

SANSKRIT GEOGRAPHICAL TABLES

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There is ample evidence that the shadows of a gnomon began to be used for telling time in India toward the end of the last millennium BC. At first linear zig-zag functions related to just one parallel of latitude were employed, but by the fifth century AD correct trigonometrical solutions to the problems of relating time to the gnomon's shadow had been developed. These trigonometrical solutions involved the fixed relation of the local noon equinoctial shadow to the local terrestrial latitude. Thenceforth the expression for the latitudinal terrestrial coordinate in Indian astronomical texts was the noon equinoctial shadow.

In this paper five lists of toponyms with their noon equinoctial shadows are published as one basis for an investigation of the history of mathematical geography in India. They were all copied, often inaccurately, in the seventeenth, eighteenth, or nineteenth century, but must represent the final products of a long previous tradition.

Some of these documents also give information concerning the other coordinate used in Indian geography, the *deśāntara* or distance in *yojanas* of a locality from the prime meridian. A second paper will deal with the *deśāntaras* in Indian astronomical literature and their accuracy.

Key Words: *Arthaśāstra*, Babylonian astronomy, *deśāntara*, geographical coordinates, gnomon, *Karaṇakutūhala*, terrestrial latitude, noon equinoctial shadow, *Paitāmahasiddhānta*, *Pañcasiddhāntikā*, prime meridian, *Śārdūlakarṇāvadāna*, shadow, Sphujidhvaja, *Yavanajātaka*, zig-zag function.

It must have been noticed from the earliest times in India that the Sun's shadow at a particular time – e.g., midday – varies both with the seasons and with the movement of the observer to the north or the south. Indeed, such a report made by seamen on the Indian Ocean was recorded by Alexander the Great's admiral, Nearchus. For he says:¹ "The shadows did not do the same thing for them; but when they advanced in the sea to the south, those shadows appeared turned to the south, and when the Sun attained the middle of the day, all of their shadow was seen to be null." It cannot be, however, that this actually occurred to Nearchus because he set sail from the mouth of the Indus (latitude of about 27° N) at the beginning of September (when the Sun was close to the equator), and proceeded along the coast, to the west and then to the north-west, while the Sun's declination was becoming

more southern. He must only have reported what he was told by others.

Megasthenes, who was the ambassador of Seleucus I to the court of Candragupta in the early years of the third century BC, reported (again, like Nearchus, obtaining this information from others), that² at the cape of India (i.e., Dvārikā in Saurāṣṭra, whose latitude is 22;15⁰ N) the gnomons cast no shadows. This is indeed true at that place at noon on a day sometime before and after the summer solstice.

A mathematical theory for relating the lengths of noon shadows to the Sun's longitude is found in the *Śārdūlakarṇāvadāna*³ and in the second book of the *Arthaśāstra*,⁴ both of which may be dated in the first or second century AD; the mathematical theory in each case is a linear zig-zag function borrowed from Babylonian astronomy.⁵ Both of these linear zig-zig functions will work for only one latitude, and even there not without serious problems. A general rule for relating the time of any day to the curret shadow is found in the *Yavanajātaka*, written by Sphujidhvaja in 279 AD⁶, and correct trigonometrical solutions of time and shadow problems, including the relation of the noon equinoctial shadow to the local terrestrial latitude, are stated fully in the *Paitāmahasiddhānta*⁷ of c. 425 AD and by Varāhamihira in his *Pañcasiddhāntikā*⁸ in about 550 AD, while Āryabhaṭa in about 500 was clearly aware of these matters.⁹

In the following centuries it became customary among astronomers to express the local latitude in terms of the local noon equinoctial shadow, and the local longitude in terms of the distance, of the locality in yojanas to the east or west of the prime meridian passing through Laṅkā and Ujjayinī. These coordinates were needed for telling the local time, for preparing the local pañcāṅga and for computing planetary longitudes or the times and magnitudes of eclipses for the locality. They can be found in abundance in *karaṇas*, *koṣṭhakas*, and commentaries, as well as in detailed horoscopes.

The documents published in this paper constitute the small class of five identified tables of geographical coordinates derived from this purely Indian tradition (different are the traditions of Ptolemaic geography and of Islamic astrolabes, of which we will say nothing more here). Though the manuscripts that preserve them are of the seventeenth, eighteenth, or nineteenth century, the lists are all compilations from earlier sources as is shown by certain shared errors and by the internal disarray of some; how much earlier the sources are has not at present been determined; a study of the histories of the individual localities mentioned might eventually clarify this point, as would the discovery of additional lists and the compilation of a corpus of coordinates from other medieval sources. For the moment I shall only indicate that it seems likely that a very complex tradition lies behind what is here presented.

All of the tables give the noon equinoctial shadows of the places named in terms of *aṅgulas* and *vyāṅgulas* of shadows cast by a vertical gnomon twelve *aṅgulas* high. Since the shadow is the Tangent of the terrestrial latitude while the Gnomon is the Radius of the circle whose center is its tip, the terrestrial latitude is the arc of the tangent (radius = 1) which equals a twelfth of the noon equinoctial shadow. In Appendix C, I present a table of terrestrial latitudes corresponding to noon equinoctial shadows from 0;0 to 9;0 *aṅgulas* at intervals of 6 *vyāṅgulas*. This table has been used to compute the latitudes added to the editions of the five documents, and to compute the noon equinoctial shadows included in Appendix B, the Index of Identified Cities.

These computed shadow-lengths rarely correspond exactly to those given in our documents (but see Ahmedabad, Bhuj, Bijapur, Calcutta, Jaunpur, Kampil, Raipur and Ramnagar). The reason lies in the difficulties of measuring a length of a sixtieth of an *aṅgula*, of observing the precise end of the shadow, of correctly determining when the Sun is on both the equator and the local meridian, and of erecting the gnomon in a precisely vertical position relative to a level plane parallel to the local horizon. Agreement to within a tenth (0;6) of an *aṅgula* is remarkable, to within a fourth (0;15) tolerable.

However, our documents are filled with much greater discrepancies. In some cases I may have failed to identify the city correctly; but in most cases the errors are clearly due to scribal corruptions since the identification of the city seems secure (see Bahraich, Balkh, Bhilsa, Bikaner, Chanderi, Damao, Deogarh, Dhaka, Dhamoni, Dohad, Dwarka, Gandevi, Gaur, Goa, Gogha, Gujrat, Hanumangarh, Hardwar, Ichapur, Indore, Jalalabad, Jetpur, Jind, Jullundur, Junagadh, Junnar, Kabul, Kalabagh, Kalinjara, Kalpi, Kaman, Kandahar, Koregaon, Langar, Lucknow, Machilpur, Mahbubnagar, Mangalore, Mangrol, Multan, Nabadwip, Nagor, Nagpur, Nathdwara, Navsari, Nimsar, Pandvapura, Pathari, Pāti, Patna, Peshawar, Rajewadi, Raj Mahal, Rameswaram, Ranthambhor, Ratanpur, Sambhal, Sasaram, Shahgarh, Simla, Sirohi, Sitapur, Somnath, Tilhar, Tonk, and Uch). In this long list the majority of errors, as some others, can be easily explained by the hypothesis of massive scribal ineptitude. The agreement of several documents in a specific error allows us to group sections of these composite texts as derived from a common, corrupt source; and sometimes misreadings of the corruption permit us to hypothesize the existence of intermediaries between the common source and the extant manuscripts.

Table I is preserved on Sanskrit manuscript 1895 in the Library of the University of Pennsylvania, a manuscript of 2 ff. written probably in the eighteenth century¹⁰. I repeat my former edition¹¹ with some corrections. Table I incorporates several alphabetized sections that are closely related to those in Tables IV and III,

as is illustrated in the following table for avarga. A comparison of the other alphabetized sections in these three documents would also demonstrate that they have a common source, though Table III deviates from it more than Tables I and IV do.

Table I	Table IV	Table III
avarga		
155. Ayodhyā	8. Ayodhyā	84. Ayodhyā
156. Āhmedabad	4. Ahmedabad	41. Ahmedabad
157. Ajmer	3. Ajmer	46. Ajmer
158. Ahmedabad	11. Ahmedabad	47. Ahmedabad
159. Agra	1. Agra	42. Agra
160. Ujjain	10. Ujjain	45. Ujjain
161. Umarkot	9. Umarkot	49. Umarkot
162. Abhanpur	12. Abhanpur	
163. Apasaṭilā (?)		
164. Aurangabad		43. Aurangabad
165. Agnamapāṭama (?)		
166. Indore		
167. Etawah		
168. Udayapur	5. Udayapur	
169. Ichapur		
170. Oḍha (?)	7. Uḍisā	
171. Utkala		

Here it may be convenient to locate the alphabetized sections within each of these three documents

avarga	I 155-171, III 41-49, IV 1-14.
kavarga	I 5-30, III 1-8 and 52-55, IV 15-40.
cavarga	I 11-40, IV 41-53
ṭavarga	I 3-4, III 73-75, IV 54-58.
tavarga	I 81-101, III 12-17 and 26-28, IV 59-78.

pavarga	I 102-130, III 29-32 and 63-68, IV 71-107.
yavarga	I 134-142, III 9-11 and 33-36, IV 108-120.
savarga	I 143-154, III 18-25.

The other entries in Table I help us to localize it. I 1 Ujjain, on the prime meridian. The first non-alphabetized section, I 41-80, begins with Poona; and the last, I 172-175, contains Poona and Wai. The compiler, then, was a Mahārāṣṭrian. The final entry, Calcutta, shows that he wrote at a time after that city had gained its pre-eminence in British India.

On f. 2r in the margin is written the noon equinoctial shadow for rīvāṃḍa, 5;28, to which corresponds a terrestrial latitude of 24;28⁰; the latitude of the city Rewa is 24;32⁰ with a noon equinoctial shadow of 5;29. This scribe has also written in the margin the rising-times in palas of the zodiacal signs at rīvāgrāma, the same locality. This scribe from Rewa was probably a later owner of our document. On f. 2v are written the longitudes of certain localities expressed as *yojanas* to the east (-) or to the west (+) of the prime meridian:

brahmāvarta	-28
kurukṣetra	-28
puṇe	+28
nāśika	+27
vāi	+24

The occurrence of Poona, Nasik, and Wai again reflect the Mahārāṣṭrian origin of the original scribe.

In this and the following Tables the original documents contain only the name of the locality and its noon equinoctial shadow; the rest-serial numbers, corresponding terrestrial latitudes, and modern place names-are supplied by me.

Table I. University of Pennsylvania, Sanskrit 1895

1.	ujjaina	5;0	(22;37 ⁰)	Ujjain
2.		5;36	(25;1 ⁰)	
3.	ḍhakanapura	5;6	(23;2 ⁰)	
4.	ḍhāmkā	6;20	(27;47 ⁰)	Dhaka

5.	kālavāga	5:30	(24;37 ⁰)	Kalabagh
6.	kaśmīra	7:52	(33;15 ⁰)	Srinagar
7.	korāgāṃvama	4:25	(20;12 ⁰)	Koregaon
8.	kābil	8:30	(35;19 ⁰)	Kabul
9.	kāmtī	3:5	(14;24 ⁰)	Kancheepuram
10.	komkaṇa	3:15	(15;8 ⁰)	Koñkaṇa
11.	kanaūjja	6:10	(27;10 ⁰)	Kannauj
12.	kurukṣetra	6:36	(28;49 ⁰)	Thanesar
13.	kapilā	6:16	(27;35 ⁰)	Kampil
14.	kedāre	7:0	(30;15 ⁰)	Kedarnath
15.	kāmcī	2:30	(11;46 ⁰)	Kancheepuram
16.	khaṃdāra	8:0	(33;41 ⁰)	Kandahar
17.	khamāca	4:55	(22;17 ⁰)	
18.	gaṃgāsāgara	4:56	(22;21 ⁰)	Sagar Island
19.	gopa	3:0	(14;3 ⁰)	Goa
20.	golakuṃdā	3:45	(17;21 ⁰)	Golconda
21.	golavaṃ	4:0	(18;26 ⁰)	Golegaon
22.	gargarāt	5:25	(24;18 ⁰)	
23.	guvarāpura	5:50	(25;56 ⁰)	
24.	gahorā	5:45	(25;36 ⁰)	Gahorā
25.	gauḍa	5:10	(23;18 ⁰)	Gaur
26.	gayā	5:50	(25;56 ⁰)	Gaya
27.	gaṇasūklerabhya	6:4	(26;50 ⁰)	
28.	gorakhpura	6:8	(27;5 ⁰)	Gorakhpur
29.	gokul	5:55	(26;15 ⁰)	Gokul
30.	gujrāt	4:48	(21;48 ⁰)	Gujrat
31.	col	4:0	(18;26 ⁰)	Chaul
32.	cāṭasta	5:45	(25;37 ⁰)	Chatsu
33.	caṃderī	5:0	(22;37 ⁰)	Chanderi
34.	citauḍa	5:30	(24;37 ⁰)	Chitorgarh
35.	jālamdhara	7:0	(30;15 ⁰)	Jullundur
36.	jaṃbūsara	4:58	(22;29 ⁰)	Jambusar

37.	jūnagaḍa	5;0	(22;37 ⁰)	Junagadh
38.	jāro	5;36	(25;1 ⁰)	
39.	jivanapura	5;47	(25;44 ⁰)	Jaunpur
40.	jalālābāda	5;10	(23;18 ⁰)	Jalalabad
41.	puṇā	4;45	(21;35 ⁰)	Poona
42.	dillī	6;0	(26;34 ⁰)	Delhi
43.	viśālagada	3;45	(17;21 ⁰)	Vishalgarh
44.	naipāl	6;25	(28;7 ⁰)	Katmandu
45.	lāhora	7;30	(32;0 ⁰)	Lahore
46.	nāsika	4;24	(20;8 ⁰)	Nasik
47.	khaṃdhāra	2;20	(11;0 ⁰)	Kandahar
48.	jharasara	6;30	(28;26 ⁰)	Jasrasar
49.	tailaṃga	3;55	(18;5 ⁰)	Hyderabad
50.	bedara	4;15	(19;30 ⁰)	Bidar
51.	vidyānagara	4;0	(18;26 ⁰)	Vijapur
52.	devagirau	4;25	(20;12 ⁰)	Daulatabad
53.	avaṃti	5;2	(22;45 ⁰)	Ujjain
54.	somanāthapāttana	5;6	(23;2 ⁰)	Somnath
55.	nāgora	5;4	(22;54 ⁰)	Nagor
56.	yoginīpurapātalī	6;24	(28;4 ⁰)	Patiali (Delhi?)
57.	citrakūṭe	5;30	(24;37 ⁰)	Chitrakut
58.	gargarāṭ	5;20	(23;58 ⁰)	
59.	ajameri	6;0	(26;34 ⁰)	Ajmer
60.	kurukṣetra	6;55	(29;57 ⁰)	Thanesar
61.	prabhāsapattana	5;35	(24;57 ⁰)	Somnath
62.	bhṛgukache	4;51	(22;0 ⁰)	Broach
63.	samarakaṃde	10;3	(41;11 ⁰)	Samarkand
64.	khurāsāne	10;3	(41;11 ⁰)	Khurasan
65.	sarasapattana	6;50	(29;47 ⁰)	Sirsa
66.	sītapure	4;40	(21;15 ⁰)	Sitapur
67.	maṃḍapācale	4;57	(22;25 ⁰)	Mandu
68.	khambhādrava	4;51	(22;0 ⁰)	Cambay

69.	goteru āgaha			Gotaru
70.	pīlāpātana	5;20	(23;58 ⁰)	Pilu
71.	viṃḍugariri	6;0	(26;34 ⁰)	
72.	jagannātha	5;30	(24;37 ⁰)	Puri
73.	sarjhara	6;30	(28;26 ⁰)	
74.	nāranda	6;15	(27;30 ⁰)	
75.	mahal	6;36	(28;49 ⁰)	Raj Mahal
76.	jīda	7;0	(30;15 ⁰)	Jind
77.	hiṃsāra	6;4	(26;50 ⁰)	Hissar
78.	pāñipatha	6;50	(29;47 ⁰)	Panipat
79.	sonapatha	6;40	(29;4 ⁰)	Sonepat
80.	narelā	6;35	(28;45 ⁰)	Narela
81.	tājapura	5;45	(25;36 ⁰)	Tajpur
82.	tailaṃga	4;4	(18;44 ⁰)	Hyderabad
83.	dvārikā	6;5	(26;54 ⁰)	Dwarkaganj
84.	davlatābāja	4;11	(19;14 ⁰)	Daulatabad
85.	devagaḍha	5;4	(22;54 ⁰)	Deogarh
86.	dadhigrāma	4;40	(21;15 ⁰)	Dohad
87.	dābhola	5;0	(22;37 ⁰)	Dabhoi
88.	damanapura	5;45	(25;36 ⁰)	Damao
89.	dholaka	5;2	(22;45 ⁰)	Dholka
90.	brahmapurī	5;20	(23;58 ⁰)	Brahmapuri
91.	dhānapura	6;30	(28;26 ⁰)	Dhanepur
92.	dhakalapura	5;57	(26;23 ⁰)	
93.	dhāmegamḍa	5;10	(23;18 ⁰)	Dharmjaygarh
94.	naravara	5;54	(26;11 ⁰)	Narwar
95.	naḍibāda	5;2	(22;45 ⁰)	Nadiad
96.	nāgora	5;51	(26;0 ⁰)	Nagor
97.	nagarakoṭa	7;40	(32;35 ⁰)	Kangra
98.	navavadāpā	4;47	(21;44 ⁰)	Nabadwip
99.	naipāla	6;25	(28;8 ⁰)	Katmandu
100.	naimiṣāraṇya	5;47	(25;44 ⁰)	Nimsar

101.	devagiri			Daulatabad
102.	peṣaura	4;20	(19;52 ⁰)	Peshawar (?)
103.	pātharī	4;30	(20;33 ⁰)	Pathari (?)
104.	prayāga	5;45	(25;36 ⁰)	Allahabad
105.	prakāṇa	4;5	(18;48 ⁰)	Prakasha
106.	paunī	4;30	(20;33 ⁰)	Pauni
107.	pāṃḍava	5;1	(22;41 ⁰)	Pandvapura (?)
108.	puruṣottama	5;44	(25;32 ⁰)	Puri
109.	bedara	3;45	(17;21 ⁰)	Bidar
110.	budhānapura	4;31	(20;38 ⁰)	Burhanpur
111.	būṃḍī	5;30	(24;37 ⁰)	Bundi
112.	vānagaṃgā	4;30	(20;33 ⁰)	Wainganga River
113.	rajavāḍā	6;57	(30;5 ⁰)	Rajewadi
114.	bījāpura	3;30	(16;16 ⁰)	Bijapur
115.	bhalāsā	5;6	(23;2 ⁰)	Bhilsa
116.	vadhānagara			Vadnagar
117.	bhikāner			Bikaner
118.	paḍodara	4;52	(22;5 ⁰)	Baroda
119.	balatha	8;7	(34;4 ⁰)	Balkh
120.	virāṭ	6;27	(28;15 ⁰)	Bairat
121.	vairātī	6;0	(26;34 ⁰)	Bairat
122.	bhūcavi	4;5	(18;48 ⁰)	
123.	bhṛgupusākṣe	4;8	(19;0 ⁰)	Broach
124.	mālavā	5;30	(24;37 ⁰)	Malwa
125.	māṃḍogana	4;57	(22;25 ⁰)	Mandu
126.	mathurā	6;0	(26;34 ⁰)	Mathura
127.	mugerī	5;56	(26;19 ⁰)	
128.	śurera	4;30	(20;33 ⁰)	
129.	mūlatāna	6;0	(26;34 ⁰)	Multan
130.	mithilā	6;0	(26;34 ⁰)	Darbhangā
131.	ijā	5;30	(24;37 ⁰)	Ichapur (?)
132.	yodhapura	5;28	(24;30 ⁰)	Jodhpur

133.	gohi	5;45	(25;36 ⁰)	Goh
134.	rājāpil	4;44	(21;32 ⁰)	Jajpipla
135.	rāmeśvara	0;30	(2;23 ⁰)	Rameswaram
136.	rājapura	5;30	(24;37 ⁰)	Raipur
137.	lābhapura	7;30	(32;0 ⁰)	Lahore
138.	raṇathambhaura	5;30	(24;37 ⁰)	Ranthambhor
139.	lavamgapura	5;30	(24;37 ⁰)	Langar (?)
140.	lakṣavatyā	5;44	(24;32 ⁰)	Lucknow
141.	lakhanaura	5;45	(25;36 ⁰)	Lucknow
142.	rājamahal	5;25	(24;18 ⁰)	Raj Mahal
143.	siṃhā	5;0	(22;37 ⁰)	
144.	siṃrauja	5;18	(23;50 ⁰)	Sironj
145.	samasāvāda	6;50	(29;39 ⁰)	Samasata
146.	samala	6;3	(27;8 ⁰)	Simla (?)
147.	śyāhagaḍh	4;28	(20;25 ⁰)	Shahgarh (?)
148.	somanātha	5;6	(23;2 ⁰)	Somnath
149.	siṃdhupura	4;40	(21;15 ⁰)	
150.	sāramgapura	5;12	(23;26 ⁰)	Sarangarh
151.	sūrata	4;47	(21;44 ⁰)	Surat
152.	sahasrāṃva	5;17	(23;46 ⁰)	Sasaram
153.	śrīnagara	6;46	(29;25 ⁰)	Srinagar
154.	hastināpura	6;30	(28;26 ⁰)	Hastināpur
155.	ayodhyā	6;7	(27;1 ⁰)	Ayodhya
156.	amadābāda	4;36	(20;58 ⁰)	Ahmedabad
157.	ajmera	5;52	(26;4 ⁰)	Ajmer
158.	ahamadābāda	5;31	(24;41 ⁰)	Ahmedabad
159.	āgrā	6;30	(28;26 ⁰)	Agra
160.	avaṃti	5;0	(22;37 ⁰)	Ujjain
161.	amarakoṭa	5;25	(24;18 ⁰)	Umarkot
162.	abhānaura	4;36	(20;58 ⁰)	Abhanpur
163.	apasaṭlā	6;45	(29;22 ⁰)	
164.	avaramgābāda	4;30	(20;33 ⁰)	Aurangabad

165.	agnamapāṭama	5:40	(25;17 ⁰)	
166.	iṃdura	5:20	(23;58 ⁰)	Indore
167.	iṭāū	6:0	(26;34 ⁰)	Etawah
168.	udayapura	5:30	(24;37 ⁰)	Udayapur
169.	ichā	5:45	(25;36 ⁰)	Ichapur
170.	oḍha	4:6	(18;52 ⁰)	
171.	utkala	5:4	(22;54 ⁰)	Orissa
172.	brahmāvarta	6:0	(26;34 ⁰)	Brahmāvarta
173.	puṇem	4:0	(19;26 ⁰)	Poona
174.	vāiṃ	3;55	(18;5 ⁰)	Wai
175.	kalakattā	5:0	(22;37 ⁰)	Calcutta

Table II is preserved on a folio that is part C of Chandra Shum Shere g. 17 in the Bodleian Library, Oxford¹² This manuscript, which contains parts of the *Makaranda* of Makaranda (its epoch is 1478) and of the *Rāmaṇoda* of Rāmacandra (who wrote in 1590) as well as the geographical table, appears to have been copied in the seventeenth century. Its disorder indicates a rather haphazard collection at its origin, but its numerous errors and several dislocations are evidence that the present manuscript was copied, inaccurately, from that original or an intermediate copy. The locality at which it was compiled is not hinted at. I repeat, with some corrections, my previous edition.¹³

Table II Bodleian Library, Chandra Shum Shere g. 17, ff. 109-109v.

1.	bhelasā	5:45	(25;36 ⁰)	Bhilsa
2.	naravara	5:55	(26;15 ⁰)	Narwar
3.	oḍase	5:20	(23;58 ⁰)	Orissa
4.	mālapura	6:0	(26;34 ⁰)	Malpura
5.	damana	5:45	(25;36 ⁰)	Damao
6.	dvārāvātī	6:5	(26;54 ⁰)	Dwarkaganj
7.	thaṭā	6:6	(26;57 ⁰)	Tatta (?)
8.	rāmanagara	5:0	(22;37 ⁰)	Ramnagar
9.	mabūnagara	5:25	(24;18 ⁰)	Mahbubnagar (?)
10.	māṃgalora	5:1	(22;42 ⁰)	Mangalore
11.	diva	5		Diu
12.	māhoda	5		

13.	jūṇāgaḍha	5;20	(23;58 ⁰)	Junagadh
14.	halavada	5;20	(23;58 ⁰)	Halvad
15.	gujarātha	5;20	(23;58 ⁰)	Gujrat (?)
16.	vairāṭe	6;27	(28;15 ⁰)	Bairat
17.	lāpalolāṇū	5;10	(23;18 ⁰)	
18.	nagaradhātthā	6;6	(26;57 ⁰)	Tatta (?)
19.	devagaḍha	4;4	(18;44 ⁰)	Deogarh
20.	paunī	4;30	(20;33 ⁰)	Pauni
21.	aivakapattana	5;4	(22;54 ⁰)	
22.	durgāvatiḡaḍha	4;6	(18;52 ⁰)	
23.	dhāṃdhavagaḍha	5;52	(26;4 ⁰)	
24.	dillī	6;3	(26;45 ⁰)	Delhi
25.	mathurā	6;14	(27;27 ⁰)	Mathura
26.	cāṃdā			Chanda
27.	sūrata	4;45	(21;45 ⁰)	Surat
28.	raṭanapura	5;52	(26;4 ⁰)	Ratanpur
29.	kaṇaḍavāna	4;59	(22;33 ⁰)	Kapadwanj
30.	khambhāīta	4;59	(22;33 ⁰)	Cambay
31.	jaṃbūsara	4;59	(22;33 ⁰)	Jambusar
32.	kāpilā	4;54	(22;13 ⁰)	Kampil
33.	gaṃdhāra	4;52	(22;5 ⁰)	
34.	navasāri	5;4	(22;54 ⁰)	Navsari
35.	ghaṇadīvī	5;47	(25;44 ⁰)	Gandevi
36.	valasāḍa	4;38	(21;6 ⁰)	Balasore (?)
37.	bālāpura	4;25	(20;12 ⁰)	Balapur
38.	devagaḍha	4;4	(18;44 ⁰)	Deogarh
39.	ḍhākhāṃ	6;20	(27;50 ⁰)	Dhaka
40.	māḍau	4;50	(21;56 ⁰)	Mandu
41.	vurāṃlapura	4;30	(20;33 ⁰)	Burhanpur
42.	śiromaṇja	4;48	(21;48 ⁰)	Sironj
43.	sāraṃgapura	4;56	(22;21 ⁰)	Sarangarh
44.	revā narmadā	4;47	(21;44 ⁰)	Rewa/Narmada River

45.	madhyadeśe	6;9	(27;8 ⁰)	Madhyadeśa
46.	caṃderī	6;0	(26;34 ⁰)	Chanderi
47.	hastanāpura	6;31	(28;30 ⁰)	Hastināpur
48.	ruṭidvāra	6;36	(28;49 ⁰)	
49.	mādato	5;45	(25;36 ⁰)	Merta
50.	māṃḍavagaḍha	5;1	(22;41 ⁰)	Mandu
51.	ajamera	5;50	(25;56 ⁰)	Ajmer
52.	gagarapura	5;3	(22;50 ⁰)	
53.	vāsavāla	5;10	(23;18 ⁰)	
54.	ucavādhāgaḍha	5;3	(22;50 ⁰)	Uch
55.	hājīpura	5;45	(25;36 ⁰)	Hajipur
56.	khārūmpātala	3;47	(17;29 ⁰)	
57.	ānāvāmūpaṭṭana	5;20	(23;58 ⁰)	
58.	machalīpaṭṭana	5;6	(23;2 ⁰)	Machilpur
59.	khaṃḍāra	8;0	(33;41 ⁰)	Kandahar
60.	ayodhyā	6;7	(27;1 ⁰)	Ayodhya
61.	nāgapura	5;0	(22;37 ⁰)	Nagpur
62.	jugamṇātha	4;24	(20;8 ⁰)	Puri
63.	utkaladeśe kaṭakagrāme	4;27	(20;20 ⁰)	Cuttack
64.	jaitapura	5;6	(23;2 ⁰)	Jetpur
65.	gahorā	5;57	(26;22 ⁰)	Gahorā
66.	gayāyāṃ	4;32	(20;42 ⁰)	Gaya
67.	āgarā	6;0	(26;34 ⁰)	Agra
68.	kanauja	6;0	(26;34 ⁰)	Kannauj
69.	thāneśvara	6;30	(28;26 ⁰)	Thanesar
70.	kurukṣetra	6;30	(28;26 ⁰)	Thanesar
71.	rohatārāga	6;30	(28;26 ⁰)	Rohtak
72.	kāśmīra	7;30	(32;0 ⁰)	Srinagar
73.	kābila	8;30	(35;19 ⁰)	Kabul
74.	kāpila	7;22	(31;33 ⁰)	Kampil
75.	mithilā	6;6	(26;57 ⁰)	Darbhanga
76.	dadhigrāma	4;4	(18;42 ⁰)	Dohad

77.	siṅhanade	7;13	(31;2 ⁰)	
78.	ujjayinyāṃ	5;0	(22;37 ⁰)	Ujjain
79.	dasora	5;11	(23;22 ⁰)	Mandsaur
80.	vadhanāpura	5;20	(23;58 ⁰)	Vadnagar
81.	hisāra	6;45	(29;22 ⁰)	Hissar
82.	kampilāyāṃ	6;15	(27;30 ⁰)	Kampil
83.	aṃbhala	5;51	(26;0 ⁰)	Ambala
84.	solāpura	3;38	(16;47 ⁰)	Sholapur
85.	govā	6;0	(26;34 ⁰)	Goa
86.	bhṛgukṣetre	4;48	(21;48 ⁰)	Broach
87.	vaṭapatra	4;54	(22;13 ⁰)	Baroda
88.	ahamadāvāda	5;0	(22;37 ⁰)	Ahmedabad
89.	kanādī vijāpura	3;41	(17;4 ⁰)	Bijapur
90.	hūkerī vinnārāma	6;10	(27;12 ⁰)	
91.	ubbola	5;0	(22;37 ⁰)	
92.	cīola	5;0	(22;37 ⁰)	Chaul

Table III is transcribed on ff. 65-65v of manuscript α 424 in the Wellcome Institute in London, a miscellany of astrological and astronomical material, including some of Persian origin, that was purchased from the bookseller Bhajan Lal of Amritsar, who states that he acquired it at Bharatpur. Included in this manuscript are horoscopes and interrogations dated in the latter half of the seventeenth century, which must be the date of the transcription of an original. On f. 59 is a text giving the distances in *yojanas* between localities that lie on the prime meridian:

laṅkāpuryāḥ kumārī viśikharavi tato yojanaiḥ ṣaṣṭi kāntī
tasmān nāgābdhisāṅkhyaiḥ sitagiri tadanu prajvalī cāṣṭa tasmād |
vyomendur vacchagulmaṃ tad api khaviśikhe'vanti go gargarātas
tasmāt khatrīndu kṣetre kuru bhavati tato meru tattvābdasāṅkhyaiḥ ||

The intervals given in this inept verse, if one reads "tattvābdhi" in the last line, are:

Laṅkā to Kumārī	125 <i>yojanas</i>
Kumārī to Kāntī	60 <i>yojanas</i>
Kāntī to Sitagiri	48 <i>yojanas</i>

Sitagiri to Prajvalī	8 <i>yojanas</i>
Prajvalī to Vacchagulma	10 <i>yojanas</i>
Vacchagulma to Avanti	50 <i>yojanas</i>
Avanti to Gargarāta	9 <i>yojanas</i>
Gargarāta to Kurukṣetra	130 <i>yojanas</i>
Kurukṣetra to Meru	425 <i>yojanas</i>

The total is 1065 *yojanas* in a quadrant of the earth's sphere, or 4260 *yojanas* in its circumference.

On f. 71, just before Table IV, are two verses, the first on converting *yojanas* north or south of Avanti (Ujjayinī) into the local noon equinoctial shadow, the second a list of cities on the prime meridian. This second verse is derived from the *Karaṇakutūhala* of Bhāskara¹⁴.

ayantiyāmyottarayojanāni digghnāni nāgair viḥṛtāny ṛṇasvam |
khābhrāgniṣu prāptiyuto 'bhratarkais tadaṅgulādya viṣuvatprabhā syāt ||
purī rākṣasām devakanyātha kāñcī sitaḥ parvataḥ prajvalī vacmigulmam |
purī cojjayanyāhvayā gargarātaḥ kurukṣetramerū bhuvo madhyarekhā ||

Finally, on f. 77 is a list of the rising times of the zodiacal signs at savāījayapura. Since this city was founded by Jayasiṃha only in 1728, this manuscript clearly was copied later in the eighteenth century.

The compiler of Table III has utilized a source (among others) in which toponyms beginning with the same letter were grouped together. The following fragments of this list, which was related to the alphabetized source utilized in Tables I and IV, survive:

a III 41-49

ka III 1-8

ga III 52-55

ḍa/dha III 73-75

ḍa III 12-17

na III 26-28

- pa III 63-68
 ma III 29-32
 ra III 33-36
 la III 9-11
 sa III 18-25

Table III. Wellcome Institute Sanskrit α 424.

F. 65, column 1.

1.	kāśī	5;45	(25;36 ⁰)	Varanasi
2.	kedāra	7;2	(30;21 ⁰)	Kedarnath
3.	kurukṣetra	6;46	(29;25 ⁰)	Thanesar
4.	kāśmīra	8;20	(34;47 ⁰)	Srinagar
5.	kanyakuvja	6;0	(26;34 ⁰)	Kannauj
6.	kampilā	6;16	(27;35 ⁰)	Kampil
7.	koṭā	5;30	(24;37 ⁰)	Kota
8.	kāvīla	8;30	(35;19 ⁰)	Kabul
9.	laṃkāyāṃ	0;0	(0;0 ⁰)	Laṅkā
10.	laṃgarapura	5;30	(24;37 ⁰)	Langar
11.	lāhora	7;30	(32;0 ⁰)	Lahore
column 2				
12.	devagiri	3;30	(16;16 ⁰)	Daulatabad
13.	devagaḍha	6;4	(26;48 ⁰)	Deogarh
14.	dammana	5;25	(24;18 ⁰)	Damao
15.	dvārakā	6;5	(26;54 ⁰)	Dwarkaganj
16.	dābhola	5;0	(22;37 ⁰)	Dabhoi
17.	dillī	6;24	(28;4 ⁰)	Delhi
18.	sūrati	4;44	(21;31 ⁰)	Surat
19.	śrīnagara	6;46	(29;25 ⁰)	Srinagar
20.	siromja	5;48	(25;48 ⁰)	Sironj
21.	sihāḍi	5;20	(23;58 ⁰)	Sihora

column 3

22.	sāraṅga	4;52	(22;5 ⁰)	Sarangarh
23.	śambala	5;21	(24;2 ⁰)	Sambhal
24.	sirohi	5;30	(24;37 ⁰)	Sirohi
25.	somanātha	5;39	(25;12 ⁰)	Somnath
26.	nepāla	6;25	(28;8 ⁰)	Katmandu
27.	nagarakoṭa	7;20	(31;26 ⁰)	Kangra
28.	naimaṣāranya	5;25	(24;18 ⁰)	Nimsar

column 4

29.	mulatān	6;40	(29;3 ⁰)	Multan
30.	mithilā	6;8	(27;4 ⁰)	Darbhanga
31.	māḍava	5;1	(22;41 ⁰)	Mandu
32.	mathurā	6;0	(26;34 ⁰)	Mathura
33.	rāmanagara	5;0	(22;37 ⁰)	Ramnagar
34.	rohitāsa	6;29	(28;22 ⁰)	Rohtak
35.	raṇaṭhambhora	5;30	(24;37 ⁰)	Ranthambhor
36.	raivatācala	5;27	(24;26 ⁰)	Junagadh

column 5

37.	śrījī dvāra	5;20	(23;58 ⁰)	Dwarka
38.	udayapura	5;20	(23;58 ⁰)	Udayapur
39.	cītorā	5;30	(24;37 ⁰)	Chitorgarh
40.	ṭoḍo	5;30	(24;37 ⁰)	Toda Bhim

F. 65v, column 1

41.	amadānagara	5;0	(22;37 ⁰)	Ahmedabad
42.	āgarā	6;0	(26;34 ⁰)	Agra
43.	oraṅgāvāda	3;55	(18;4 ⁰)	Aurangabad
44.	āmbera	5;55	(26;15 ⁰)	Amber
45.	avaṃṭī	5;0	(22;37 ⁰)	Ujjain
46.	ajamera	5;45	(25;36 ⁰)	Ajmer
47.	amadāvāda	4;49	(21;52 ⁰)	Ahmedabad
48.	ayodhyā	5;7	(23;6 ⁰)	Āyodhya

49.	amarakoṭa	5;35	(24;57 ⁰)	Umarkot
50.	būdī	5;30	(24;37 ⁰)	Bundi
51.	tailiṅga	4;4	(18;45 ⁰)	Hyderabad
52.	gaghābāṃdara	6;0	(26;34 ⁰)	Gogha (?)
53.	gaḍhā	6;6	(26;57 ⁰)	Gadra
54.	gargarāṭa	5;16	(23;42 ⁰)	
column 2				
55.	gamgāsāgara	4;56	(22;21 ⁰)	Sagar Island
56.	jodhapura	5;58	(26;27 ⁰)	Jodhpur
57.	hastanāpura	24;31		Hastināpur
58.	haridvāra	6;36	(28;49 ⁰)	Hardwar
59.	virāṭa	6;27	(28;15 ⁰)	Bairat
60.	balakha	8;7	(34;4 ⁰)	Balkh
61.	burahāṃnapura	4;30	(20;33 ⁰)	Burhanpur
62.	vijayāpura	3;54	(18;0 ⁰)	Vijapur
63.	prāga	5;54	(25;36 ⁰)	Allahabad
64.	paṭaṇā	4;45	(21;35 ⁰)	Patna (?)
65.	prakāśā	4;51	(22;0 ⁰)	Prakasha
66.	poṇī	4;30	(20;33 ⁰)	Pauni
67.	puṣkara	5;52	(26;3 ⁰)	Pushkar
68.	puruṣottamakṣe	4;45	(21;35 ⁰)	Puri
column 3				
69.	jālamdhara	6;5	(26;53 ⁰)	Jullundur
70.	jambūsara	4;44	(21;31 ⁰)	Jambusar
71.	khambbhāta	4;59	(22;33 ⁰)	Cambay
72.	bharupaca	4;48	(21;48 ⁰)	Broach
73.	ḍhāko	6;20	(27;49 ⁰)	Dhaka
74.	ḍhumḍhahara	5;25	(24;18 ⁰)	Amber
75.	ḍūṃgarapura	5;30	(24;37 ⁰)	Dungarpur

Table IV is preserved on ff. 71v-72v of the manuscript that contains Table III. It represents the alphabetized list utilized in Table I, but omits the last section,

which contained the savarga, and does not necessarily correspond precisely to its origin.

Table IV. Wellcome Institute Sanskrit α 424.

F. 71v, column 1

avarga

1.	āgarā	6;0	(26;34 ⁰)	Agra
2.	āṃbera	5;45	(25;36 ⁰)	Amber
3.	ajamera	5;45	(25;36 ⁰)	Ajmer
4.	amadāvāda	5;6	(23;2 ⁰)	Ahmedabad
5.	udayapura	5;20	(23;58 ⁰)	Udayapur
6.	āsera	4;30	(20;33 ⁰)	Asirgarh
7.	uḍisā	5;45	(25;36 ⁰)	Orissa
8.	ayodhyā	6;7	(27;0 ⁰)	Ayodhya
9.	amarako	5;25	(24;18 ⁰)	Umarkot
10.	avamtī	5;0	(22;37 ⁰)	Ujjain
11.	ahamadānagara	4;49	(21;52 ⁰)	Ahmedabad
12.	abhānera	6;13	(27;23 ⁰)	Abhanpur
13.	Īdara	5;20	(23;58 ⁰)	Idar
14.	+ rāvo	6;0	(26;34 ⁰)	

column 2

kavarga

15.	kāṃtū	3;31	(16;20 ⁰)	Kancheepuram
16.	kāśī	5;45	(25;36 ⁰)	Varanaśi
17.	kanoja	6;10	(27;10 ⁰)	Kannauj
18.	kuṃkaṇa	3;15	(15;8 ⁰)	Koṅkaṇa
19.	kurukṣetra	6;36	(28;49 ⁰)	Thanesar
20.	kāśmīra	7;52	(33;15 ⁰)	Srinagar
21.	kāvila	8;48	(36;15 ⁰)	Kabul
22.	gargarāṭa	5;25	(24;18 ⁰)	
23.	gvālera	5;51	(26;0 ⁰)	Gwalior
24.	kāmā	6;0	(26;34 ⁰)	Kaman

25.	khamdhāra	9;55	(39;32 ⁰)	Kandahar
26.	gaḍhī	6;6	(26;57 ⁰)	Gadra
27.	gopācala	6;0	(26;34 ⁰)	Gwalior
28.	kapilā	6;0	(26;34 ⁰)	Kampil
29.	kālimjara	5;45	(25;36 ⁰)	Kalinjara

column 3

30.	kālapī	8;0	(33;41 ⁰)	Kalpi
31.	kacha	5;8	(23;10 ⁰)	Bhuj
32.	gaḍhā	4;32	(20;42 ⁰)	Gadhra
33.	gambhorā	5;47	(25;44 ⁰)	Gahorā
34.	kedāra	7;1	(30;18 ⁰)	Kedarnath
35.	guhāhaḍhī	3;30	(16;16 ⁰)	
36.	gamgāsāgara	6;0	(26;34 ⁰)	Sagar Island
37.	ghoghābamḍara	3;0	(14;3 ⁰)	Gogha
38.	gokula	6;0	(26;34 ⁰)	Gokul
39.	golakuḍā	3;45	(17;21 ⁰)	Golconda
40.	golagāva	4;10	(19;9 ⁰)	Golegaon

F. 72, column 1

cavarga

41.	cola	4;0	(18;26 ⁰)	Chaul
42.	caṁderī	4;0	(18;26 ⁰)	Chanderi
43.	cāṭasu	5;55	(26;15 ⁰)	Chatsu
44.	cītoḍa	5;30	(24;37 ⁰)	Chitorgarh
45.	jālorā	5;58	(26;26 ⁰)	Jalor
46.	jyodhapura	5;3	(22;49 ⁰)	Jodhpur
47.	jūnāgaḍha	5;0	(22;37 ⁰)	Junagadh
48.	jaṁbūsara	4;58	(22;29 ⁰)	Jambusar
49.	jesalamera	6;15	(27;30 ⁰)	Jaisalmer
50.	jetārāna	5;52	(26;3 ⁰)	Jetpur (?)
51.	ceḍala	5;0	(22;37 ⁰)	Bedla
52.	jālamdhara	7;0	(30;15 ⁰)	Jullundur
53.	junera	5;0	(22;37 ⁰)	Junnar (?)

column 2

ṣavarga

54.	ṣoka	6;15	(27;30 ⁰)	Tonk
55.	ṣoḍā	6;10	(27;12 ⁰)	Toda Bhim
56.	ḍuṃgarapura	5;3	(22;49 ⁰)	Dungarpur
57.	ḍhāko	6;20	(27;49 ⁰)	Dhaka
58.	ḍhaḍho	8;20	(34;47 ⁰)	

tavarga

59.	tilaṃga	5;42	(25;24 ⁰)	Hyderabad
60.	dillī	6;30	(28;26 ⁰)	Delhi
61.	dvārikā	6;5	(26;54 ⁰)	Dwarkaganj
62.	dolatāvāda	4;15	(19;30 ⁰)	Daulatabad
63.	devagaḍha	5;4	(22;54 ⁰)	Deogarh
64.	dambhoja	5;0	(22;37 ⁰)	Dabhoi
65.	naravara	5;45	(25;36 ⁰)	Narwar
66.	nāgora	5;51	(26;0 ⁰)	Nagor

column 3

67.	narmadā	4;47	(21;44 ⁰)	Narmada
68.	nātheśvara	6;51	(29;43 ⁰)	Nathdwara (?)
69.	tilahara	5;10	(23;18 ⁰)	Tilhar
70.	dadhigrāme	4;4	(18;44 ⁰)	Dohad
71.	dholakā	5;2	(22;46 ⁰)	Dholka
72.	dhāmoni	4;4	(18;44 ⁰)	Dhamoni (?)
73.	naḍīyāda	5;2	(22;46 ⁰)	Nadiad
74.	nagarakoṣṭha	7;4	(30;30 ⁰)	Kangra
75.	navānagara	5;5	(22;58 ⁰)	Jamnagar
76.	nepāla	6;25	(28;8 ⁰)	Katmandu
77.	naimiṣāranya	5;54	(26;11 ⁰)	Nimsar
78.	tāīpura	5;42	(25;24 ⁰)	Tajpur

F. 72v, column 1

pavarga

79.	prayāga	5;42	(25;24 ⁰)	Allahabad
80.	paṭanā	5;45	(25;36 ⁰)	Patna
81.	peśora	6;30	(28;26 ⁰)	Peshawar (?)
82.	vedara	3;45	(17;21 ⁰)	Bidar
83.	vahūtipura	4;30	(20;33 ⁰)	
84.	būdī	5;30	(24;37 ⁰)	Bundi
85.	bīlāḍo	5;40	(25;16 ⁰)	Bilara
86.	meṭatā	5;53	(26;8 ⁰)	Merta
87.	mugera	6;49	(29;36 ⁰)	
88.	mathurā	6;2	(26;42 ⁰)	Mathura
89.	bagadā	5;53	(26;8 ⁰)	Bagru
90.	mithilā	6;8	(27;1 ⁰)	Darbhanga
91.	+ nāgaḍha	4;0	(18;26 ⁰)	

column 2

92.	makaramḍapura	6;30	(28;26 ⁰)	
93.	burahāṃnapura	4;30	(20;33 ⁰)	Burhanpur
94.	maṃḍapācala	5;1	(22;42 ⁰)	Mandu
95.	māṃḍavagaḍha	4;47	(21;44 ⁰)	Mandu
96.	māgarāla	5;1	(22;42 ⁰)	Mangrol (?)
97.	bareḷī	5;10	(23;18 ⁰)	Bareli
98.	mulatāna	8;30	(35;19 ⁰)	Multan
99.	bhakhara	8;25	(35;3 ⁰)	Bhakkar
100.	bhaḍūyaca	4;48	(21;48 ⁰)	Broach
101.	prakāśā	4;41	(21;19 ⁰)	Prakasha
102.	pāṃḍava	5;1	(22;42 ⁰)	Pandvapura (?)
103.	puruṣottamakṣetra	5;45	(25;36 ⁰)	Puri
104.	pātibaṃdara	4;15	(19;30 ⁰)	Pāti
105.	bījāpura	3;30	(16;16 ⁰)	Bijapur
106.	bikānera	7;0	(30;16 ⁰)	Bikaner
107.	baḍodarā	4;52	(22;8 ⁰)	Baroda

column 3

yavarga

108.	rāmeśvara	1;30	(7;8 ⁰)	Rameswaram
109.	rājamehela	5;5	(22;58 ⁰)	Raj Mahal
110.	raulāsa	6;27	(28;15 ⁰)	Rohtak
111.	raṇathobhora	5;30	(24;37 ⁰)	Ranthambhor
112.	lāhora	7;30	(32;0 ⁰)	Lahore
113.	lakhanāvātī	5;48	(25;48 ⁰)	Lucknow
114.	vijāpura	13;38	(16;51 ⁰)	Bijapur
115.	vīkānera	6;0	(26;34 ⁰)	Bikaner
116.	vedalo	5;0	(22;37 ⁰)	Bedla
117.	laṃkāpurī	0;0	(0;0 ⁰)	Laṃkā
118.	rāmanagara	5;0	(22;37 ⁰)	Ramnagar
119.	laṃgarapura	5;30	(24;37 ⁰)	Langar
120.	baharāyaca	7;30	(32;0 ⁰)	Bahraich

Table V is inscribed on the two folio of manuscript β 810 in the Wellcome Institute. The tables themselves give the name of the locality, its noon equinoctial shadow, its *carakhaṇḍāni*, and the local oblique ascensions of the zodiacal signs; in the following I record only the first two columns. The margins contain other geographical information:

1. On f. 1 is the statement that from Laṃkā Lāhora is distant 320 *yojanas*, Ajamera 247 *yojanas*, and Ayodhyā 252 *yojanas*; further that Jaitāraṇa is 228 *yojanas* from Laṃkā, and, on f. 'v, that Śaṃbhāita (Cambay) is distant 192 *yojanas*.

2. The following noon equinoctial shadows and *deśāntaras* (i.e., distances from the prime meridian) are recorded on ff. 1 and 1v in the margins:

sunāma	7 (30;16 ⁰)	deśāntara 12;0	(Sunam 30;6 ⁰)
pohakaraṇa	6;12 ½	(27;19 ⁰)	(Pokaran 27;57 ⁰)
phalavaddhī	6;18 ½	(27;42 ⁰)	(Phalodi 27;6 ⁰)
bīlāḍa	5;40 ½	(25;15 ⁰)	(Bilara 26;10 ⁰)
pacīyāṣa	5;38 ½	(25;8 ⁰)	(Pachbhadra 25;58 ⁰ ?)
sokata	5;43 ½	(25;27 ⁰)	(Sojat 25;53 ⁰)

jaitāraṇa	5;43 ½ (25;27 ⁰)	(cf. IV 50)
vagaḍī	5;41 ½ (25;23 ⁰)	(Bagru 26;49 ⁰ ?)
devagaḍha	5;21 (24;2 ⁰) deśāntara 21	(Deogarh 25;31 ⁰)

Since all of these localities lie in the area of Jodhpur and Jaipur in Rājasthāna, that is most likely where the manuscript was copied. Since in a computation in the margin of f. 1v it employs an *ayanāmsā* of 18;16;10⁰, it was probably copied in the seventeenth century. Many of the places named in the list are in Rājasthāna; therefore the list as well as the manuscript may have originated there.

Table V. Wellcome Institute Sanskrit β 810

F. 1

1.	mathurāyām	6;0	(26;34 ⁰)	Mathura
2.	āgarākā	6;0	(26;34 ⁰)	Agra
3.	lāhora	7;0	(30;15 ⁰)	Lahore
4.	vrahāmnapura	4;30	(20;33 ⁰)	Bramhapuri
5.	ajamere	6;0	(26;34 ⁰)	Ajmer
6.	ujjenc	5;0	(22;37 ⁰)	Ujjain
7.	gujarāte	5;24	(24;14 ⁰)	Gujrat
8.	dakṣiṇe	4;22	(20;0 ⁰)	
9.	vīkānere	6;0	(26;34 ⁰)	Bikaner
10.	mulatāne	6;21	(27;53 ⁰)	Multan
11.	yodhapure	5;5	(22;58 ⁰)	Jodhpur
12.	nāgore	5;54	(26;11 ⁰)	Nagor
13.	rohīte	6;34	(28;45 ⁰)	Rohtak
14.	jālore	5;36	(25;1 ⁰)	Jalor
15.	sīrohī	5;30	(24;37 ⁰)	Sirohi
16.	rāmapure	5;18	(23;50 ⁰)	Rampur
17.	bhrgukacche	4;51	(22;0 ⁰)	Broach
18.	ṣambhāite	4;51	(22;0 ⁰)	Cambay
19.	ābere	6;0	(26;34 ⁰)	Amber
20.	sāgānere	6;0	(26;34 ⁰)	Sanganer
21.	sīhanamḍe	7;0	(30;15 ⁰)	

22.	haridvāre	6;36	(28;49 ^o)	Hardwar
23.	ajodhyā	6;7	(27;0 ^o)	Ayodhya
24.	dvārāvatyāṃ	6;5	(26;53 ^o)	Dwarkaganj
25.	cītoṛe	5;30	(24;37 ^o)	Chitorgarh
26.	būṃḍī	5;20	(23;58 ^o)	Bundi
F. 1v				
27.	sūrata	4;44	(21;28 ^o)	Surat
28.	siroja	4;48	(21;48 ^o)	Sironj
29.	lašāṇeūṃ	5;30	(24;37 ^o)	Lucknow
30.	pīrānapaṭṭa	5;20	(23;58 ^o)	Pilu (?)
31.	kurukṣetra	6;55	(29;57 ^o)	Thanesar
32.	maharāthe	3;11	(14;50 ^o)	Mahārāṣṭra
33.	kanoje	6;0	(26;34 ^o)	Kannauj
34.	nagarathaṭṭā	5;36	(25;1 ^o)	Tatta
35.	gvālere	5;58	(26;27 ^o)	Gwalior
36.	vijāpure	4;0	(18;26 ^o)	Vijapur
37.	prayāge	5;45	(25;36 ^o)	Allahabad
38.	kāśmīra	8;38	(35;44 ^o)	Srinagar
39.	lāhora	5;5	(22;58 ^o)	Lahore
40.	ahamādāvāda	5;0	(22;37 ^o)	Ahmedabad
41.	laṃkānagare	0;0	(0;0 ^o)	Laṅkā
42.	hamsāre	6;24	(28;4 ^o)	Hissar
43.	bhaṭanerasarase	6;26	(28;11 ^o)	Hanumangarh
44.	baṃgālai	8;0	(33;41 ^o)	Bengal
45.	kābila	8;30	(35;19 ^o)	Kabul
46.	balake	8;7	(34;4 ^o)	Balkh
47.	kāśyāṃ	5;42	(25;24 ^o)	Varanasi
48.	dillyāṃ	6;30	(28;26 ^o)	Delhi
49.	paṭṭanaī	5;45	(25;36 ^o)	Patna
50.	jesalamerau	5		Jaisalmer
51.	meḍate	5;54	(26;11 ^o)	Merta
52.	phatepura	5;54	(26;11 ^o)	Fatehpur

Appendix A. Index of Place-Names

- Agnamapātama 540; I 165
 Ajamera Ajmer II 51; III 46; IV 3; V 5
 Ajameri Ajmer I 59
 Ajodhyā Ayodhya V 23
 Ajmera Ajmer I 157
 Aasaīlā 6;45 I 163
 Abhānera Abhanpur IV 12
 Abhānaura Abhanpur I 162
 Amadānagara Ahmedabad III 41
 Amadābāda Ahmedabad I 156
 Amadāvāda Ahmedabad III 47; IV 4
 Amarako Umartkot IV 9
 Amarakoṭa Umartkot I 161; III 49
 Āmbhala Ambala II 83
 Ayodhyā Ayodhya I 155; II 60; III 48; IV 8
 Avamti Ujjain I 53, 160
 Avamti Ujjain III 45; IV 10
 Avaramgābāda Aurangabad I 164
 Ahamadānagara Ahmedabad IV II
 Ahamadābāda Ahmedabad I 158
 Ahamadāvāda Ahmedabad II 88
 Ahamadāvāda Ahmedabad V 40
 Āgrā Agra II 67; III 42; IV 1; V 2
 Āgrā Agra I 159
 Ānāvāmūpattana 5;20 II 57
 Ābera Amber V 19
 Āmbera Amber III 44; IV 2
 Āsera Asirgarh IV 6
 Ichā Ichapur I 169
 Ijā Ichapur I 131
 Iṭāū Etawah I 167
 Īmdura Indore I 166
 Īdara Idar IV 13
 Ucaṽadhāgadhā Uch II 54
 Ujjayinī Ujjain II 78
 Ujjēna Ujjain V 6
 Ujjaina Ujjain I 1
 Uḍḍīsā Orissa IV 7
 Utkala Orissa I 171
 Utkaladeśe Kaṭakagrāma Cuttack II 63
 Udayapura Udayapur I 168; III 38; IV 5
 Ubhola 5;0 II 91
 Aivakapattana 5;4 II 21
 Oḍase Orissa II 3
 Oḍha 4;6 I 170
 Oraṁgāvāda Aurangabad III 43
 Kacha Bhuj IV 31
 Kaṭakagrāma Cuttack II 63
 Kṇaḍī Vijāpura Bijapur II 89
 Kanaūjja Kannauj I 11
 Kanoja Kannauj IV 17; V 33
 Kanauja Kannauj II 68
 Kanyakuvja Kannauj III 5
 Kapaḍavāna Kapadwanj II 29
 Kapilā Kampil I 13; IV 28
 Kampilā Kampil II 82; III 6
 Kalakattā Calcutta I 175
 Kāṁcī Kancheepuram I 15
 Kāṁṭī Kancheepuram I 9; IV 15
 Kāpila Kampil II 74
 Kāpilā Kampil II 32
 Kābil Kabul I 8
 Kābila Kabul II 73; V 45
 Kāmā Kaman IV 24
 Kālapī kalpi IV 30

- Kālavāga Kalabagh I 5
 Kālīm̐jara Kalinjara IV 29
 Kāvila Kabul III 8; IV 21
 Kāśī Varanasi III 1; IV 16; V 47
 Kāsmīra Srinagar I 6; II 72; III 4; IV 20; V 38
 Kuṃkaṇa Koṅkaṇa IV 18
 Kurukṣetra Thanesar I 12, 60; II 70; III 3; IV 19; V 31
 Kedāra Kedarnath I 14; III 2; IV 34
 Koṃkaṇa Koṅkaṇa I 10
 Koṭā Kota III 7
 Korāḡamvaṃ Koregaon I 7
 Khaṃdāra Kandahar I 16; II 59
 Khaṃdhāra Kandahar I 47; IV 25
 Khamāca 4;55 I 17
 Khaṃbhāita Cambay II 30
 Khaṃbhāta Cambay III 71
 Khaṃbhādrava Cambay I 68
 Khārūṃpāṭala 3;47 II 56
 Khurāsāna Khurasan I 64
 Gaṃhorā Gahora IV 33
 Gagarapura 5;3 II 52
 Gaghābaṃdara Gogha III 52
 Gaṃgāsāgara Sagar Island I 18; III 55; IV 36
 Gaḡhā Gadra III 53
 Gaḡhā Gadhra IV 32
 Gaḡhī Gadra IV 26
 Gaṇaśuklerabhya 6;4 I 27
 Gaṃdhāra 4;52 II 33
 Gayā Gaya I 26; II 66
 Gargarāt 5;20 I 58
 Gargarāta 5;16 III 54 5;25 IV 22
 Gargarāt 5;25 I 22
 Gahorā Gahora I 24; II 65
 Gujarāta Gujrat V 7
 Gujarātha Gujrat II 15
 Gujrāt Gujrat I 30
 Guvarāpura 5;50 I 23
 Guhāhādhi 3;30 IV 35
 Gokul Gokul I 29
 Gokula Gokul IV 38
 Goghābaṃdara Gogha IV 37
 Goteru Āgaha Gotaru I 69
 Gopā Goa I 19
 Gopācala Gwalior IV 27
 Gorakhapura Gorakhpur I 28
 Golakuḡā Golconda IV 39
 Golakumḡā Golconda I 20
 Golagāva Golegaon IV 40
 Galavaṃ Golegaon I 21
 Govā Goa II 85
 Gohi Goh I 133
 Gauḡa Gaur I 25
 Gvālera Gwalior IV 23; V 35
 Ghaṇḡadīvi Gandevi II 35
 Caṃderī Chanderi I 33; II 46; IV 42
 Cātasu Chatsu IV 43
 Cātasta Chatsu I 32
 Cāṃdā Chanda II 26
 Citauḡa Chitorgarh I 34
 Citrakūṭa Chitrakut I 57
 Cīoḡa Chaul II 92
 Cītoḡa Chitorgarh IV 44
 Cītora Chitorgarh III 39; V 25
 Ceḡala Bedla IV 51
 Col Chaul I 31
 Cola Chaul IV 41
 Jagannātha Puri I 72
 Jambūsara Jambusar I 36; II 31; III 70; IV 48

- Jalālābāda Jalalabad I 40
 Jāro 5;36 I 38
 Jālamdhara Jullundur I 35; III 69; IV 52
 Jālorā Jalor IV 45; V 14
 Jivanapura Jaunpur I 39
 Jīda Jind I 76
 Jugamṇātha Puri II 62
 Junera Junnar IV 53
 Jūnagaḍa Junagadh I 37
 Jūnāgaḍha Junagadh II 13; IV 47
 Jetāraṇa Jetpur IV 50
 Jesalamera Jaisalmer IV 49
 Jesalameru Jaisalmer V 50
 Jaitapura Jetpur II 64
 Jodhapura Jodhpur III 56
 Jyodhapura Jodhpur IV 46
 Jharasara Jasrasar I 48

 Ṭoka Tonk IV 54
 Ṭoḍā Toda Bhim IV 55
 Ṭoḍo Toda Bhim III 40
 Ḍumgarapura Dungarpur IV 56
 Ḍūmgarapura Dungarpur III 75
 Dhakanapura 5;6 I 3
 Dhadho 8;20 IV 58
 Dhāko Dhaka III 73; IV 57
 Dhākhām Dhaka II 39
 Dhāmḱā Dhaka I 4
 Dhumḍhahara Amber III 74

 Tāipura Tajpur IV 78
 Tājapura Tajpur I 81
 Tilamga Hyderabad IV 59
 Tilahara Tilhar IV 69
 Tailamga Hyderabad I 49, 82

 Tailimḡa Hyderabad III 51
 Thaṭā Tatta II 7
 Thāneśvara Thanesar II 69
 Dakṣiṇa 4;22 V 8
 Dadhigrāma Dohad I 86; II 76; IV 70
 Damana Damao II 5
 Damanapura Damao I 88
 Daṃbhoja Dabhoi II 64
 Daṃmana Damao III 14
 Davlatābāja Daulatabad I 84
 Dasora Mandsaur II 79
 Dābhola Dabhoi I 87; III 16
 Dillī Delhi I 42; II 24; III 17; IV 60; V 48
 Dīva Diu II 11
 Durgāvātīgaḍha 4;6 II 22
 Devagaḍha Deogarh I 85; II 19, 38; III 13; IV 63
 Devagiri Daulatabad I 52, 101; III 12
 Dolatāvāda Daulatabad IV 62
 Dvāra Dwarka III 37
 Dvārakā Dwarkaganj III 15
 Dvārāvātī Dwarkaganj II 6; V 24
 Dvārikā Dwarkaganj I 83; IV 61
 Dhakalapura 5;57 I 92
 Dhanapura Dhanepur I 91
 Dhāmegamḍa Dharmjaygarh I 93
 Dhāmonī Dhamoni IV 72
 Dhāmdhavaḡaḍha 5;52 II 23
 Dholaka Dholka I 89
 Dholakā Dholka IV 71
 Nagarakoṭa Kangra I 97; III 27; IV 74
 Nagaradhātṭhā Tatta II 18
 Nagarathaṭā Tatta V 34
 Naḡībāda Nadiad I 95
 Naḡīyāda Nadiad IV 73
 Naravara Narwar I 94; II 2; IV 65

Narelā Narela I 80	Prakāna Prakasha I 105
Narmadā Narmada II 44; IV 67	Prakāśā Prakasha III 65; IV 101
Navavadāpā Nabadwip I 98	Prabhāsapattana Somnath I 61
Navasārī Navsari II 34	Prayāga Allahabad I 104; IV 79; V 37
Navānagara Jamnagar IV 75	Prāga Allahabad II 63
Nāgapura Nagpur II 61	Phatepura Fatehpur V 52
Nāgora Nagor I 55, 96; IV 66; V 12	Bagaḍā Bagru IV 89
Nātheśvara Nathdwara IV 68	Baṃgāla 8;0 V 44
Nāranda 6;15 I 74	Baḍodara Baroda IV 107
Nāśika Nasik I 46	Bareli Bareli IV 97
Nepāla Katmandu III 26; IV 76	Balaka Balkh V 46
Naipāl Katmandu I 44	Balakha Balkh III 60
Naipāla Katmandu I 99	Balatha Balkh I 119
Naimiṣāraṇya Nimsar I 100; III 28; IV 77	Baharāyaca Bahraich IV 120
	Bikānera Bikaner IV 106
Paṭanā Patna III 64; IV 80	Bijāpura Bijapur I 114; IV 105
Paṭṭana Patna V 49	Bilāḍo Bilara IV 85
Paḍodara Baroda I 118	Buḍhānapura Burhanpur I 110
Pāṇipatha Panipat I 78	Burahānnapura Burhanpur III 61; IV 93
Pāṃḍava Pandvapura I 107; IV 102	Būḍi Bundi III 50; IV 84
Pātibāṃḍara Pāti IV 104	Būṃḍī Bundi I 111; V 26
Pātharī Pathari I 103	Bedara Bidar I 50, 109
Pīrānapaṭṭa Pīlu V 30	Brahmapurī Bramhapuri I 90
Pīlāpāṭana Pīlu I 70	Brahmāvarta 6,0 I 172
Puṇā Poona I 41	Bhakhara Bhakkar IV 99
Puṇem Poona I 173	Bhatanerasarasa Hanumangarh V 43
Puruṣottama Puri I 108	Bhaḍūyaca Broach IV 100
Puruṣottamakṣe Puri III 68	Bharupaca Broach III 72
Puruṣottamakṣetra Puri IV 103	Bhalāsā Bhilsa I 115
Puškara Pushkar III 67	Bhikāner Bikaner I 117
Peśora Peshawar IV 81	Bhūcavī 4;5 I 122
Peśaura Peshawar I 102	Bhṛgukaccha Broach V 17
Poṇī Pauni III 66	Bhṛgukacha Broach I 62
Paunī Pauni II 20	Bhṛgukṣetra Broach II 86
Paunī Pauni I 106	Bhṛgupuṣakṣe Broach I 123

- Bhelasā Bhilsa II 1
 Makarandapura 6;30 IV 93
 Machalīpattana Machīpur II 58
 Maṃḍapācala Mandu I 67; IV 94
 Mathurā Mathura I 126; II 25; III 32; IV 88; V 1
 Madhyadeśa Madhyadeśa II 45
 Mabūnagara Mahbubnagar II 9
 Maharāṭha 3;11 V 32
 Mahal Raj Mahal I 75
 Māgarāla Mangrol IV 96
 Māṃgalora Mangalore II 10
 Māḍato Merta II 49
 Māḍava Mandu III 31
 Māṃḍavagaḍha Mandu II 50; IV 95
 Māṃḍogaṇa Mandu I 125
 Mādu Mandu II 40
 Mālapura Malpura II 4
 Mālava 5;30 I 124
 Māhoda 5 II 12
 Mithilā Darbhanga I 130; II 75; III 30; IV 90
 Mugera 6;49 IV 87
 Mugerī 5;56 I 127
 Mulatān Multan III 29
 Mulatāna Multan IV 98; V 10
 Mūlatāna Multan I 129
 Meṭatā Merta IV 86
 Meḍata Merta V 52

 Yoginīpurapāṭālī Patiali (Delhi?) I 56
 Yodhapura Jodhpur I 132; V 11
 Rajavāḍā Rajewadi I 113
 Raṇaṭhambhōra Ranthambhor III 35
 Raṇaṭhambhaura Ranthambhor I 138
 Raṇaṭhobhōra Ranthambhor IV 111
 Ratanapura Ratanpur II 28

 Rājapura Raipur I 136
 Rājamahal Raj Mahal I 142
 Rājamehela Raj Mahal IV 109
 Rājāpīl Rajpipla I 134
 Rāmanagara Ramnagar II 8; III 33; IV 118
 Rāmapura Rampur V 16
 Rāmeśvara Rameswaram I 135; IV 108
 Rutidvāra 6;36 II 48
 Revā Rewa II 44
 Raivatācala Junagadh III 36
 Rohatārāga Rohtak II 71
 Rohitāsa Rohtak III 34
 Rohita Rohtak V 13
 Rautāsa Rohtak IV 110
 Lakṣavātī Lucknow I 140
 Lakhānāvātī Lucknow IV 113
 Lakhānaura Lucknow I 141
 Laṃkā Laṅkā III 9
 Laṃkānagara Laṅkā V 41
 Laṃkāpurī Laṅkā IV 117
 Laṃgarapura Langar III 10; IV 119
 Lavaṃgapura Langar I 139
 Laṣaṇeūṃ Lucknow V 29
 Lāpālolaṇū 5;10 II 17
 Lābhapura Lahore I 137
 Lāhora Lahore I 45; III 11; IV 112; V 3, 39
 Vaṭapatra Baroda II 87
 Vadhanāpura Vadnagar II 80
 Vadhānagara Vadnagar I 116
 Valasāḍa Balasore II 36
 Vahūtīpura 4;30 IV 83
 Vāiṃ Wai I 174
 Vānagamgā Wanganga I 112
 Vāsavāla 5;10 II 53
 Vijayāpura Vijapur III 62

Vidyānagara Vijapur I 51	Sāraṅga Sarangarh III 22
Viṃḍugariri 6;0 I 71	Sāraṅgapura Sarangarh I 150; II 43
Vinnārāma 6;10 II 90	Siṃrauja Sironj I 144
Virāṭ Bairat I 120	Siṃhanada 7;13 II 77
Virāṭa Bairat III 59	Siṃhā 5;0 I 143
Viśālagaḍa Vishalgarh I 43	Siṃdhupura 4;40 I 147
Vikānera Bikaner IV 115; V 9	Siroja Sironj V 28
Vijāpura Bijapur IV 114; V 36	Sironja Sironj III 20
Vurāṃlapura Burhanpur II 41	Sirohi Sirohi III 24
Vedara Bidar IV 82	Sihāḍi Sihora III 21
Vedalo Bedla IV 116	Sītapura Sitapur I 66
Vairāṭa Bairat II 16	Sirohī Sirohi V 15
Vairāṭi Bairat I 121	Sīhanada 7;0 V 21
Vrahāṃnapuri Bramhapuri V 4	Sūrata Surat I 151; II 27; V 27
Śambala Sambhal III 23	Sūrati Surat III 18
Śironja Sironj II 42	Sonapatha Sonapat I 79
Śurera 4;30 I 128	Somanātha Somnath I 148; III 25
Śyāhagaḍh Shahgarh I 147	Somanāthapāttana Somnath I 54
Śrījī Dvāra Dwarka III 37	Solāpura Sholapur II 84
Śrīnagara Srinagar I 153; III 19	Haṃsāra Hissar V 42
Śambhāita Cambay V 18	Haridvāra Hardwar III 58; V 22
Samarakaṃḍa Samarkand I 63	Halavada Halvad II 14
Samala Simla I 146	Hastanāpura Hastinapur II 47; III 57
Samasāvāda Samasata I 145	Hastināpura Hastinapur I 154
Sarasapattana Sirsa I 65	Hājīpura Hajipur II 55
Sarjhara 6;30 I 73	Hīmsāra Hissar I 77
Sahasrāṃva Sasaram I 152	Hisāra Hissar II 81
Sāgānera Sanganer V 20	Hūkerī Vinnārāma 6;10 II 90

Appendix B. Index of Identified Cities

Abhanpur 21;5° 4;38

I 162 has correctly 4;36; IV 12 has 6;13.

Agra 27;9° 6;9

II 67, III 42, IV 1, and V 2 all have 6;0; I 159 has 6;30.

Ahmedabad 23;3° 5;6

IV 4 (Amadāvāda) has 5;6, while II 88 (Ahamadāvāda), III 41 (Amadānagara), and V 40 (Ahamadāvāda) all have 5;0. I 158 (Ahamadābāda) has by mistake 5;31 (cf. 6;30 for 6;0 in I 159). Inexplicably III 47 (Amadāvāda) and IV 11 (Ahamadānagara) have 4;49, and I 156 (Amadābāda) has 4;36. Note that the noon equinoctial shadow at Ahmad is 5;15, while that at Ahmednagar is 4;10; possibly III 41 refers to the former of these two, and IV 11 to the latter.

Ajmer 26;29° 5;59

I 59 and V 5 have 6;0; I 157 has 5;52; II 51 has 5;50; and III 46 and IV 3 have a difficult 5;45.

Allahabad 25;57° 5;51

I 104, III 63, and V 37 all have 5;45, while IV 79 has 5;42.

Ambala 30;19° 7;1

Presumably 5;51 in II 83 is a mistake for 6;51.

Amber 27;0° 6;7

V 19 has 6;0, and III 44 has 5;55; presumably the 5;45 in IV 2 and the 5;25 in III 74 are mistakes for 5;55.

Asirgarh 21;31° 4;44

IV 6 has 4;30.

Aurangabad 19;52° 4;20

I 164 has 4;30; the 3;55 in III 43 is an error.

Ayodhya 26;47° 6;4

I 155, II 60, IV 8, and V 23 all have 6;7, for which the 5;7 in III 48 is clearly a mistake.

Bagru 26;49° 6;4

IV 89 has 5;53.

Bahraich 27;35° 6;16

IV 120 has 7;30 by mistake for 6;30.

Bairat 27;27° 6;14

I 120, II 16, and III 59 have 6;27, which therefore should be read in place of 6;0 in I 121.

Balapur 20;40° 4;32

II 37 has 4;25.

Balasure 22;48° 5;3

At II 36 is written 4;38, though that number belongs to II 35.

Balkh 36;46° 8;59

The length of this, as of most other northern noon equinoctial shadows, is too low in our texts. I 119, III 60, and V 46 all give 8;7.

Bareli 23;0° 5;6

IV 97 gives 5;10.

Baroda 22;19° 4;56

II 87 has 4;54, while I 118 and IV 107 have 4;52.

Bedla 24;41° 5;31

IV 116 has a truncated 5;0; cf. IV 51.

Bhakkar 31;40° 7;24

Read 7;25 for the 8;25 in IV 99.

Bhilsa 23;30° 5;13

I 115 has a correct 5;6, but II 1 an impossible 5;45.

Bhuj 23;12° 5;8

IV 31 has 5;8.

Bidar 17;56° 3;53

I 109 and IV 82 both have 3;45; this may be what lies behind the 4;15 in I 50.

Bijapur 16;52° 3;38

IV 114 has 3;38, and both I 114 and IV 105 a truncated 3;30. II 89 has 3;41.

Bikaner 28;1° 6;23

The length appears in a truncated form in IV 115 and V 9 (6;0), and in IV 106 as 7;0 by mistake for 6;0. No number is recorded at I 117.

Bilara 26;10° 5;54

IV 85 has 5;40.

Bramhapuri 20;36° 4;31

V 4 has correctly 4;30; the 5;20 in I 90 should be corrected to 4;20.

Broach 21;40° 4;46

II 86, III 72, and IV 100 all have 4;48, for which the 4;8 in I 123 is a simple error; I 62 and V 17 have 4;51.

Bundi 25;28° 5;43.

I 111, III 50, and IV 84 all have 5;30, for which the 5;20 in V 26 is an error.

Burhanpur 21;18° 4;40

I 110 has 4;31 while II 41, III 61, and IV 93 have 4;30.

Calcutta 22;35° 5;0

I 175 has 5;0.

Cambay 22;19° 4;55

I 68 and V 18 have 4/51 while II 30 and III 71 have 4;59.

Chanda 19;58° 4;22

No number is entered at II 26.

Chanderi 24;49° 5;45

II 46 has 6;0, for which the 5;0 in I 33 and the 4;0 in IV 42 are presumably errors.

Chatsu 26;32° 6;0

IV 43 has 5;55, I 32 has 5;45.

Chaul 18;35° 4;2

I 31 and IV 41 have 4;0, for which the 5;0 in II 92 is an error.

Chitorgarh 24;54° 5;34

I 34, III 39, IV 44, and V 25 all have 5;30.

Chitrakut 25;13° 5;39

I 57 has 5;30.

Cuttack 20;26° 4;28

II 163 has 4;27.

Dabhoi 22;8° 4;53

I 87, III 16, and IV 64 all have 5;0.

Damao 20;25° 4;28

III 14 has 5;25 by mistake for 4;25; the same error may lie behind the 5;45 in I 88 and II 5.

Darbhanga 26;10° 5;54

I 130 has 6;0, II 75 has 6;6, and III 30 and IV 90 have 6;8.

Daulatabad 19;57° 4;22

I 52 has 4;25 while IV 62 has 4;15 and I 84 has 4;11. In III 12 is 3;30, perhaps by mistake for 4;30. No number is entered in I 101.

Delhi 28;40° 6;34

IV 60 and V 48 have 6;30, for which the 6;3 in II 24' and the 6;0 in I 42 are probably mistakes. The 6;24 in III 17 may be an error for 6;34; cf. I 56.

Deogarh 25;31° 5;44

I 85 and IV 63 both have the truncated 5;4, while II 19 and II 38 both have 4;4; this is either a mistake for the already mistaken 5;4 or an error for 5;44. Presumably the 6;4 in III 13 is a mistake for 5;4. Possibly, then, all five entries go back to a single original in which 5;4 was written instead of 5;44.

Dhaka 26;41° 6;2

Here I 4, II 39, III 73, and IV 57 all have 6;20, probably a mistake for 6;2 that occurred in their common source.

Dhamoni 24;11° 5;23

IV 72 has 4;4, which may an error for 5;44, though even that is not very close to the required length of the noon equinoctial shadow.

Dhanepur 27;13° 6;11

I 91 has 6;30.

Dharmjaygarh 22;27° 4;58

I 93 has 5;10.

Dholka 22;42° 5;1

I 89 and IV 71 have 5;2.

Diu 20;41° 4;32

II 11 has the incomplete entry 5, whose interpretation is not clear.

Dohad 22;48° 5;2

II 76 and IV 70 have 4;4 as an error for 5;4; I 86 has further corrupted it to 4;40. Again these texts share a common, corrupt source.

Dungarpur 23;53° 5;19

III 75 has 5;30, for which the 5;3 in IV 56 is an error.

Dwarka 22;15° 4;54

The 5;20 in III 37 is not very close.

Dwarkaganj 26;20° 5;56

I 83, II 6, III 15, IV 61, and V 24 all have 6;5, again showing a common source. If 6;5 were an error for 5;5, they might be referring to Dwarka instead of Dwarkaganj.

Etawah 26;46° 6;3

I 167 has 6;0.

Fatehpur 25;56° 5;50

V 52 has 5;54.

Gadhra 20;53° 4;35

IV 32 has 4;32.

Gadra 26;26° 5;58

III 53 and IV 26 have 6;6.

Gahora ca. 25° ca. 5;36

I 24 has 5;45, IV 33 has 5;47, and II 65 has 5;57.

Gandevi 20;48° 4;34

II 35 has 5;47, but the correct 4;38 is found in II 36.

Gaur 24;54° 5;34

I 25 has the rather incorrect 5;10.

Gaya 24;48° 5;33

II 66 has 4;32 in error for 5;32; I 26 has 5;50.

Goa 15;31° 3;20

I 19 has 3;0, for which the 6;0 in II 85 is a mistake.

Gogha 21;40° 4;46

Neither the 6;0 of III 52 nor the 3;0 of IV 37 makes any sense except as an error for 5;0.

Goh 24;59° 5;36

I 133 has 5;45.

Gokul 27;27° 6;14

IV 38 has 6;0 and I 29 has 5;55.

Golconda 17;22° 3;46

Both I 20 and IV 39 have 3;45.

Golegaon ca, 20;26° 4;28

IV 40 has 4;10, for which the 4;0 in I 21 is a mistake.

Gorakhpur 26;45° 6;3

I 28 has 6;8.

Gotaru 27;18° 6;12

There is no entry in I 59.

Gujarat 32;35° 7;40

The 4;48 in I 30 is probably an error for 7;48; and perhaps the 5;24 in V 7, for which the 5;20 in II 15 is an error, is a mistake for 7;24.

Gwalior 26;12° 5;54

Independently derived are the 5;51 in IV 23, the 5;58 in V 35, and the 6;0 in IV 27.

Hajipur 25;41° 5;46

II 55 has 5;45.

Halvad 23;2° 5;6

The 5;20 in II 14 may be an error for 5;2.

Hanumangarh 29;33° 6;48

The 6;26 in V 43 is rather far off.

Hardwar 29;58° 6;55

The 6;36 in III 58 and in V 22 is also not very good.

Hastinapur 29;9° 6;42

II 47 has 6;31, for which both the 24;31 in III 57 and the 6;30 in I 154 must be errors.

Hissar 29;10° 6;42

II 81 has 6;45, for which the 6;4 in I 77 is probably an error. V 42 has 6;24, where 24 may be the scribe's metathesis of 42.

Hyderabad 17;22° 3;46

I 49 has 3;55, while I 82 and III 51 have 4;4, which may represent an error for 3;44 in a common source. The 5;42 in IV 59 is an error for 3;42.

Ichapur 22;47° 5;2

I 131 has 5;30 while I 169 has 5;45; neither is easily explained.

Idar 23;47° 5;17

IV 13 has 5;20.

Indore 22;42° 5;1

The 5;20 in I 166 may be mistake for 5;2.

Jaisalmer 26;52° 6;5

IV 49 has 6;15. while V 50 has just 5 (for 6;5?).

Jalalabad 27;6° 6;9

The 5;10 in I 40 should be changed to 6;10.

Jalor 25;21° 5;41

V 14 has 5;36, while IV 45 has 5;58.

Jambusar 22;0° 4;51

I 36 and IV 48 agree on 4;58, while II 31 has 4;59; III 70, however, has 4;44.

Jamnagar 22;28° 4;58

IV 75 has 5;5.

Jasrasar 27;43° 6;18

I 48 has 6;30.

Jaunpur 24;44° 5;47

I 39 has 5;47.

Jetpur 21;43° 4;47

IV 50 has 5;52, an error for 4;52; II 64 has 5;6, which may be an error for 4;56.

Jind 29;19° 6;44

I 76 has 7;0.

Jodhpur 26;18° 5;56

III 56 has 5;58, for which the 5;5 in V 11 and the 5;28 in I 132 are errors; more problematical is the 5;3 (5;53?) in IV 46.

Jullundur 31;18° 7;18

I 35 and IV 52 have 7;0; III 69 has 6;5, which must be an error for 7;5.

Junagadh 21;32° 4;45

I 37 and IV 47 both have 5;0; needing drastic emendations are the 5;20 in II 13 and the 5;27 in III 36.

Junnar 19;15° 4;13

IV 53 has 5;0, which presumably is a mistake for 4;0.

Kabul 34;30° 8;15

I 8, II 37, III 8, and IV 45 all have 8;30, for which the 8;48 in IV 21 seems to be an error.

Kalabagh 33;0° 7;30

The 5;30 in I 5 is an error for 7;30.

Kalinjara 23;20° 5;10

The 5;45 in IV 29 is an error - perhaps for 5;4, 5;5, or 5;15.

Kalpi 26;7° 5;53

The 8;0 in IV 30 is probably a mistake for 6;0.

Kaman 27;39° 6;17

IV 24 has 6;0.

Kampil 27;33° 6;16

I 13 and III 6 both have 6;16, for which the 6;15 in II 82 and the 6;0 in IV 28 are probably errors. The 7;22 in II 74 may be a mistake for 6;22, and the 4;54 in II 32 an error for 5;54.

Kancheepuram 12;50° 2;44

I 15 has 2;30 and I 9 has 3;5; perhaps the 3;31 in IV 15 is an error for 2;31.

Kandahar 31;36° 7;23

There are no good entries here, though 2;20 in I 47 may be a mistake for 7;20. Otherwise I 16 and II 59 have 8;0, while IV 25 has 9;55.

Kangra 32;4° 7;31

I 97 has 7;40, for which the 7;4 in IV 74 is an error; III 27 has 7;20.

Kannauj 27;2° 6;8

I 11 and IV 17 have 6;10 while II 68, III 5, and V 33 have 6;0.

Kapadwanj 23;3° 5;6

II 29 has 4;59.

Katmandu 27;42° 6;18

I 44, I 99, III 26, and IV 76 all have 6;25.

Kedarnath 30;44° 7;8

III 2 has 7;2, IV 34 has 7;1, and I 14 has 7;0.

Koregaon 17;44° 3;50

The 4;25 in I 7 is rather far off.

Kota 24;27° 5;27

III 7 has 5;30.

Lahore 31;34° 7;22

I 45, I 137, III 11, and IV 112 all have 7;30, for which the 7;0 in V 3 must be an error. V 39, however, has 5;5.

Langar 32;38° 7;41

I 139, III 10, and IV 119 all have 5;30; this suggests that their common source had that number as an error for 7;30.

Lucknow 26;50° 6;4

IV 113 has 5;48, I 141 has 5;45, I 140 has 5;44, and V 29 has 5;30.

The explanation for this situation is not clear.

Machilpur 26;38° 6;1

II 58 has 5;6, which is an error for either 6;6 or 5;56.

Mahbubnagar 16;45° 3;37

II 9 has 5;25, which may be a mistake for 3;25.

Malpura 26;19° 5;56

II 4 has 6;0.

Mandsaur 24;3° 5;21

II 79 has 5;11.

Mandu 22;22° 4;56

I 67 and I 125 have 4;57, for which the 4;50 in II 40 and the 4;47 in IV 95 are mistakes. The other entries - in II 50, III 31, and IV 94 - are all 5;1.

Mangalore 12;54° 2;46

II 10 has 5;1, which possibly is an error for 2;51.

Mangrol 21;10° 4;39

The 5;1, in IV 96 is not very satisfactory.

Mathura 27;30° 6;15

II 25 has 6;14, and IV 88 has 6;2; in the remaining cases, in I 126, III 32, and V 1, the entry is 6;0.

Merta 26;40° 6;1

V 51 has 5;54, for which the 5;45 in II 49 may be an error; IV 86 has 5;53.

Multan 30;10° 6;58

III 29 has 6;40, which itself is not very good; but V 10 has 6;21, I 129 has 6;0, and IV 98 has 8;30. No explanation for this situation is apparent.

Nabadwip 23;24° 5;12

Rather far off is the 4;47 in I 98.

Nadiad 22;42° 5;1

I 95 and IV 73 have 5;2.

Nagor 27;12° 6;10

V 12 has 5;54, for which the 5;4 in I 55 is probably an error; I 96 and IV 66 have 5;51.

Nagpur 21;10° 4;39

The 5;0 in II 61 is rather far off.

Narela 28;50° 6;36

I 80 has 6;35.

Narwar 25;39° 5;46

IV 65 has 5;45, for which both 5;54 in I 94 and 5;55 in II 2 may possibly be errors.

Nasik 20;0° 4;22

I 46 has 4;24.

Nathdwara 24;55° 5;50

The 6;51 in IV 68 is probably a mistake for 5;51.

Navsari 20;58° 4;36

The 5;4 in II 34 is corrupt.

Nimsar ca. 27;20° 6;12

IV 77 has 5;54, I 100 has 5;47, and III 28 has 5;25. Again there is no clear solution to the problems posed by these numbers.

Pandvapura 12;29° 2;40

The common entry 5;1 is found in I 107 and IV 102; perhaps some other locality is intended.

Panipat 29;24° 6;46

I 78 has 6;50.

Pathari 22;48° 5;2

The 4;30 of I 103 is quite far off.

Pāti 21;55° 4;50

IV 104 has 4;15, perhaps as an error for 4;51 or for 4;55.

Patiali 27;41° 6;18

I 56 has 6;24.

Patna 25;37° 6;1

IV 80 and V 49 have 5;45, for which the 4;45 in III 64 is an error.

Pauni 20;45° 4;33

I 106, II 20, and III 66 all have 4;30.

Peshawar 34;1° 8;6

It is unclear why IV 81 has 6;30 and I 102 has 4;20.

Pilu 24;43° 5;32

I 70 and V 30 have 5;20.

Poona 18;34° 4;2

I 173 has 4;0, it is possible that the 4;45 in I 41 is an error for this.

Prakasha 21;30° 4;44

III 65 has 4;51, for which both the 4;5 in I 105 and the 4;41 in IV 101 are probably errors.

Puri 19;49° 4;20

II 62 has 4;24 while III 68 has 4;45, perhaps by mistake for 4;25; but 5;45 in IV 103 seems to be an error for 4;45, while 5;44 in I 108 may be the same. The 5;30 in I 72 is probably a mistake for 4;30.

Pushkar 26;28° 5;58

III 67 has 5;52.

Raipur 24;34° 5;30

I 136 has 5;30.

Rajewadi 18;26° 4;0

The 6;57 in I 113 is an error for 3;57.

Raj Mahal 25;56° 5;50

I 142 has 5;25, which may be a mistake for 5;52; so 'also might be the 5;5 in IV 109. More difficult to explain is the 6;36 in I 75.

Rajpipla 21;49° 4;48

I 134 has 4;44.

Rameswaram 9;18° 1;58

IV 108 has 1;30, for which the 0;30 in I 135 is an error.

Ramnagar 22;36° 5;0

II 8, III 33, and IV 118 all have 5;0.

Rampur 23;11° 5;8

V 16 has 5;18.

Ranthambhor 26;4° 5;52

I 138, III 35, and IV 111 all have 5;30, which may represent an error in their common source.

Ratanpur 21;43° 4;47

II 28 has 5;52, which is probably an error for 4;52.

Rohtak 28;57° 6;38

V 13 has 6;34, II 71 has 6;30, III 34 has 6;29, and IV 110 has 6;27.

Sagar Island ca. 21;48° 4;48

I 18 and III 55 have 4;56, while the 6;0 in IV 36 is probably an error for 5;0.

Samarkand 39;40° 9;57

I 63 has 10;3.

Samasata 29;20° 6;44

I 145 has 6;50.

Sambhal 28;35° 6;32

The 5;21 of III 23 may be an error for 6;21.

Sanganer 26;48° 6;4

V 20 has 6;0.

Sarangarh 21;38° 4;45

III 22 has 4;52, and II 43 has 4;56, but I 150 has the difficult 5;12.

Sasaram 24;58° 5;35

I 152 has 5;17.

Shahgarh 27;8° 6;9

the 4;28 of I 147 is either corrupt or pertains to a different locality.

Sholapur 17;43° 3;50

II 84 has 3;38.

Sihora 23;28° 5;12

III 21 has 5;20.

Simla 31;7° 7;4

The 6;3 of I 146 may be an error for 7;3.

Sirohi 25;53° 5;49

The 5;30 of III 24 and V 15 is rather far off.

Sironj 24;5° 5;22

I 144 has 5;18, for which the 5;48 of III 20 and the 4;48 of II 42 and V 28 are both mistakes.

Sirsa 29;32° 6;48

I 65 has 6;50.

Sitapur 27;33° 6;16

The 4;40 of I 66 is corrupt.

Somnath 20;50° 4;34

All of the entries are corrupt. For 5;35 in I 61 read 4;35; for 5;6 in I 54 and I 148 read 4;36; and for 5;39 in III 25 read 4;39.

Sonepat 29;0 6;39

I 79 has 6;40.

Srinagar 30;12° 6;59

I 153 and III 19 have 6;46.

Srinagar 34;8° 8;8

V 38 has 8;38 (for 8;8 ?), III 4 has 8;20 (for 8;2 ?), I 6 and IV 20 have 7;52, and II 72 has a corrupt 7;30.

Surat 21;10° 4;39

III 18 and V 27 have 4;44, II 27 has 4;45, and I 151 has 4;47.

Tajpur 25;51° 5;49

I 81 has 5;45, and IV 78 has 5;42.

Tatta 24;44° 5;32

V 34 has 5;36, for which the 6;6 in II 7 and II 18 be an error.

Thanesar 29;59° 6;56

I 60 and V 31 have 6;55. I 12 and IV 19 have 6;36, which may be an error in their common source for 6;56 as may be the 6;46 in III 3. The 6;30 in II 69 and II 70 may be a secondary error for 6;36.

Tilhar 2757° 6;22

IV 69 has 5;10, which is presumably an error for 6;10.

Toda Bhim 26;52° 6;5

IV 55 has 6;10. The 5;30 in III 40 is a mistaken repetition of the 5;30 in III 39.

Tonk 26;10° 5;54

IV 54 has 6;15, which is perhaps a mistake for 6;5.

Uch 29;18° 6;44

II 54 has 5;3; is this an error for 6;53?.

Udayapur 23;55° 5;19

III 38 and IV 5 have 5;20, for which the 5;30 in I 168 is probably an error.

Ujjain 23;11° 5;9

Most entries - in I 1, I 160, II 78, III 45, IV 10, and V 6 - are 5;0, but I 53 has 5;2.

Umarkot 25;22° 5;42

III 49 has 5;35, for which the 5;25 in I 161 and IV 9 is probably an error.

Vadnagar 23;48° 5;18

II 80 has 5;20, while there is no entry in I 116.

Varanasi 25;20° 5;41

V 47 has 5;42, while III 1 and IV 16 both have 5;45.

Vijapur ca. 18;46° 4;5

I 51 and V 36 have 4;0, while III 62 has 3;54.

Vishalgarh 16;55° 3;39

I 43 has 3;45.

Wai 17;57° 3;53

I 174 has 3;55.

Appendix C. Latitudes corresponding to noon equinoctial shadows

Shadow	Latitude	Differences
0	0°	0;28°
0;6	0;28°	0;29°
0;12	0;57°	0;29°
0;18	1;26°	0;29°
0;24	1;55°	0;28°
0;30	2;23°	0;29°
0;36	2;52°	0;28°
0;42	3;20°	0;29°
0;48	3;49°	0;29°
0;54	4;18°	0;28°
1;0	4;46°	0;28°
1;6	5;14°	0;29°
1;12	5;43°	0;29°
1;18	6;11°	0;28°
1;24	6;39°	0;29°
1;30	7;8°	0;28°
1;36	7;36°	0;28°
1;42	8;4°	0;28°
1;48	8;32°	0;28°
1;54	9;0°	0;28°
2;0	9;28°	0;28°
2;6	9;56°	0;27°
2;12	10;23°	0;28°
2;18	10;51°	0;28°
2;24	11;19°	0;27°
2;30	11;46°	0;27°
2;36	12;13°	0;28°
2;42	12;41°	0;27°

Shadow	Latitude	Differences
2;48	13;8°	0;27°
2;54	13;35°	0;28°
3;0	14;3°	0;26°
3;6	14;29°	0;26°
3;12	14;55°	0;27°
3;18	15;22°	0;27°
3;24	15;49°	0;27°
3;30	16;16°	0;26°
3;36	16;42°	0;26°
3;42	17;8°	0;26°
3;48	17;34°	0;26°
3;54	18;0°	0;26°
4;0	18;26°	0;26°
4;6	18;52°	0;26°
4;12	19;18°	0;25°
4;18	19;43°	0;25°
4;24	20;8°	0;25°
4;30	20;33°	0;25°
4;36	20;58°	0;25°
4;42	21;23°	0;25°
4;48	21;48	0;25°
4;54	22;13°	0;24°
5;0	22;37°	0;25°
5;6	23;2°	0;24°
5;12	23;26°	0;24°
5;18	23;50°	0;24°
5;24	24;14°	0;23°
5;30	24;37°	0;24°

Shadow	Latitude	Differences
5;36	25;1°	0;23°
5;42	25;24°	0;24°
5;48	25;48°	0;23°
5;54	26;11°	0;23°
6;0	26;34°	0;23°
6;6	26;57°	0;22°
6;12	27;19°	0;23°
6;18	27;42°	0;22°
6;24	28;4°	0;22°
6;30	28;26°	0;23°
6;36	28;49°	0;22°
6;42	29;11°	0;21°
6;48	29;32°	0;22°
6;54	29;54°	0;21°
7;0	30;15°	0;22°
7;6	30;37°	0;21°
7;12	30;58°	0;21°
7;18	31;19°	0;21°
7;24	31;40°	0;20°
7;30	32;0°	0;21°
7;36	32;21°	0;20°
7;42	32;41°	0;20°
7;48	33;1°	0;20°
7;54	33;21°	0;20°
8;0	33;41°	0;20°
8;6	34;1°	0;20°
8;12	34;21°	0;19°
8;18	34;40°	0;20°

8;24	35;0°	0;19°
8;30	35;19°	0;19°
8;36	35;38°	0;19°
8;42	35;57°	0;18°
8;48	36;15°	0;19°
8;54	36;34°	0;19°
9;0	36;53°	

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