pingree 1970–94, A3.202–204, A4.162, A5.202; Pingree 1980; Pingree 1981, p. 42)

***Gaṇakānanda*** (1447 CE)

Sūrya

Saurapakṣa

(Rupa 2014, p. 42)

***Gaṇitamakaranda*** (1618 CE)

Rāmadāsa Dave

Śuddhadantī, Marwar

(Pingree 1970–94, A5.490; Pingree 2004, p. 36)

***Gaṇitarāja*** Kali 4829 (1728 CE)

Kevalarāma Pañcānana

Navadvīpa, Bengal

Adjusted Saurapakṣa, mean-with-equation

(Pingree 1970–94, A2.63, A4.63, A5.54; Pingree 1973, pp. 158–168; Pingree 1981, p. 44)

***Grahaḥkalpataru/Maṇipradīpa*** Śaka 1487 (1565 CE)

Raghunātha

Kāśī

(Pingree 1970–94, A5.372; Pingree 2003, pp. 62–64)

***Grahaḥkaumudī*** Śaka 1510/1525 (1588/1603 CE)

Nṛsiṃha

Nandigrāma, Gujarāt

Gaṇeśapakṣa, mean-to-true

(Pingree 1970–94, A3.202–204, A4.162, A5.202; Pingree 1973, pp. 118–123; Pingree 1981, p. 42)

***Grahañāna*** Śaka 1054 (1132 CE)

Āśādhara

(Gujarāt)

Brāhmapakṣa, mean-to-true

(Pingree 1970–94, A1.54, A2.16, A3.16, A4.28, A5.17; Pingree 1973, pp. 69–72;

Pingree 1981, p. 42; Pingree 1989)

*Gaṇitacūdāmaṇi* of Harihara (*fl. ca.* 1575)

***Grahaḥprakāśa*** Śaka 1584 (1662 CE)

Devadatta

Adjusted Saurapakṣa

(Pingree 1970–94, A3.119; Pingree 1973, pp. 142–148)

commentary of Devadatta

**Grahaprabodha** Śaka 1541 (1619 CE)

Nāgeśa

Gujarāt

Gaṇeśapakṣa, mean-with-equation

(Pingree 1970–94, A3.145–146, A4.125, A5.167; Pingree 1968, pp. 63–64; Pingree 1981, p. 43)

*udāharaṇa* of Yādava (Śaka 1585 = 1663 CE)

**Grahalāghavavīyamadhyamaspaṣṭārkasārīṇī** Śaka 1447 (1525 CE)

(Pingree 1968, p. 50)

**Grahalāghavasārīṇī** Śaka 1676 (1754 CE)

Gaṇeśapakṣa, mean-with-equation

(Pingree 1968, pp. 69–70; Pingree 1973, pp. 93–99)

**Grahalāghavasārīṇī** (ca. 1630 CE)

Nīlakaṇṭha

(Pingree 1970–94, A3.174, A4.142, A5.184–185; Pingree 2003, pp. 80–83)

**Grahalāghavasārīṇī** Śaka 1578 (1656 CE)

Prema

(Pingree 1970–94, A4.229, A5.226; Pingree 2003, pp. 87–90)

**Grahasiddhi/Bhramaṇasāraṇī** Saṃvat 1776 (1704 CE)

Trivikrama

Nalinapura, Rājasthān

Brāhmapakṣa, cyclic

(Pingree 1970–94, A3.93, A4.105; Pingree 1968, pp. 64–66; Pingree 1981, pp. 43–44)

*udāharaṇa* of Trivikrama

**Grahāgama** Śaka 1695 (1773 CE)

Govindasūnu

Sipośi, Rājasthān

Gaṇeśapakṣa, mean-with-equation

(Pingree 1970–94, A2.143, A4.86; Pingree 1973, pp. 168–169; Pingree 1981, p. 44)

**Candrārki** Śaka 1500 (1578 CE)

Dinakara

Bāreḷya, (Bariya, Rewa Kantha, Gujarāt)

Brāhmapakṣa, mean-to-true

(Pingree 1970–94, A3.102–104, A4.109, A5.138–9; Pingree 1968, pp. 51–3; Pingree 1973, p. 101; Pingree 1981, p. 42; Pingree 2003, pp. 65–68)

*Candrārkiṭṭippana* of Dinakara

***Candrārākī*** Śaka 1577 (1655 CE)

Acalajit

Muraripapura, Gujarāt

Brāhmapakṣa/Saurapakṣa

(Pingree 1970–94, A4.12; Pingree 1981, pp. 45–6)

***Camatkārasiddhi*** Śaka 1549 (1627 CE)

Vīrasimha

Bikāner

(Pingree 1981, p. 45; Sarma 1945)

***Jagaccandrikāsāriṇī*** Saṃvat 1725 (1668 CE)

(Jaina author)

(Pingree 2003, pp. 90–91)

***Jagadbhūṣaṇa*** Śaka 1560 (1638 CE)

Haridatta

Mewar, Rājasthān ( $\phi \approx 24$ , Ujjain, Madhya Pradesh?)

Brāhmapakṣa, cyclic

(Pingree 1968, pp. 55–9; Pingree 1973, pp. 141–142; Pingree 2003, pp. 83–87; Montelle 2014)

***Jayavinodasāraṇī*** Śaka 1657 (1735 CE)

(Jayasimha)

Amber Palace, Jaipur, Rājasthān

(Pingree 1968, pp. 66–7; Pingree 1981, p. 46)

***Tīthikalpadrumal/Pañcāṅgapatraracanā*** Śaka 1527 (1605 CE)

Kalyāṇa

Maṅgalapura, Saurāṣṭra

Brāhmapakṣa

(Pingree 1970–94, A2.24–5, A4.47, A5.28; Pingree 1973, pp. 123–128; Pingree 1981, p. 45)

***Tīthikalpalatā*** Śaka 1281 (1359 CE)

(Pingree 1973, pp. 89–92; Pingree 2004, pp. 20–21)

***Tīthikāmadhenu*** Śaka 1279 (1357 CE)

Mahādeva

Tryambaka, Mahārāṣṭra

Āryapakṣa

(Pingree 1970–94, A4.376–77; Pingree 1973, pp. 82–89; Pingree 1981, p. 44) commentary of Ananta (*fl. ca.* 1575)

***Tithicintāmaṇi*** Śaka 1447 (1525 CE)

Gaṇeśa

Nandigrāma, Gujarāt

Gaṇeśapakṣa

(Pingree 1970–94, A2.100–103, A3.28, A4.74–5, A5.73; Pandeya 1938; Āpaṭe 1942b; Pingree 1968, pp. 47–50; Pingree 1973, pp. 100–101; Pingree 1981, p. 45; Ikeyama and Plofker 2001)

*Harṣakaumudī* of Nṛsiṃha (*b.* 1548)*Siddhāntarahasyodaharaṇa* of Viśvanātha (*fl.* 1454/1458)*ṭippaṇa* of Vyeṅkaṭa alias Bāpū*Maṇicandrikā* of Yajñeśvara Roḍe (*fl.* 1815/1842)***Tithicūdāmaṇi/Kāmadhenu*** (*ca.* 1560–1580 CE)

Rāmacandra

(Pingree 1970–94, A5.479–480; Pingree 2003, p. 65)

***Tithidarpaṇa***

Murāri

Kāśī

Saurapakṣa

(Pingree 1970–94, A4.441; Pingree 1973, pp. 149–153; Pingree 1981, p. 46)

***Tithisāraṇī/Dinakarasāraṇī*** Śaka 1505 (1583 CE)

Dinakara

Bārejya, (Bariya, Rewa Kantha, Gujarāt)

Brāhmapakṣa

(Pingree 1970–94, A3.104, A5.139; Pingree 1973, pp. 112–114; Pingree 1981, p. 45; Pingree 2003, pp. 68–69)

***Tithisāraṇī***

Trivikrama

Nalinapura, Rājasthān

Brāhmapakṣa

(Pingree 1970–94, A3.93)

commentary of Trivikrama

***Tithisāraṇī***

Kevalarāma Pañcānana

Navadvīpa, Bengal

(Pingree 1970–94, A2.63)

***Tithyādicintāmaṇi*** Saṃvat 1643 (1586 CE)

Dinakara

Unnatadurga (Uparkot in Junāgaḍh, Saurāṣṭra)

(Pingree 1970–94, A3.104–5; Pingree 1968, p. 51; Pingree 1981, p. 45)

***Tyāgarti/Grahagaṇitapadakāni*** Kali 4813 (1712 CE)  
 ( $\phi \approx 14^\circ$ )  
 (Rupa 2014, pp. 40–41)

***Dinacandrikā*** (1599 CE)  
 Rāghavaśarman  
 (Pingree 1984, pp. 24)

***Dr̥kpaḥṣasāraṇī***  
 Kevalarāma Pañcānana  
 Navadvīpa, Bengal  
 (Pingree 1970–94, A2.63)

***Daivajñavallabha*** (1447 CE)  
 Sumiśra  
 Nepāla  
 Ārdharātrikapakṣa  
 (Pingree 1981, p. 45)

***Pañcāṅgavidyādharī*** Śaka 1565 (1643 CE)  
 Vidyādhara  
 Rājakoṭa, Saurāṣṭra  
 Āryapakṣa/Brāhmapakṣa  
 (Pingree 1970–94, A5.648; Pingree 1968, pp. 60–61; Pingree 1973, p. 142; Pingree 1981, p. 45)

***Pañcāṅgasārīṇī*** (1735 CE)  
 Kevalarāma  
 Jaipur  
 (Pingree 2003, p. 93)

***Pañcāṅgasiddhi*** (1529 CE)  
 Gaṇeśa (alias Gaṇapati)  
 (Pingree 1984, pp. 20)

***Patraprakāśa*** Śaka 1672 (1750 CE)  
 Viśrāmasukla  
 Kāśī  
 Adjusted Saurapakṣa  
 (Pingree 1970–94, A5.660; Pingree 1973, pp. 170–5; Pingree 1981, pp. 46)

***Pātasāraṇī*** Śaka 1444 (1522 CE)  
 Gaṇeśa  
 Nandigrāma, Gujarāt  
 Gaṇeśapakṣa



(Pingree 1970–94, A2.100, A4.74, A5.72; Pingree 2003, pp. 59–60)  
 commentary of Divākara (*fl.* 1575)  
 commentary of Viśvanātha (*fl.* 1612/1634)  
 commentary of Dinakara (*fl.* 1839)

***Brhattithicintāmaṇi*** Śaka 1471 (1552 CE)

Gaṇeśa

Nandigrāma, Gujarāt

Gaṇeśapakṣa

(Pingree 1970–94, A2.104, A3.28, A4.75, A5.73; Āpaṭe 1942a; Pingree 1968, pp. 50–51; Pingree 1973, p. 101; Pingree 2003, pp. 60–61)

*Subodhinī* of Viṣṇu (*fl. ca.* 1575)

***Brahmatulyasāraṇī*** Śaka 1105 (1183 CE)

(Nāgadatta?)

Brāhmapakṣa, mean-with-equation

(Pingree 1970–94, A5.166; Pingree 1968, pp. 36–37; Montelle and Plofker 2015)

***Makaranda*** Śaka 1400 (1478 CE)

Makaranda

Kāśī

Saurapakṣa, mean-with-equation

(Pingree 1970–94, A4.341–343; Pingree 1968, pp. 39–46; Pingree 1973, p. 92; Pingree 1981, p. 42; Pingree 2003, pp. 54–59)

*Makarandapañcāṅgopapatti* of Dhunḍhirāja (*fl.* 1590)

*Makarandavivaraṇa* of Divākara (*b.* 1606)

*Makarandapaddhatikārikā* of Harikarṇa (*fl.* 1610)

*Abhinavatāmarasa* of Puruṣottama Bhaṭṭa (*fl. ca.* 1610)

*Makarandodāharana* of Viśvanātha (*fl.* 1612/1630)

*Makarandaṭippaṇa* of Moreśvara (1622 CE)

*Subodhikā* of Kṣemaṅkara Mīśra (*fl.* 1632)

*Makarandakārikā* of Kṛpārāma Mīśra (*fl.* 1815)

*vāsanā* of Nīlāmbara Jhā (*b.* 18 July 1823)

*udāharana* of Jīvanātha Jhā (*fl. ca.* 1846/1900)

*Makaranda-vāsanā* of Gokulanātha

*Makaranda-sādhana-prakriyā* of Cūḍamaṇi Cakravartin

*ṭippaṇa* of Vināyaka

commentary of Mākhanaḷāla

commentary of Trivedin

commentary of Rāma

commentary of Rāmadatta

commentary of Lakṣmīpati

commentary of Sadāśīva

***Mahādevī/Grahasiddhi*** Śaka 1238 (1316 CE)

Mahādeva

(Gujarāt/Rājasthān)

Brāhmapakṣa, mean-to-true

(Pingree 1970–94, A4.374–76, A5.288–289; Neugebauer and Pingree 1967; Pingree 1968, pp. 37–39; Pingree 1973, p. 82; Pingree 2003, pp. 51–54)

*Mahādevī-dīpikā* of Dhanarāja (1635)

commentary of Divākara (*fl.* 1578)

***Ravisiddhāntamañjarī*** Śaka 1531 (1609 CE)

Mathurānātha

(Bengal?)

Saurapakṣa, mean-with-equation

(Pingree 1970–94, A4.349, A5.274; Pingree 1981, p. 43; Pingree 1973, pp. 128–134; Jyotiṣārṇava 1911)

***Rājamṛgāṅka*** Śaka 964 (1042 CE)

Bhojarāja

Dhārā, Western India

Brāhmapakṣa, mean-with-equation

(Pingree 1970–94, A4.256–7; Pingree 1981, p. 34; Pingree 1987b)

***Rāmaṇodā*** Śaka 1512 (1590 CE)

Rāma

Mughal court, Kāśī

Saurapakṣa, mean-to-true

(Pingree 1970–94, A5.427–428; Pingree 1973, pp. 114–118; Pingree 1981, p. 42; Pingree 2003, pp. 69–70)

***Laghukhecarasiddhi*** Śaka 1149 (1227 CE)

Śrīdhara

Khāndeśa

Brāhmapakṣa, mean-with-equation

(Pingree 1973, pp. 73–6; Pingree 1976; Pingree 1981, p. 42)

***Laghuṭīthidarpaṇa*** Śaka 1587 (1665 CE)

Murāri

Kāśī

Saurapakṣa

(Pingree 1970–94, A4.442; Pingree 1973, pp. 151–153; Pingree 1981, p. 46)

***Śīghrasiddhi*** Śaka 1200 (1278 CE)

Lakṣmīdhara

(Territory of the Yādavas of Devagiri)

Āryapakṣa/Brāhmapakṣa

(Pingree 1973, pp. 76–82; Pingree 1981, p. 44)

***Siddhāntasindhu*** Śaṃvat 1685 (1628 CE)

Nityānanda

Agra

(Pingree 1970–94, A3.173–4, A4.141, A5.184; Pingree 1981, p. 30)

***Subodhasāriṇī*** Śaka 1479 (1557 CE)

Jayarāma

Alindrapūrī

(Pingree 1970–94, A4.96; Pingree 2003, pp. 61–62)

***Sūryasiddhāntarahasya*** (1591 CE)

Rāghavaśarman

(Pingree 1984, p. 24)

***Sūryasiddhāntasāriṇī*** Śaka 1665 (1743 CE)

(Pingree 2003, pp. 93–94)

***Sūryasiddhāntasāriṇī/Grahaspaṣṭasāraṇī*** (1748 CE)

Candrāyaṇa

Mulatāna

(Pingree 1970–94, A3.46, A5.109; Pingree 2003, pp. 94–95)

# Appendix B

## Classification schemata and parameters

### B.1 Astronomical and calendric name-lists

Fully explaining the complicated nature of traditional Indian luni-solar calendars and the challenges they pose for calendar conversion is far beyond the scope of this appendix. More detailed discussions can be found in, e.g., Sewell and Dikshit (1896), Plofker and Knudsen (2011), and Salomon (1998). As described in Section 1.1.4, Indian calendars are for the most part luni-solar, synchronizing sidereal years and synodic months; some of their commonly used eras or starting-points are noted in Table B.7. Years may be reckoned as strictly sidereal, starting from the moment or day of Meṣasaṅkrānti, the sun's entrance into the zodiacal sign/solar month Meṣa (see Table B.1). Or they may be taken to begin at the start of a synodic calendar month (see Table B.4), most often, but not invariably, the *śuklapratipad* or new moon of Caitra near the vernal equinox.

Synodic months may be considered *amānta*, beginning at new moon, or *pūrṇimānta*, beginning at full moon. An intercalary synodic month or *adhimāsa* can be inserted between any two of the twelve regular calendar months, and is typically called by the name of the month it immediately precedes, prefixed with “*adhika*”. Thus an intercalary month occurring between Āśvina and Kārttika is *adhika Kārttika*, followed by “regular” or *nija Kārttika*, then Mārgaśīrṣa, etc.

Depending on the astronomical *pakṣa* used, civil days in the calendar may be reckoned from sunrise (at Laṅkā, the zero-point of the terrestrial coordinate system) or from midnight. All of these variables including calendar era, beginning of the year, month, and day, and sequence of intercalations depend on which of the many variants of regional calendars is used in a particular work or calendric calculation. Precise Julian or Gregorian equivalents of particular Indian calendar dates are thus not always readily obtainable. If the given date includes the current weekday or position in the 60-year “Jupiter cycle” (see Table B.8), identification may be easier.

**Table B.1** Sanskrit terms for the twelve 30° zodiacal signs and associated solar months, their classical equivalents, and their initial ecliptic longitudes. The actual celestial position of the signs will vary depending on whether the zodiac is considered tropical or sidereal, and the assumed location of the tropical or sidereal zero-point of the ecliptic.

	Standard name	Alternative names	Classical	$\lambda$
1	Meṣa (ram)	Triya, Aja	Aries	0
2	Vṛṣabha (bull)	Tāvura, Go	Taurus	30
3	Mithuna (couple)	Jituma, Nryuj	Gemini	60
4	Karkata (crab)	Kulīra	Cancer	90
5	Simha (lion)	Leya, Mṛgarāja	Leo	120
6	Kanyā (girl)	Pārthona	Virgo	150
7	Tulā (balance)	Jūka, Vaṇij	Libra	180
8	Vṛścika (scorpion)	Kaurpi, Āli	Scorpio	210
9	Dhanus (bow)	Taukṣika, Cāpa	Sagittarius	240
10	Makara (sea-monster)	Mrga	Capricorn	270
11	Kumbha (water-pot)	Hṛdroga, Ghaṭa	Aquarius	300
12	Mīna (fish)	Jhaṣa, Timi, Matsya	Pisces	330

**Table B.2** Sanskrit names for the seven *vāras* or weekdays and their corresponding planets.

Weekday		Alternative names
Sunday (Sun)	<i>ravi, sūrya</i>	<i>arka, āditya, ina, dinakara, bhānu, bhāskara, heli</i>
Monday (Moon)	<i>candra, soma</i>	<i>indu, mṛgāṅka, rātrikara, vidhu, śaśi</i>
Tuesday (Mars)	<i>bhauma</i>	<i>kuja, maṅgala</i>
Wednesday (Mercury)	<i>buddha</i>	<i>jña, vid</i>
Thursday (Jupiter)	<i>guru</i>	<i>indra, bṛhaspati</i>
Friday (Venus)	<i>śukra</i>	<i>bhṛgu, śukla, sita</i>
Saturday (Saturn)	<i>śani</i>	<i>mṛdu</i>

**Table B.3** Sanskrit names for the 27 13;20° *nakṣatras* and their initial (sidereal) ecliptic longitudes.

	<i>nakṣatra</i>	$\lambda$		<i>nakṣatra</i>	$\lambda$
1	Aśvinī	0°	15	Svāti	186°;40
2	Bharaṇī	13°;20	16	Viśākhā	200°
3	Kṛttikā	26°;40	17	Anurādhā	213°;20
4	Rohiṇī	40°	18	Jyeṣṭhā	226°;40
5	Mṛgaśiras	53°;20	19	Mūla	240°
6	Ārdrā	66°;40	20	Pūrvāṣādhā	253°;20
7	Punarvasu	80°	21	Uttarāṣādhā	266°;40
8	Puṣya	93°;20	22	Śrāvaṇa	280°
9	Āśleṣā	106°;40	23	Dhaniṣṭhā	293°;20
10	Māgha	120°	24	Śatabhiṣaj	306°;40
11	Pūrvaphālgunī	133°;20	25	Pūrvabhadrapadā	320°
12	Uttaraphālgunī	146°;40	26	Uttarabhadrapadā	333°;20
13	Hasta	160°	27	Revatī	346°;40
14	Citrā	173°;20			

**Table B.4** Sanskrit terms for the twelve synodic months of the year and the corresponding six seasons. The first column contains the standard month names derived originally from the *nakṣatra* occupied by the full moon of that month, as Caitra from Citrā, Vaiśākha from Viśākhā, etc. The second column lists the ancient month names referring to their seasonal characteristics.

	<i>nakṣatra</i> -derived name	Seasonal name	Season
1	Caitra	Madhu	Vasanta (bright)
2	Vaiśākha	Mādhava	
3	Jyaiṣṭha	Śukra	Grīṣma (hot)
4	Āṣāḍha	Śuci	
5	Śrāvaṇa	Nabha	Vārṣa (rains)
6	Bhādrapada	Nabhasya	
7	Āśvina	Iṣa	Śarad (ripening)
8	Kārttika	Ūrja	
9	Mārgaśīrṣa/Mārgaśira	Saha	Hemanta (winter)
10	Pauṣya	Sahasya	
11	Māgha	Tapa	Śīsira (cool)
12	Phālguna	Tapasya	

**Table B.5** Sanskrit names for the sixty fixed (i.e., uniquely numbered) and movable (or cyclic) *karaṇas* or half-*tithis* in a synodic month.

								<i>karaṇa</i>
1								Kimstughna (fixed)
2	9	16	23	30	37	44	51	Bava
3	10	17	24	31	38	45	52	Balava
4	11	18	25	32	39	46	53	Kaulava
5	12	19	26	33	40	47	54	Taitila
6	13	20	27	34	41	48	55	Gara
7	14	21	28	35	42	49	56	Vaṇija
8	15	22	29	36	43	50	57	Viṣṭi
58								Śakuni (fixed)
59								Catuṣpada (fixed)
60								Nāga (fixed)

The tables that follow provide the basic information about Sanskrit astronomical and calendric terminology required for identification of (most) dates and positions in tables, horoscopes, etc. For the specifics of conversion of a date between Indian and Gregorian calendars, we recommend the abovementioned sources and especially the online calendar software application “Pancanga” by Michio Yano ([cc.kyoto-su.ac.jp/~yanom/pancanga](http://cc.kyoto-su.ac.jp/~yanom/pancanga)).

**Table B.6** Sanskrit names for the 27 *yogas*.

	<i>yoga</i>		<i>yoga</i>
1	Viṣkamba	15	Vajra
2	Prīti	16	Siddhi
3	Āyusmat	17	Vyatipāta
4	Saubhāgya	18	Variyas
5	Śobhana	19	Parigha
6	Atigaṇḍa	20	Śiva
7	Sukarman	21	Siddha
8	Dhṛti	22	Sādhya
9	Śūla	23	Śubha
10	Gaṇḍa	24	Śukla
11	Vṛddhi	25	Brahman
12	Dhruva	26	Indra
13	Vyāghāta	27	Vaidhṛti
14	Harṣaṇa		

**Table B.7** Calendar eras epochs with the equivalent BCE/CE year-numbers and commonly used dates of their epochs.

Era	Conventional epoch date(s)
Śaka, Śālivāhana	Meṣasaṅkrānti/Caitra- <i>śuklapratipad</i> 78 CE
Vikrama/Vikramāditya Saṃvat	Meṣasaṅkrānti/Caitra- <i>śuklapratipad</i> 57 BCE
Kaliyuga, Kali	Midnight/sunrise Meṣasaṅkrānti (18 February) 3102 BCE
(Islamic calendar)	1 Muḥarram AH 1 = sunset 15 July 622 CE

**Table B.8** Sanskrit names for the successive years of the 60-year Jupiter cycle.

	Jupiter year		Jupiter year		Jupiter year
1	Prabhava	21	Sarvajit	41	Plavaṅga
2	Vibhava	22	Sarvadhārin	42	Kīlaka
3	Śukla	23	Virodhin	43	Saumya
4	Pramoda	24	Vikṛta	44	Sādhāraṇa
5	Prajāpati	25	Khara	45	Virodhakṛt
6	Aṅgiras	26	Nandana	46	Paridhāvin
7	Śrīmukha	27	Vijaya	47	Pramādin
8	Bhāva	28	Jaya	48	Ānanda
9	Yuvan	29	Manmatha	49	Rākṣasa
10	Dhātṛ	30	Durmukha	50	Anala
11	Īśvara	31	Hemlamba	51	Piṅgala
12	Bahudhānya	32	Vilamba	52	Kālayukta
13	Pramāthin	33	Vikārin	53	Siddhārthin
14	Vikrama	34	Śārvarī	54	Raudra
15	Vṛṣa	35	Plava	55	Durmati
16	Citrabhānu	36	Śubhakṛt	56	Dundubhi
18	Tāraṇa	38	Krodhin	58	Raktākṣa
19	Pārthiva	39	Viśvāvasu	59	Krodhana
20	Vyaya	40	Parābhava	60	Kṣaya

**Table B.9** Sanskrit names and abbreviations for planetary synodic phenomena.

Phenomenon	Sanskrit term	Abbreviation	Greek symbol
West rising, reappearance	<i>udaya paścima</i>	<i>u pa</i>	Ξ
Retrogradation, first station	<i>vakra</i>	<i>va</i>	Φ (sup. planets) Ψ (inf. planets)
West setting, disappearance	<i>asta paścima</i>	<i>a pa</i>	Ω
East rising, reappearance	<i>udaya pūrva</i>	<i>u pū</i>	Γ
Direct motion, second station	<i>mārga</i>	<i>mā</i>	Ψ (sup. planets) Φ (inf. planets)
West setting, disappearance	<i>asta pūrva</i>	<i>a pū</i>	Σ



## B.2 Parameter sets of the *pakṣas*

The values of mean daily motion listed in the following tables (B.10–B.14) are truncated at the ellipsis rather than rounded to the nearest integer sexagesimal digit. These parameter sets are modeled on the similar tables presented by Pingree (1978a), but recomputed from the original data in the cited published editions.

**Table B.10** Āryapakṣa parameters derived from *Āryabhaṭṭīya, daśagūtika* 3–4 (Shukla 1976, p. 6).

Āryapakṣa		
Length of period: <i>mahāyuga</i> = 4,320,000 years		
Civil days in period: 1,577,917,500		
Year length: 365;15,31,15 days		
Epoch: sunrise		
Planet	Revolutions	Mean daily motion
Sun	4,320,000	0°;59,8,10,13,3,31...
Moon	57,753,336	13°;10,34,52,39,18,56...
Lunar node	−232,226	−0°;3,10,44,7,49,44...
Lunar apogee	488,219	0°;6,40,59,30,7,38...
Mars	2,296,824	0°;31,26,27,48,54,22...
Mercury's <i>śīghra</i>	17,937,020	4°;5,32,18,54,36,24...
Jupiter	364,224	0°;4,59,9,0,38,51...
Venus's <i>śīghra</i>	7,022,388	1°;36,7,44,17,4,45...
Saturn	146,564	0°;2,0,22,41,41,32...

**Table B.11** Ārdharātrikapakṣa parameters derived from *Khaṇḍakhādya* 1.8–10, 13–14 (Chatterjee 1970, pp. 49–50, 91–92).

Ārdharātrikapakṣa		
Length of period: <i>mahāyuga</i> = 4,320,000 years		
Civil days in period: 1,577,917,800		
Year length: 365;15,31,30 days		
Epoch: midnight		
Planet	Revolutions	Mean daily motion
Sun	4,320,000	0°;59,8,10,10,37,48...
Moon	57,753,336	13°;10,34,52,6,50,56...
Lunar node	−232,226	−0°;3,10,44,7,41,54...
Lunar apogee	488,219	0°;6,40,59,29,51,10...
Mars	2,296,824	0°;31,26,27,47,36,54...
Mercury's <i>śīghra</i>	17,937,000	4°;5,32,17,45,23,13...
Jupiter	364,220	0°;4,59,8,48,36,56...
Venus's <i>śīghra</i>	7,022,388	1°;36,7,44,13,7,53...
Saturn	146,564	0°;2,0,22,41,36,36...

**Table B.12** Brāhmapakṣa parameters derived from *Paitāmahasiddhānta* III.5 (Pingree 1967–8, p. 478), *Brāhmasphuṭasiddhānta* 1.14–22 (Dvivedī 1901–1902, pp. 5–7).

<b>Brāhmapakṣa</b>		
Kalpa length: 4,320,000,000 years		
Civil days in a kalpa: 1,577,916,450,000		
Year length: 365;15,30,22,30 days		
Epoch: sunrise		
Planet	Revolutions	Mean daily motion
Sun	4,320,000,000	0°;59,8,10,21,33,30...
Moon	57,753,300,000	13°;10,34,52,46,30,13...
Lunar node	–232,311,168	–0°;3,10,48,20,6,41...
Lunar apogee	488,105,858	0°;6,40,53,56,32,54...
Mars	2,296,828,522	0°;31,26,28,6,47,45...
Mercury's <i>śīghra</i>	17,936,998,984	4°;5,32,18,27,45,31...
Jupiter	364,226,455	0°;4,59,9,8,37,23...
Venus's <i>śīghra</i>	7,022,389,492	1°;36,7,44,35,18,27...
Saturn	146,567,298	0°;2,0,22,51,43,56...

**Table B.13** Saurapakṣa parameters derived from *Sūryasiddhānta* 1.29–33, 37 (Pāṇḍeya 1991, pp. 7–8).

<b>Saurapakṣa</b>		
Length of period: <i>mahāyuga</i> = 4,320,000 years		
Civil days in period: 1,577,917,828		
Year length: 365;15,31,31,24 days		
Epoch: midnight		
Planet	Revolutions	Mean daily motion
Sun	4,320,000	0°;59,8,10,10,24,12...
Moon	57,753,336	13°;10,34,52,3,49,8...
Lunar node	–232,238	–0°;3,10,44,43,10,4...
Lunar apogee	488,203	0°;6,40,58,42,31,5...
Mars	2,296,832	0°;31,26,28,11,8,56...
Mercury's <i>śīghra</i>	17,937,060	4°;5,32,20,41,51,16...
Jupiter	364,220	0°;4,59,8,48,35,47...
Venus's <i>śīghra</i>	7,022,376	1°;36,7,43,37,16,52...
Saturn	146,568	0°;2,0,22,53,25,46...

**Table B.14** The mean daily motions have been derived from *Grahalāghava* 1.6–8 (Jošī 1994, p. 18). Their source is Gaṇeśa’s prescribed *dhrivas*, namely, the complement up to  $360^\circ$  or  $360^\circ$ -remainder of the longitudinal excess over complete revolutions for each of the planets per 4016-day interval. To recompute the mean daily motions, we have added this excess to the appropriate integer number of complete revolutions and divided the sum by 4016. As these *dhrivas* are precise only to arcminutes (arcseconds in the case of the sun and the moon), the resulting mean daily motions are only approximate.

<b>Gaṇeśapakṣa</b>		
Planet	<i>dhriva</i>	Mean daily motion
Sun	0 <sup>s</sup> 1°;49,11	0°;59,8,10,10,...
Moon	0 <sup>s</sup> 3°;46,11	13°;10,34,52,4,...
Lunar node	7 <sup>s</sup> 2°;50	−0°;3,10,47,12,...
Lunar apogee	9 <sup>s</sup> 2°;45	0°;6,40,55,16,...
Mars	1 <sup>s</sup> 25°;32	0°;31,26,28,26,...
Mercury’s <i>śīghra</i>	4 <sup>s</sup> 3°;27	4°;5,33,57,32,...
Jupiter	0 <sup>s</sup> 26°;18	0°;4,59,8,0,...
Venus’s <i>śīghra</i>	1 <sup>s</sup> 14°;2	1°;36,9,17,34,...
Saturn	7 <sup>s</sup> 15°;42	0°;2,0,23,18,...

# Appendix C

## Sanskrit technical terms

### C.1 The Sanskrit alphabet

The table in Figure C.1 lists the *akṣaras* or syllabic phonemes of the Classical Sanskrit alphabet in *nāgarī* script, transliterated according to the IAST (International Alphabet of Sanskrit Transliteration) system. The traditional ordering of the *akṣaras* from *a* to *h* proceeds in this phonetic array from left to right and from top to bottom. The glossary in Section C.3 follows this alphabetical order.

In our transliterations we also employ three additional symbols common in the *nāgarī* script: the *avagraha* *ʻ* indicating an elided initial *a*-vowel, the *anusvāra* *ṃ* standing in for any of the nasal consonants, and the *visarga* *ḥ* representing a final *s*. The single *daṇḍa* | and double *daṇḍa* || are the standard punctuation marks.

### C.2 Technical vocabulary for tables

Most of the terms listed in Section C.3 are part of the standard technical vocabulary of *jyotiṣa*, and are defined and explained in detail in many editions of Sanskrit treatises. In this section we explore in more depth the use of a few specialized terms pertaining especially to table-text works.

#### C.2.1 Names for table-text compositions

There appears to be no single standard Sanskrit word for an astronomical table text. Although individual tables vary greatly in content and format, there seems to be no systematic distinction between those called *koṣṭhaka* and those called *sāraṇī*. Nor

Vowels	Simple vowels	अ	आ	इ	ई	उ	ऊ	ऋ	ॠ	ऌ	ॡ
		a	ā	i	ī	u	ū	ṛ	ṝ	ḷ	ḹ
	Diphthongs			ए	ऐ	ओ	औ				
				e	ai	o	au				
Consonants	Velar	क	ख	ग	घ	ङ					
		k	kh	g	gh	ṅ					
	Palatal	च	छ	ज	झ	ञ					
		c	ch	j	jh	ñ					
	Retroflex	ट	ठ	ड	ढ	ण					
		ṭ	ṭh	ḍ	ḍh	ṇ					
	Dental	त	थ	द	ध	न					
		t	th	d	dh	n					
	Labial	प	फ	ब	भ	म					
		p	ph	b	bh	m					
	Semivowels	य	र	ल	व						
		y	r	l	v						
	Sibilants	श	ष	स							
		ś	ṣ	s							
	Aspirate	ह									
		h									

**Fig. C.1** The *akṣaras* of the Sanskrit alphabet.

1	2	3	4	5	6	7	8	9	0
१	२	३	४	५	६	७	८	९	०

**Fig. C.2** Modern standard forms of *nāgarī* decimal numerals.

have we found any clear pattern of nomenclature among authors or commentators to denote a set of astronomical tables regarded as a book in its own right, as opposed to an individual *koṣṭhaka* or *sāraṇī* table itself.<sup>1</sup>

<sup>1</sup>The secondary literature tends to follow the flexible approach of the sources themselves. Pingree, for example, references the Sanskrit table-text genre sometimes by the term *sāraṇī* (Pingree 1968, p. 3), sometimes by *koṣṭhaka* (Pingree 1981, p. 41), and sometimes just as “astronomical tables” with no Sanskrit equivalent (Pingree 1973). In manuscript catalogues he tends to use *koṣṭhaka* as the subject category for this type of texts, but individual works may be called by either name or neither. The word *koṣṭhakakāra* (Pingree 1981, p. 44) appears to be Pingree’s own coinage; at least we have not seen it elsewhere. Poleman (1938) refers to such works as “tables.” Sarma and Sastry (2002) list several works whose titles contain words such as *sāraṇī*, *koṣṭhaka*, and *vākya*, but do not designate a separate genre in *vyotiṣa* for them.

**Table C.1** Usage examples for *koṣṭhaka/koṣṭha*.

<i>koṣṭhaka/koṣṭha</i> meaning	Example source	Excerpt
Table text (in title)	<i>Mahādevī</i> , Smith Indic MB 4946 LXI f. 91, colophon <i>Candrārktī</i> , Jaipur Khasmohor 5247 f. 10v, colophon	<i>iti śrīmahādevīkoṣṭhaka saṃpūrṇaḥ</i> <i>iti caṃdrārktīkoṣṭaka saṃpūrṇam</i>
Individual table/tables	<i>Brahmatulyasāraṇī</i> , verse 4 (Montelle and Plofker 2015, pp. 11–12) <i>Tithicintāmaṇi</i> , UPenn 390 1859, f. 12v <i>Jagadbhūṣaṇa</i> , Poleman 4869, f. 1r, title	<i>kendrasya doraṃśamitiś ca koṣṭe</i> <i>iti sūryamahānakṣatrapakoṣṭhakāni saṃkramaṇakoṣṭhakāni samāptāni</i> <i>jagadbhūṣaṇasamjñakasya jyotirgranthasya koṣṭhakāni</i>
Table cell/cells	<i>Brahmatulyasāraṇī</i> , verse 6 (Montelle and Plofker 2015, pp. 16–17) <i>Candrārktī</i> , verse 8, RORI 5482 f. 2r <i>Candrārktī</i> , verse 12, RORI 5482 f. 2v <i>Jagadbhūṣaṇa</i> , verse 1.19, LDI 6182 f. 1v <i>Karaṇakesarī</i> , 1.3 (Montelle and Plofker 2013, p. 17)	<i>bhāgāṅkasamkhyāgatakoṣṭakaṃ</i> <i>tasya nāḍyā gatir nighnā taraṇer nijakoṣṭajā</i> <i>tau yuktau nijakoṣṭeṣu yāvat koṣṭamitir bhavet</i> <i>granthābdavrndaṃ nijacakramityā bhajet tataḥ śeṣamitāṅkakoṣṭe</i> <i>mitaiḥ koṣṭhakair aṅgulādih śaraḥ syāt</i>

**Table C.2** Usage examples for *grantha*.

Example source	Excerpt
<i>Makaranda</i> , Vyāsa 12/30 Bodleian f. 21v, colophon	<i>iti śrīśaurapakaṣṭyamakaramdagranthaḥ saṃpūrṇaḥ</i>
<i>Jagadbhūṣaṇa</i> , verse 1.19, LDI 6182 f. 1v	<i>granthābdavrndaṃ nijacakramityā bhajet</i>
<i>Jagadbhūṣaṇa</i> , LDI 6182 f. 5v, colophon	<i>saṃpūrṇo yaṃ jagadbhūṣaṇasamjñako granthaḥ</i>
<i>Mahādevī</i> , JVS 70 1103 f. 13v, table title	<i>mahādevīgrantha sūryaspaṣṭa avadhamukhe paṃktiḥ</i>
Viṣṇu Daivajña commentary on <i>Brhātithicintāmaṇi</i> (see Section 5.6.3) (Āpaṭe 1942a, p. 1)	<i>bṛhaccintāmaṇisaṃjñam granthaṃ</i>

**koṣṭhaka.** The word *koṣṭhaka* (frequently spelled with a non-aspirated dental consonant *koṣṭaka*) and its variant *koṣṭha* seem to be used interchangeably to designate a table text, an individual table within a table text, or a cell within an individual table. See Table C.1.

**grantha.** The general term *grantha* or “book” is very commonly used by scribes in colophons to mean the work they have just finished copying, irrespective of what its specific textual genre may be. This usage is sometimes applied to table texts as well, as illustrated in Table C.2.

**Table C.3** Usage examples for *pattra/patra*.

Example source	Excerpt
<i>Candrārktī</i> , verse 1, RORI 5482 f. 1v	. . . vakṣye sūryacandrodbhavaṃ ca   patraṃ pañcāṅgābhidhaṃ
<i>Gaṇitacūdāmaṇi</i> , verse 114 (Pingree 1989, p. 32)	kutūhalād rājamṅgāṅkād vā āśādharaṭ khecarasiddhitas tu    pañcāṅgapatrād vidadhīta . . .

**Table C.4** Usage examples for *sāriṇī/sāraṇī*.

Example source	Excerpt
<i>Brahmatulyasāraṇī</i> , Smith Indic 29, f. 6v, colophon	iti brahmatulyasāraṇīślokaḥ
<i>Brahmatulyasāraṇī</i> , Jaipur Khasmohor 5253(a) f. 1r, colophon	iti śrīkarṇakutūhalasāraṇyaḥ
<i>Subodhāsāraṇī</i> , Jaipur Khasmohor 5519, f. Av, colophon	iti subodhāsāraṇī samāptāḥ
<i>Makaranda</i> , RORI 5498 f. 45v, colophon	samāpteyaṃ makaraṃdasya sāraṇī liṣatu
<i>Makaranda</i> , Nepal 5.5639 f. 1r, title page	atha makarandasāriṇī prārabhyate
<i>Grahalāghavasāriṇī</i> of Nīlakaṇṭha, verse 1 (Pingree 2003, p. 80)	. . . grahalāghavasāriṇī kriyate nīlakaṇṭhena . . .
<i>Grahalāghavasāriṇī</i> of Prema, verse 1 (Pingree 2003, p. 88)	premo grahārthaṃ grahalāghavasya laghukriyāṃ sāraṇikāṃ prakurve
Jaipur Puṇḍarīka Jyotiṣa 48 f. 3r, colophon and Jaipur Puṇḍarīka Jyotiṣa 47 f. 3v, colophon (Pingree 2003, p. 93)	iti śrījyotiṣarāyakevalarāmakṛtā pañcāṅgasāraṇī

**pattra/patra.** This term, literally meaning “leaf, folio,” is widely used by scribes and cataloguers in titles or headings of individual tables or small sets of tables, apparently used as standalone reference works concerning a particular astronomical quantity. They generally pertain to calendrics and timekeeping. Some other examples of its usage are shown in Table C.3.

**sāraṇī/sāriṇī.** This word appears in the title of works to indicate a table-text compilation, and also references individual tables. See Table C.4.

### C.3 Glossary of Sanskrit terms

<i>aṃśa</i>	“part”; degree; fractional part
<i>akṣa</i>	terrestrial latitude
<i>aṅka</i>	number, numeral, digit; word-numeral 9
<i>aṅga</i>	“limb”; ascendant; word-numeral 6
<i>aṅgula</i>	“finger-breadth”; (linear) digit, unit of linear measure for quantities such as lunar latitude or disk diameter, equivalent to about three arc-minutes (see Chapter 2, Note 9)
<i>atha</i>	“now”; frequently used to begin table titles
<i>adhimāsa</i>	intercalary month
<i>adhyāya</i>	chapter

<b>antara</b>	difference, distance; interval for linear interpolation
<b>antardaśā</b>	in astrology, subdivision of a <i>daśā</i> , life-stage, the division of the native’s life into periods related to the planets
<b>a pa</b>	abbreviation of <i>asta-pāścima</i>
<b>a pū</b>	abbreviation of <i>asta-pūrvā</i>
<b>abda</b>	year
<b>abdapa</b>	“lord of the year”; the excess measured in integer and fractional days by which a sidereal year exceeds 52 integer weeks or $52 \times 7 = 364$ days; the weekday beginning the year
<b>arka</b>	Sun; word-numeral 12
<b>avadhi</b>	14-day interval; the time required for the mean sun to traverse $13;20^\circ$ or one <i>nakṣatra</i> in longitude, a little less than 14 days (see Sections 2.3.2 and 5.4.1)

Example source	Excerpt
<i>Grahasiddhi</i> , 7, RAS Tod 24 f. 1v	<i>krameṇāvadhayo ’bdāder manubhir manubhir dinaiḥ</i>
<i>Jagadbhūṣaṇa</i> , verse 2.2, LDI 6182 f. 2r	<i>caturdaśāhāntaritaḥ sameśakāle sphuṭā bhāvadhīṣu grahāḥ syuḥ</i>

<b>avasthā</b>	“situation, status”; in astrology, a particular characteristic of a planet
<b>aṣṭakavarga</b>	“ <i>varga</i> of eight”; in astrology, a system for determining the effects of planets’ positions and ascendant upon one another
<b>asta</b>	setting
<b>asta-pāścima</b>	“west setting”; acronycal setting of a planet, last visibility in the west; see Table B.9
<b>asta-pūrvā</b>	“east setting”; heliacal setting of an (inferior) planet, last visibility in the east; see Table B.9
<b>ahargaṇa</b>	accumulated days between a given epoch and a given date
<b>āgama</b>	“lore”; used in book titles
<b>indu</b>	“drop”; Moon
<b>ucca</b>	“high”; orbital apogee; in astrology, exaltation
<b>utkramajyā</b>	<i>R</i> vers of an arc/angle, equivalent to the difference between the trigonometric radius <i>R</i> and the <i>R</i> cos of the arc
<b>uttara</b>	north
<b>udaya</b>	“rising”; heliacal rising of a planet; ascension
<b>udaya-pāścima</b>	“west rising”; acronycal rising of an (inferior) planet, first visibility in the west (see Table B.9)
<b>udayapūrvā</b>	“east rising”; heliacal rising, first visibility in the east (see Table B.9)



<b><i>udayāntara/yātaphala</i></b>	“rising-difference”; a time correction due to the difference between an arc of mean solar longitude on the ecliptic and its right ascension (see Section 2.1.5)
<b><i>unnata</i></b>	“elevation”; complement of the zenith distance <i>nata</i> ; arc of celestial equator corresponding to time since sunrise or until sunset
<b><i>unmīlana</i></b>	moment of emersion in an eclipse, the end of totality
<b><i>u pa</i></b>	abbreviation of <i>udaya-pāścima</i>
<b><i>upakaraṇa/upakarṇa</i></b>	offset in mean longitude for the beginning of the current year (see Section 5.6.3); computational technique (see Section 5.2)
<b><i>upari</i></b>	“above”; argument value, specifically at top of table column

Example source	Excerpt
<i>Karaṇakesarī</i> , RORI 12792 f. 2r, title	... <i>avadhyopariḥ</i> ...
<i>Karaṇakesarī</i> , RORI 12792 f. 2v, title	... <i>atha caṁdrachinnāṁguloparicaṁdrasya madhyasthiti</i> ...
<i>Brahmatulyasāraṇī</i> , Smith Indic 43 f. 12r, title	<i>śīghrakemḍrāṁśopari-śukrasya śīghraphalaṁ</i>

<b><i>u pū</i></b>	abbreviation of <i>udaya-pūrva</i>
<b><i>ṛṇa</i></b>	subtractive; decreasing, negative (see Section 3.2.1)
<b><i>eṣya</i></b>	“future”; next table entry, as opposed to <i>gata</i> or previous entry, in interpolation procedure (see Section 2.2.1)
<b><i>kaṭapayādi</i></b>	alphanumeric notation for representing numbers
<b><i>kanda</i></b>	“bulb, root”; in the <i>Makaranda</i> , a calendar day/time corresponding to a mean time-unit (see Table 5.7)
<b><i>karāṇa</i></b>	astronomical handbook; a time interval equal to half a <i>tithi</i>
<b><i>karṇa</i></b>	hypotenuse; geocentric distance of planet (see Sections 2.1.2 and 2.1.3)
<b><i>kalā</i></b>	arcminute
<b><i>kali/kaliyuga</i></b>	last and worst division of a <i>mahāyuga</i> ; the present age; a historical era with epoch 3102 BCE (see Table B.7)
<b><i>kalpa</i></b>	time interval equal to 4,320,000,000 years; lifetime of the universe
<b><i>kuja</i></b>	Mars
<b><i>kṛṣṇapakṣa</i></b>	“dark half”; half of a synodic month from full moon to new moon
<b><i>ketu</i></b>	lunar node; descending node; the ninth of the celestial bodies or <i>navagraha</i>
<b><i>kendra</i></b>	orbital anomaly or arc between mean longitudes of planet and orbital apogee (see Sections 2.1.2 and 2.1.3); time offset

	between the end of some astronomical cycle and the start of a year (see Section 5.2)
<b>koṭi</b>	complement of an arc/angle <i>bhuja</i> ; upright side of a right triangle
<b>koṭiphala</b>	scaled $R$ sin of the complement of an arc/angle
<b>koṣṭha/koṣṭhaka</b>	set of tables, a table, a tabular cell; numerical entry in a tabular cell; see Section C.2.1
<b>krānti</b>	declination, angular distance north or south of celestial equator
<b>kṣepa</b>	additive quantity; constant difference; epoch offset in mean longitude, epact, etc.

Example source	Excerpt
<i>Candrārkkī</i> , verse 4, RORI 5482 ff. 1v–2r	<i>śāko vihīno gaganābhraḡhasraiḡ nighno guṇaiḡ kṣepayuto dhruvaḡ syāt</i>
<i>Mahādevī</i> , BORI 497 f. 8v, table title	<i>guro koṣṭhakā sakṣepā sabṡjā</i>
<i>Grahaḡjñāna</i> , RAS Tod 36e f. 4r, paratext	<i>kṣepakabṡjasamṡskāraṇā</i>
<i>Laghukhecarasiddhi</i> , verse 4 (Pingree 1976, p. 4)	<i>kṣepāṇvitāḡ</i>
<i>Grahasiddhi</i> , verse 21, RAS Tod 24 f. 1v	<i>nāḡgāṇyarkona śākaḡhnā guṇāḡ kṣepayutā dhruvāḡ</i>

<b>khaṇḡa</b>	“portion”; increment, difference between two successive values
<b>khecara</b>	“sky-mover”; planet
<b>gata</b>	“past”; previous table entry, as opposed to <i>eṡya</i> or next entry, in interpolation procedure (see Section 2.2.1)
<b>gati</b>	“motion”; velocity; mean amount of ascension per degree of the corresponding zodiacal sign (see Section 4.5)
<b>gatiphala</b>	planetary velocity-correction due to orbital equation (see Sections 2.1.2 and 2.1.3)
<b>gamyā</b>	“future”; next table entry in interpolation procedure (see Section 2.2.1)
<b>gucṡa</b>	“blossom, flower, shrub”; in the <i>Makaranda</i> , the calendar day/time of an initial mean time-unit (see Table 5.7)
<b>guṇaka</b>	multiplier; longitudinal increment to be multiplied by a number of time-units
<b>guru</b>	“heavy, great”; great, long; teacher; Jupiter; in prosody, heavy syllable
<b>grṡa</b>	“house”; in astrology, an astrological house
<b>gocara</b>	planet; in astrology, transit
<b>gomūtra/gomūtrika</b>	a multiplication technique
<b>gola</b>	“sphere”; spherics; armillary sphere
<b>grantha</b>	book, work; see Section C.2.1
<b>graha</b>	planet

<i>ghaṭī/ghaṭikā</i>	time-unit equal to one-sixtieth of a day or 24 minutes
<i>ghaṭī</i>	sixtieth; a “sexagesimorion” or 6° arc-unit interval in longitude (see Sections 4.2.3 and 5.4.1)
<i>cakra</i>	“cycle”; cycle, period of some number of days/years/unit of measure; especially a period of 4016 days or nearly 11 years (see Section 4.1); in astrology, a diagram with astrological/divinatory significance
<i>catuṣṭayaikya</i>	“sum of four”; the combination of the <i>udayāntara</i> , <i>bhujāntara</i> , <i>cara</i> , and <i>deśāntara</i> time-corrections (see Section 2.1.5)
<i>candra</i>	Moon
<i>cara</i>	“variable”; the half-equation of daylight; ascensional difference
<i>carakaraṇa</i>	“movable <i>karaṇa</i> ”; the sequence of seven <i>karaṇas</i> or half- <i>tithis</i> that repeats eight times in a synodic month (see Table B.5); see also <i>sthirakaraṇa</i>
<i>carakhaṇḍa</i>	ascensional difference
<i>cālaka</i>	interval for linear interpolation
<i>cālana</i>	interval for linear interpolation
<i>cintāmaṇi</i>	“thought-jewel”; used in book titles
<i>cūdāmaṇi</i>	“crest-jewel”; used in book titles
<i>chāyā</i>	shadow; tangent
<i>janma</i>	in astrology, birth, nativity
<i>janmapattra</i>	in astrology, birth-chart, nativity horoscope diagram
<i>jātaka</i>	“nativity”; in astrology, genethliology/horoscopes
<i>jīvā</i>	“bow-string”; sine; chord
<i>jñāna</i>	knowledge; used in book titles
<i>jyā</i>	“bow-string”; sine; chord
<i>jyotiṣa</i>	“astral sciences”; calendrics, astronomy, astrology
<i>ṭippaṇa</i>	commentary
<i>tattva</i>	truth, reality, essence; used in book titles
<i>tantra</i>	astronomical treatise; model; system
<i>tājika</i>	in astrology, a type of genethliology adapted from Arabic/Persian sources
<i>tīthi</i>	lunar day, one thirtieth of a lunar month
<i>triṃśāṃśa</i>	in astrology, subdivision of a zodiacal sign into thirty
<i>traikya</i>	“sum of three”; the combination of the <i>udayāntara</i> , <i>bhujāntara</i> , and <i>cara</i> time corrections (see Section 2.1.5)
<i>dakṣiṇa</i>	south
<i>daṇḍa</i>	vertical stroke; punctuation mark
<i>darpaṇa</i>	mirror; used in book titles
<i>daśā</i>	“condition, period of life”; in astrology, a life-stage, the division of the native’s life into periods related to the planets
<i>dina</i>	day; “day” of a planet, i.e., time from its rising to setting
<i>dinamāna</i>	length of daylight

<b><i>dīpikā</i></b>	“lamp, illumination”; used in book titles
<b><i>dr̥ṣṭi</i></b>	“sight”; in astrology, aspect
<b><i>deśāntara</i></b>	“place-difference”; a time-correction to account for terrestrial longitude (see Section 2.1.5)
<b><i>dreṣkāna</i></b>	in astrology, subdivision of a zodiacal sign into three
<b><i>dvādaśāṃśa</i></b>	in astrology, subdivision of a zodiacal sign into twelve
<b><i>dviśaṃskṛti</i></b>	“two corrections”; equation of time or the combination of the <i>udayāntara</i> and the <i>bhujāntara</i> corrections (see Section 2.1.5)
<b><i>dhanam</i></b>	increasing; additive, positive (see Section 3.2.1)
<b><i>dhruva/dhruvaka</i></b>	“fixed [quantity]”; linear increment; epoch offset for desired year (see Sections 4.1 and 5.2.1); oblique ascension (see Section 4.5);

Meaning	Example source	Excerpt
Epoch offset for desired year	<i>Candrār̥kī</i> , verse 4, RORI 5482 ff. 1v–2r <i>Grahasiddhi</i> , verse 6, RAS Tod 24 f. 1v	<i>śāko vihīno gaganābhraḥrasraiḥ nīghno guṇaiḥ kṣepayuto dhruvaḥ syāt śuddhyabdeśaguṇadhruvau</i>
Cumulative oblique ascensions	<i>Grahalāghavasār̥iṇī</i> , Smith Indic 26 f. 5r, row heading	<i>dhruva</i>
Epoch complement	<i>Grahañāna</i> , verse 6 (Pingree 1989, p. 6) <i>Tithicintāmaṇi</i> , verse 5 (Ikeyama and Plofker 2001, pp. 264–5)	<i>svakīyair dhruvakair vihinā śuddhiḥ khaṣaṭśodhitanāḍikā syāt tithidhruvo . . .</i>

<b><i>dhruvāṅka</i></b>	in the <i>Grahalāghava</i> , a term referring to the epoch offset for the 11-year cycle; the number of completed 11 year cycles since the epoch (see Section 5.6.1)
<b><i>nakṣatra</i></b>	“star, constellation”; one of the 27 constellations in the moon’s path; a 13°;20 arc of the ecliptic; the time it takes the moon to travel 13°;20 in longitude (see Section 2.3.2 and Table B.3)
<b><i>nata</i></b>	“depression”; zenith distance, complement of the elevation <i>unnata</i> ; arc of celestial equator corresponding to time before noon (in morning) or since noon (in afternoon)
<b><i>nati</i></b>	latitudinal parallax
<b><i>navāṃśa</i></b>	in astrology, subdivision of a zodiacal sign into nine
<b><i>navagraha</i></b>	“nine planets”; in astrology, the group of celestial bodies comprising the two luminaries, the five star-planets, and the ascending and descending lunar nodes
<b><i>nāḍī/nāḍikā</i></b>	time-unit equal to one-sixtieth of a day or 24 minutes
<b><i>nimīlana</i></b>	moment of immersion, beginning of totality in an eclipse

<b>nīca</b>	“low”; perigee; in astrology, dejection
<b>pakṣa</b>	“wing”; synodic fortnight or period of 15 <i>tithis</i> bounded by new and full moon; astronomical school
<b>pañkti</b>	“row”; one table in a set of tables of a given quantity

Example source	Excerpt
<i>Jagadbhūṣaṇa</i> , verse 2.2, LDI 6182 f. 2r, verse	<i>śeṣamitāṅkapañktyām</i>
<i>Karaṇakesarī</i> , RORI 12792 f. 1r/v, table title extracts	... <i>labdhapañkti</i> . . . <i>śeṣapañkti</i> . . .
<i>Mahādevī</i> , JVS 70 1103 f. 13v, table title	<i>mahādevīgramthe sūryaspaṣṭa</i> <i>avadhamukhe pañktiḥ</i>
<i>Grahajñāna</i> , verse 8 (Pingree 1989, p. 7)	<i>tattulyapañktyaṁśarāḥ sphuṭās te</i>

<b>pañcāṅga</b>	“five-limbed”; calendar, almanac; specific ephemeral text created for a particular year tracking successive <i>vāras</i> , <i>tithis</i> , <i>nakṣatras</i> , <i>yogas</i> , and <i>karaṇas</i> ; see Section C.2.1
<b>pattra/patra</b>	“leaf, folio/page”; a table or set of tables particularly concerning calendrics or corrections to time; see Section C.2.1
<b>paddhati</b>	manual; path, course, line; used in book titles
<b>parvan</b>	instant of syzygy; an eclipse
<b>parveśa</b>	in astrology, deity assigned to a specific eclipse
<b>pala</b>	time-unit equal to one-sixtieth of a <i>ghaṭikā</i> , or 24 seconds
<b>pāṭī</b>	“board”; computation text; arithmetic
<b>pāta</b>	see <i>mahāpāta</i>
<b>pāda</b>	“foot”; one fourth; a quarter-verse
<b>piṇḍa</b>	“lump”; cumulative value as a sum of <i>khaṇḍas</i>
<b>prakāśa</b>	“light”; elucidation, explanation; used in book titles
<b>prati</b>	every, per, for each
<b>pratikoṣṭhaka</b>	“for each table entry”
<b>prabodha</b>	awakening, knowledge; used in book titles
<b>praśna</b>	“question”; in astrology, interrogation
<b>prāṇa</b>	“breath”; time-unit equal to one-sixth of a <i>vighaṭī/vighaṭikā</i>
<b>phala</b>	result; astronomical equation or correction, esp. equation of anomaly; interval for linear interpolation
<b>bārhaspatya</b>	Jupiter cycle, “Jovian years”
<b>bāhu</b>	“arm”; arc or angle; horizontal side of a right-angled triangle
<b>bīja</b>	“seed”; a small correction to adjust astronomical parameters; algebra
<b>bindu</b>	“dot, spot, drop”; in astrology, a symbol indicating malefic/benefic impact
<b>buddha</b>	Mercury
<b>bṛhaspati</b>	Jupiter

<b><i>bhāva</i></b>	in astrology, astrological house
<b><i>bhukta</i></b>	“elapsed”; a past time interval; <i>gata</i> or previous table entry in interpolation
<b><i>bhukti</i></b>	(daily) velocity
<b><i>bhuja</i></b>	“arm”; an arc or angle; table argument measured in units of arc; an arc reduced to the first quadrant; horizontal side of a right triangle
<b><i>bhujaphala</i></b>	scaled $R \sin$ of an arc/angle; second component of the equation of time correction (see Section 2.1.5)
<b><i>bhujāntara</i></b>	“[positional] arc-difference”, a time-correction due to longitudinal difference between mean and true sun (see Section 2.1.5)
<b><i>bhūtasamkhyā</i></b>	word-numeral system for representing numbers
<b><i>bhūṣaṇa</i></b>	ornament, decoration; embellishment; used in book titles
<b><i>bhoga</i></b>	“advance”; mean longitudinal displacement
<b><i>bhogyā</i></b>	“advance, future”; mean longitudinal displacement; <i>eṣya</i> or next table entry in interpolation
<b><i>bhauma</i></b>	Mars
<b><i>mañjarī</i></b>	blossom; used in book titles
<b><i>maṇḍala</i></b>	“circle”; orbit, cycle, as in a planetary synodic cycle
<b><i>madhya</i></b>	“middle”; mean; midpoint of any interval, such as the day (noon), an eclipse, a <i>mahāpāta</i> , etc.
<b><i>madhyama</i></b>	mean
<b><i>manda</i></b>	“slow”; relating to planetary eccentric anomaly (see Section 2.1.2)
<b><i>mandāṅka</i></b>	“ <i>manda</i> -number”; scaled <i>manda</i> -equation ( <i>mandaphala</i> ) values (see Table 5.8)
<b><i>marda</i></b>	half-duration of totality of an eclipse
<b><i>mahāpāta</i></b>	a particular symmetric configuration of the sun and moon
<b><i>mahāyuga</i></b>	“great age”; time interval equal to 4,320,000 years
<b><i>mā</i></b>	abbreviation for <i>mārga</i>
<b><i>mānasa</i></b>	spirit, mind; used in book titles
<b><i>mārga</i></b>	“path, on course”; period of direct motion of a planet; second station (see Table B.9)
<b><i>mālā</i></b>	garland; used in book titles
<b><i>māsa</i></b>	month
<b><i>mītra</i></b>	“friend”; in astrology, friendship between planets
<b><i>muhūrta</i></b>	“moment”; time-unit equal to one-thirtieth of a day or 48 minutes; catarchic astrology or the identification of auspicious moments for particular actions
<b><i>mṛgāṅka</i></b>	“deer-marked”; Moon
<b><i>yantra</i></b>	“instrument”; astronomical instrument; in astrology, a diagram with astrological/divinatory significance
<b><i>yātaphala</i></b>	see <i>udayāntara</i>
<b><i>yāmya</i></b>	south

<i>yātrā</i>	in astrology, determination of auspicious times for military operations, a branch of catarchic astrology
<i>yuga</i>	era; time cycle
<i>yoga</i>	“sum, conjunction, combination”; interval of time in which the sum of the solar and lunar longitude increases by 13°;20 (see Table B.6); in astrology, various configurations of planet, house, and aspect
<i>yojana</i>	unit of distance, on the order of 1/5000 of earth’s circumference
<i>ratna</i>	“jewel”; in divination, the determination of auspicious characteristics of gems; used in book titles
<i>ramala</i>	geomancy, a form of divination
<i>ravi</i>	Sun
<i>rātri</i>	night
<i>rātrikara</i>	“night-maker”; Moon
<i>rāmabīja</i>	see <i>bīja</i>
<i>rāśi</i>	“heap”; a quantity/amount; zodiacal sign; a 30° arc
<i>rāśi-bheda</i>	“dividing of signs”; in astrology, subdivision of the zodiac
<i>rāhu</i>	lunar node; ascending node; eclipse
<i>rekhā</i>	“line”; in astrology, a symbol indicating malefic/benefic impact
<i>lagna</i>	ascendant; ascension
<i>laghu</i>	“easy, light”; easy, simplified, short; designation for abbreviated/condensed version of a text/rule/set of tables (see Section C.2.1); in prosody, light syllable
<i>laṅkā</i>	Laṅkā; zero-point of terrestrial longitude and latitude
<i>laṅkodaya</i>	“rising at Laṅkā”; right ascension
<i>lakṣaṇa</i>	“mark, sign”; a branch of astrology concerning the interpretation of marks on the body
<i>labdha</i>	“obtained”; quotient from division; result of operation
<i>lambana</i>	longitudinal parallax
<i>va</i>	abbreviation for <i>vakra</i>
<i>vakra</i>	“reverse”; period of retrograde motion of a planet; first station (see Table B.9)
<i>varga</i>	in astrology, subdivision of the zodiac
<i>varṣeśa</i>	“lord of the year”; the excess measured in integer and fractional days that a sidereal year exceeds a year of fifty-two 7-day weeks
<i>valana</i>	angle of deflection associated with eclipses
<i>vallī</i>	in the <i>Makaranda</i> , increments to linearly increasing quantities such as civil days or lunar anomaly (see Table 5.7)
<i>vākya</i>	“sentence”; numerical data verbally encoded in <i>kaṭapayādi</i>
<i>vāṭikā</i>	in the <i>Makaranda</i> , mean longitudinal displacement (see Table 5.7)
<i>vāra</i>	weekday

<i>vāstu</i>	“house, building”; in divination, determination of auspicious features of buildings; geomancy, the interpretation of patterns formed from scattered rocks/soil
<i>vikalā</i>	time-unit equal to one second; an arcsecond
<i>vikrama/vikramāditya</i>	designation for Saṃvat era (see Table B.7)
<i>vikṣepa</i>	lunar latitude
<i>vighaṭī/vighaṭikā</i>	time-unit equal to one-sixtieth of a <i>ghaṭī</i> , or 24 seconds
<i>vitribhalagna</i>	“ascendant less three signs”; nonagesimal or midpoint of the ecliptic semicircle above the horizon
<i>vidyādhari</i>	“knowledge-bearer”; used in book titles
<i>vidhu</i>	Moon
<i>vināḍī/vināḍikā</i>	time-unit equal to one-sixtieth of a <i>nāḍī</i> , or 24 s
<i>vinoda</i>	amusement, pastime, diversion; used in book titles
<i>vipala</i>	time-unit equal to one-sixtieth of a <i>palalvighaṭī</i>
<i>vilagna</i>	nonagesimal or midpoint of the ecliptic semicircle above the horizon
<i>vivarāṇa</i>	explanation; commentary
<i>vivāha</i>	“marriage”; in astrology, determination of auspicious times for marriage, a branch of catarchic astrology
<i>vivṛti</i>	commentary
<i>viveka</i>	investigation, knowledge, discussion; used in book titles
<i>vaidhṛti</i>	one of the two <i>mahāpātas</i> or symmetric configurations of sun and moon
<i>vyāṅgula</i>	unit of measurement equal to one-sixtieth of an <i>aṅgula</i>
<i>vyatipāta</i>	one of the two <i>mahāpātas</i> or symmetric configurations of sun and moon
<i>śaka</i>	historical era beginning in 78 CE (see Table B.7)
<i>śaṅku</i>	“stick”; gnomon; <i>R</i> sin of altitude
<i>śatru</i>	“enemy”; in astrology, enmity between planets
<i>śani</i>	Saturn
<i>śara</i>	“arrow”; planetary latitude, esp. lunar; word-numeral 5
<i>śaśi</i>	“containing a hare”; Moon
<i>śākuna</i>	“bird”; in astrology, ornithomancy or the interpretation of bird behavior
<i>śānti</i>	in astrology, an act to ward off the impending ill-effects of an omen/forecast
<i>śālivāhana</i>	alternative name for Śaka era (see Table B.7)
<i>śiromaṇi</i>	“crest-jewel”; used in book titles
<i>śīghra</i>	“fast”; relating to planetary synodic anomaly (see Section 2.1.3)
<i>śīghrāṅka</i>	“ <i>śīghra</i> -number”; scaled <i>śīghra</i> -equation value (see Table 5.9)
<i>śukra</i>	Venus
<i>śukla</i>	Venus



<i>śuklapākṣa</i>	“bright half”; half of the synodic month from new moon to full moon
<i>śuklapratīpad</i>	beginning of a synodic month
<i>śuddhi</i>	epact
<i>śeṣa</i>	“remainder”; remainder from subtraction or division
<i>saṃvat</i>	for <i>saṃvatsara</i> , year; historical era beginning in 57 BCE (see Table B.7)
<i>saṃvatsara</i>	year
<i>saṃhitā</i>	in astrology, an omen; divination from omens
<i>saṃkrānti</i>	solar transit or solar entrance into signs or <i>nakṣatras</i>
<i>saṃdhi</i>	in astrology, a junction between houses
<i>sanna</i>	(Arabic) “year”; usually signifying a foreign calendar system such as <i>hijarī</i> or Gregorian
<i>sama</i>	“equal, same”; in astrology, neutrality between planets
<i>sammīlana</i>	moment of immersion in an eclipse, beginning of totality
<i>sādhana</i>	accomplishment; demonstration; computation
<i>sāmudrika</i>	in astrology, physiognomy and palmistry/chiromancy, or the interpretation of bodily marks/features/expressions
<i>sāraṇī/sāriṇī</i>	set of tables, a table; see Section C.2.1
<i>siddhānta</i>	astronomical treatise; doctrine
<i>siddhi</i>	attainment; determination
<i>sūkṣma</i>	accurate
<i>sūrya</i>	Sun
<i>soma</i>	Moon
<i>saumya</i>	north
<i>saurabha</i>	in the <i>Makaranda</i> , corrections due to anomaly (see Table 5.7)
<i>sthāna</i>	a significant figure; a place or digit in a sequence of digits
<i>sthiti/sthityardha</i>	half-duration of, e.g., an eclipse, a <i>pāta</i>
<i>sthirakaraṇa</i>	“fixed- <i>karaṇa</i> ”; one of the four <i>karaṇas</i> or half- <i>tithis</i> occurring around new moon (see Table B.5); see also <i>carakaraṇa</i>
<i>sthūla</i>	“coarse, rough”; approximate value
<i>sparśa</i>	moment of first contact in an eclipse
<i>spāṣṭa</i>	accurate; true
<i>sphuṭa</i>	accurate; true
<i>svapna</i>	“sleep, dream”; in astrology, oneiromancy or the interpretation of dreams
<i>svara</i>	“sound, tone, noise”; in astrology, pneuromancy or the interpretation of breathing
<i>hasta/hasta-rekhā</i>	“hand, palm”; in astrology, palmistry or the interpretation of lines ( <i>rekhā</i> ) on the hand; a unit of linear measure equivalent to the length of the forearm or 24 <i>angulas</i>

<i>hāyana</i>	in astrology, anniversary horoscopes
<i>hāra</i>	divisor
<i>hijarī</i>	Islamic calendar
<i>hṛti</i>	divisor
<i>horā</i>	(Greek) “hour”; in astrology, horoscopy, also subdivision of a zodiacal sign into two; time-unit equal to 1 hour or 1/24 of a day

## Appendix D

# Credits and Acknowledgements

The following abbreviations appear in the manuscript shelf-marks referenced in this book. See also the more detailed descriptions of selected manuscript collections in Section 3.1.

**Baroda** Oriental Institute, Maharaja Sayajirao University of Baroda, Vadodara, India. See Nanbiyar (1950). We thank this institution for permission to reproduce the images shown in Figures 2.18, 4.1, 4.6, 4.33, 4.50, 4.62, and 4.63.

**BORI** Bhandarkar Oriental Research Institute, Pune, India. See Bhandarkar Oriental Research Institute (1990–1991). We thank this institution for permission to reproduce the images shown in Figures 2.18, 3.2, 3.3, 4.8, 4.21, 4.48, 4.51, 4.54, 4.55, 4.59, 4.60, 5.16, 5.17, and 5.18.

**British Library OR** Oriental Manuscripts Collection, British Library, London, UK. See Rieu (1881). We thank this institution for permission to reproduce the image shown in Figure 6.3.

**CSS** Chandra Shum Shere Collection, Bodleian Library, Oxford University, Oxford, UK. See Pingree (1984). We thank this institution for permission to reproduce the images shown in Figures 4.36, 4.39, and 4.49.

**IO** India Office Collection, British Library, London, UK. See Eggeling (1896). We thank this institution for permission to reproduce the images shown in Figures 2.14, 2.16, 3.6, 4.18, 5.1, 5.2, 5.4, 5.7, and 5.9.

**Jaipur Khasmohor** Khasmohor Collection, Maharaja Man Singh II Museum, Jaipur, India. See Pingree (2003). We thank this institution for permission to reproduce the images shown in Figures 4.26, 4.30, 4.65, 6.4, and 6.5.

**Jaipur Puṇḍarīka Jyotiṣa** Puṇḍarīka Jyotiṣa Collection, Maharaja Man Singh II Museum, Jaipur, India. See Pingree (2003).

**Jodhpur Fort** Maharaja Mansingh Pustak Prakash, Jodhpur, India. See Kshirsagar and Vyāsa (1986). We thank this institution for permission to reproduce the image shown in Figure 4.21.

- JVS** Jaina Vidya Sansthan (Shri Mahavirji), Jaipur, India. Handwritten manuscript inventory; at present no published catalogue of these manuscripts is known to us. We thank this institution for permission to reproduce the images shown in Figures 5.13, 5.14, 5.15, 6.1, and 6.2.
- LDI** Lalbhai Dalpathbhai Institute of Indology, Ahmedabad, India. See Shah (1963–68). We thank this institution for permission to reproduce the image shown in Figure 4.19.
- Leipzig** Universitäts-Bibliothek, Leipzig, Germany. See Aufrecht (1901). We thank this institution for permission to reproduce the image shown in Figure 4.21.
- Nepal** National Archives of Nepal, Kathmandu, Nepal. See Nepalese-German Manuscript Cataloguing Project (n.d.). We thank this institution for permission to reproduce the image shown in Figure 4.64.
- Plofker** Photocopies of manuscripts purchased by Kim Plofker in Jaipur and donated to the collection of the Jaina Vidya Sansthan; at present only the identification numbers in the original purchase list are available to identify the manuscripts.
- Poleman** H. I. Poleman's 1938 census of North American Indie manuscripts (Poleman 1938).
- Pune** Aanandashram Sanstha Library, Pune, India. At present no published catalogue of these manuscripts is known to us. We thank this institution for permission to reproduce the image shown in Figure 4.32.
- RAS Tod** Tod Collection, Royal Asiatic Society, London, UK. See Barnett (1940). We thank this institution for permission to reproduce the images shown in Figures 3.7, 4.7, 4.16, 4.19, 5.3, and 5.11.
- RORI** Rajasthan Oriental Research Institute, Jodhpur, India. See Rajasthan Oriental Research Institute (1963–2007). We thank this institution for permission to reproduce the images shown in Figures 3.1, 3.3, 3.5, 3.8, 3.10, 3.11, 3.12, 3.13, 4.17, 4.21, 4.23, 4.29, 4.37, 4.38, 4.41, 4.42, 4.43, 4.45, 4.46, 4.47, 4.52, and 4.53.
- Smith Indie** Smith Indie Collection, Columbia University, New York, USA. See Plofker (2007). We thank this institution for permission to reproduce the images shown in Figures 2.15, 2.17, 3.2, 3.4, 3.9, 3.11, 3.14, 3.15, 3.16, 3.18, 4.2, 4.5, 4.9, 4.11, 4.12, 4.13, 4.14, 4.22, 4.28, 4.31, 4.35, 4.70, 4.71, 4.72, 4.73, 5.5, 5.6, 5.8, 5.10, 5.12, 6.6, 6.7, 6.8, and 6.9.
- SRCMI** Sri Ram Charan Museum of Indology, Jaipur, India. See Sharma (1986–1994). We thank this institution for permission to reproduce the image shown in Figure 4.25.
- Tokyo** Tokyo University Library, Tokyo, Japan. See Matsunami (1965). We thank this institution for permission to reproduce the images shown in Figures 4.27 and 4.66.
- UC MB** Macmillan Brown Collection, University of Canterbury Library, Christchurch, New Zealand. See University of Canterbury Macmillan Brown Library (n.d.). We thank this institution for permission to reproduce the images shown in Figures 4.67, 4.68, and 4.69.

**UPenn** Collection of Indic Manuscripts, Kislak Center for Special Collections, Rare Books and Manuscripts, University of Pennsylvania, Philadelphia, USA. See University of Pennsylvania Rare Book and Manuscript Library (n.d.). We thank this institution for permission to reproduce the images shown in Figures 4.44, 4.56, 4.57, 4.58, 4.61, 5.19, and 5.20.

**Vyāsa** Vyas-Weisz Collection, Bodleian Library, Oxford University. See Minkowski (2010).

Many staff members at the above-mentioned institutions gave us invaluable assistance with obtaining copies and copyright permissions for manuscript images, for which we are very grateful. We are also deeply indebted to Benno van Dalen and AJ Misra who kindly allowed us to consult their copies of manuscripts or procured copies for us. Finally, we would like to express our hearty thanks to the John Hay Library at Brown University and its librarians, especially Timothy Engels and William Monroe, for their generous assistance in consulting manuscript copies in the David E. Pingree Collection.

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