19 · Conclusion

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Bagrow was incorrect when he stated that "no one in India seems to have been interested in cartography."[1] So too were other historians of cartography who, echoing Bagrow, at various times expressed similar opinions. The four preceding chapters on South Asia make this judgment evident. Nevertheless, Bagrow was merely reflecting the conventional wisdom of his day. The reasons for that widely accepted viewpoint are not far to seek. First, there was a pervasive ignorance of the surviving cartographic corpus and an even more profound ignorance of works that no longer exist. This ignorance stemmed from several causes: (*a*) the loss of untold numbers of cartographic artifacts through decay and through accidental and intentional destruction;[2] (*b*) the unavailability of many relevant artifacts that are without a doubt stored among the personal possessions of families in many parts of South Asia;[3] (*c*) the disdain that British colonial officials and other Europeans came to develop for such indigenous cartography as they did know about, once they were able to make more accurate maps on their own;[4] (*d*) the failure, until very recently, of indigenous and foreign scholars to give the history of South Asian cartography the attention it warranted;[5] and (*e*) the general inability of nonindigenous scholars to read South Asian languages and pursue research accordingly. Second, and closely related to this massive ignorance, is the question of culture blindness or, at the very least, obtuseness on the part of foreign scholars of South Asia, even when they are sympathetically disposed toward the region. The conception of what merited the designation "map" and thereby was worthy of study by historians of cartography was often excessively narrow and failed to encompass many items that I have considered maps in this discussion. Works that did not resemble known European models elicited little or no interest and were viewed as beyond the pale of cartographic research. This was particularly the case with cosmographies. The uninitiated non-South Asian scholar would have no way of recognizing as a map some of the most interesting creations that I have called attention to: the anthropomorphic representations of the vertically ordered Jain cosmos (plate 28 and fig. 16.29), maps of the sacred region of Braj in the form of a lotus (figs. 17.20 and 17.21), maps of the environs of the great Jagannath temple in Puri in the shape of a conch (plate 36), the rhomboidal mandala map of Bhaktapur (fig. 17.46), and the geometric Rajasthani divination charts guiding their users to auspicious and inauspicious localities at times of particular astrological influences (figs. 16.12 and 16.13).

In the foregoing chapters I have considered literally hundreds of maps, a vastly greater corpus than I imagined existed when I began research on this project nearly a decade ago.[6] A relatively small fraction of that corpus had received any notice, not to mention serious analysis, by historians of cartography. For most of the works that have been studied and published we are in the debt of historians of art and religion. Although their concerns and methods of analysis differ from those of historians of cartography, they have nevertheless greatly enriched our understanding of South Asian maps, broadly conceived. Regrettably, the distribution of the surviving corpus is very uneven, from both a temporal and a spatial perspective.

As might be expected, few cartographic artifacts survive from the remote past. Works from before the seventeenth century are rare. They include a few cosmographies, the oldest dating from the years 1199–1200,

1. Leo Bagrow, *History of Cartography*, rev. and enl. R. A. Skelton, trans. D. L. Paisey (Cambridge: Harvard University Press; London: C. A. Watts, 1964; reprinted and enlarged, Chicago: Precedent Publishing, 1985), 207.

2. See above, pp. 327–30.

3. The recent discovery in Orissa of numerous centuries-old palm-leaf manuscripts containing richly detailed architectural drawings illustrates how materials of great value may suddenly come to light even though there was no prior intimation of their existence. Discoveries of this type are commonplace in India, and there are millions of old, unstudied manuscripts in private hands throughout South Asia.

4. See above, esp. p. 327.

5. The published writings on indigenous South Asian cartography are reviewed above. Susan Gole's *Indian Maps and Plans: From Earliest Times to the Advent of European Surveys* (New Delhi: Manohar Publications, 1989) is the first book-length study of traditional indigenous cartography.

6. In a letter to David Woodward, dated 23 April 1980, I hazarded a guess that I would require "not more than 3,000 words" to set down all I could readily gather about indigenous South Asian maps. At that time the editors of this history did not yet contemplate an entire volume devoted to the traditional cartography of Asia and North Africa.

and not a single topographic map, city plan, or navigation chart. In the case of cosmographies, however, the textually based models according to which they were drawn are all much older than the seventeenth century, and it is reasonable to assume that many similar works of considerable antiquity were made, only to succumb to the ravages of time. Whether a comparable judgment can be made for other forms of maps is less certain. Despite numerous allusions to maps in literary texts and historical records, their descriptions are too fragmentary to enable us to form a very clear image of how they might have looked.[7] Apart from cosmographies, this leaves us with very little: a certain number of undatable maplike graffiti on the walls of central Indian caves;[8] a few potsherds of the second or first century B.C. on which are inscribed what appear to be the rooms of ancient Buddhist monasteries (fig. 15.10); the plan, carved in stone, for a large unfinished eleventh-century temple in Madhya Pradesh;[9] and most important perhaps, the detailed architectural drawings from an Oriya architectural text dating from about the twelfth century.[10] What makes that text and later (early seventeenth-century) architectural texts from the same region particularly noteworthy is that they prove—as common sense alone suggests—that the stupendous, as well as the not-so-magnificent, monuments of Indian architecture were built to the specifications of plans that were actually drawn rather than merely envisaged. That is also true for the construction of the *vedi*s (altars) on which elaborate sacrifices were performed. Whether the same can be said about the building of towns is more problematic, since, with such notable exceptions as Madurai and Jaipur, their present layouts rarely suggest that their founders followed the instructions set down in the *śilpaśāstras*. However, the archaeological remains of the gridded cities of the Indus civilization (dating from as far back as the mid-third millennium B.C.) and also of certain later cities such as Taxila strongly lead one to believe that town planning was accomplished with the aid of formally drawn plans.[11]

What is particularly remarkable about "traditional" Indian and Nepali cartography is that it continues to be produced to this day. This is evident not only with respect to the cheap printed pilgrimage maps that one may obtain at so many of India's holy cities, but also in the persistence of hereditary groups of artists who derive their livelihood from meeting the iconographic needs of certain major temples, such as Jagannath and Nathdwara. Jain monks must still learn to paint richly detailed cosmographies as a part of their monastic training, and oblique, maplike views of the more important sacred *tīrtha*s of the Jains are still painted on the walls of modern Jain temples.

The regional distribution of surviving traditional South Asian maps is most uneven. Kashmir is without question the best covered area, in both absolute and relative terms. Rajasthan, especially the former princely state of Jaipur, was also relatively well mapped; and if one considers the variety and accuracy of its maps along with their number, it may be regarded as the premier region of South Asian cartography. Mughal maps, mainly from north-central India; Maratha maps, mostly relating to military needs and in a few cases to questions of land ownership and revenue; and Nepali maps (even excluding those to be considered in the discussion on Greater Tibet in volume 2, book 2 of *The History of Cartography*) are also fairly numerous. Otherwise coverage is perplexingly spotty. While the relative preeminence of the regions and peoples mentioned is presumably real, rather than being due mainly to the accidents of survival, the latter factor obviously has a bearing on what is known to us. The most glaring lacuna among the areas for which we have traditional maps is Bengal. This is all the more remarkable in light of Bengal's high level of cultural development, including a literary heritage that is arguably the richest in India (though much of it dates from the period since the British conquest). The four southern states of India, in which Dravidian peoples predominate, and the neighboring region of Sri Lanka are also culturally advanced regions from which very few maps survive. Although Karnataka offers a partial exception to this generalization, much of what survives from that state is of either Maratha or Muslim rather than indigenous Dravidian authorship. The same may also be said of the Pakistani regions of Punjab and Sind.

Several factors must be taken into account in explaining these regional disparities. In the case of Bengal and the South, the long duration of foreign rule is almost certainly a factor. We know from British and French accounts that Europeans made use of Indian maps in gaining knowledge of the country or engaged Indians to make maps for them. We know too from the register of maps held in various offices of the Bengal Presidency and

7. A number of such references were provided in the introductory chapter on cartography in South Asia. Many additional references will be found in the several works by Maya Prasad Tripathi cited in that chapter. Because of Tripathi's inclination to read more into his sources than I believe in many cases is warranted, I have elected not to provide complete coverage of his references to ancient maps, many of which in any event can be confirmed only by someone with a good knowledge of Sanskrit.

8. See above, pp. 304ff.

9. See above, pp. 318–19.

10. See above, p. 466.

11. The definitive work on Taxila (ancient Takṣaśilā), in the north of the present Pakistani province of Punjab is John Hubert Marshall, *Taxila: An Illustrated Account of Archaeological Excavations Carried out at Taxila under the Orders of the Government of India between the Years 1913 and 1934*, 3 vols. (Cambridge: Cambridge University Press, 1951); a detailed plan appears in vol. 3, pl. 1.

from Wilson's catalog of the Mackenzie Collection that scores, if not hundreds, of now vanished Indian maps were collected and, for a time, preserved.[12] But it appears, as already noted, that British disdain for indigenous cartography militated against efforts to preserve what had been gathered by early collectors and very likely resulted in the wholesale discarding of "inferior" native productions. In contrast to the British, the royal patrons of princely states, especially in Rajasthan, encouraged the making and saving of maps both for utilitarian purposes and as works of art. Similarly, certain religious communities, most notably the Jains, who were concentrated in Rajasthan and Gujarat, encouraged the making not only of cosmographies, but also of maps of places of pilgrimage. Further, certain temples, as we have seen, gave rise to what were in effect schools of religious mapmakers. Climatic differences are also a factor. The hot, wet conditions of Bengal and the southern coastal regions favor the breeding of vermin and the accumulation of mildew, which destroy palm leaf, paper, and cloth. Conversely, the relatively dry areas of Rajasthan and the cooler air of Kashmir would favor map preservation.

Finally, we must reckon with the differential research opportunities presented by different areas of South Asia. The base from which Susan Gole, an Indian citizen, and I operated, while carrying on research in India, was New Delhi. Locales within relatively easy reach of that city, especially Rajasthan, were the objects of more thorough investigation than were southern and eastern India. For political reasons, it was not possible to carry on research in either Pakistan or Afghanistan. Nor did we visit Bangladesh and Sri Lanka, since inquiries suggested that the returns from study there would not warrant the requisite investment of time and money. It is noteworthy, however, that for all four of these neglected countries I discovered little or nothing during visits to museums and libraries in the United States and Europe that have rich holdings on South Asia.

In organizing the materials to be discussed, my strategy was to proceed along a continuum from the universal to the highly local. Thus I began with a consideration of cosmography, including astronomy, and discussed in turn world maps, regional topographic maps, route maps, relatively large-scale maps of small areas, and finally, architectural drawings; or to put the matter differently, maps of boundless three-dimensional space (or even four-dimensional space-time), bounded three-dimensional space, areas, lines, and "points" (relatively small areas) of larger and smaller size. Although this might appear eminently logical from a Western cartographic perspective, one may question that it was the wisest choice from an Indian cultural point of view. To a devout Hindu, a sacred space, whether a great religious city such as Varanasi or a mandala at a family altar, can be seen as the embodiment of the entire cosmos, and the conceptual transmutation of finite, directly sensed objects into the infinite is a religious end that many Indians seek to attain in certain ritual practices. This was evident in the discussion of the religious maps of Kāshī (Varanasi) or Bhaktapur (in Nepal); in the latter the deities depicted in the mandala represented not only actual shrines in the city, but also the gods themselves in an all-encompassing pantheon. Similarly, the petals in the various lotus maps portraying the region of Braj stood not only for various combinations of real and mythic places but, in the aggregate, for the entire cosmos. Moreover, although I classified all the Braj maps as "topographic" in that they related to a well-known, circumscribable region, the true purpose of the maps, however varied their form (contrast the maps in fig. 17.20 and plate 31), was to serve as route maps for Krishna devotees making the *chaurāsī krosh* pilgrimage, whether physically or as a sedentary mental quest.

Culturally, South Asia is not all of a piece. Although Hindus predominate numerically, certain areas are overwhelmingly Islamic, and more than a millennium of Islamic presence has put an indelible stamp on much of the region. Other religious traditions are also present. Thus, to have attempted to cast the discussion in such a way as to make it most consonant with a Hindu worldview would necessarily run counter to other worldviews represented in the region. Because culture in South Asia is to such a large extent religiously defined, it is hardly surprising that much of the cartography of the region is religiously inspired. This is particularly true of the Hindu and Jain cosmographies and also holds for maps of sacred places. But even on secular maps, religious sites and structures tend to be given prominence that would appear inordinate in modern cartography. Some tendency toward regional styles is also evident. Jaipuri maps from Rajasthan do not closely resemble those made by Marathas, though both fall within the Hindu tradition, and Kashmiri maps, whether made by Muslims or by Hindus, are also distinctive.

With respect to influences from neighboring regions on the style and content of South Asian maps, we are not yet in a position to make definitive statements. Cartographic influences from Tibet seem to have played a great influence in Nepal and Himalayan India, but there is no clear evidence of any significant effect on South Asian cartography due to contact with China proper or other parts of East or Southeast Asia—despite more than two millennia of cultural and economic intercourse among those regions and the occasional historical records of maps' having been sent from one region to another. On the other hand, the influence of Hinduism and especially

12. See above, p. 302.

Buddhism on the cosmological thinking of East and Southeast Asia was profound, and Buddhist cosmographies abound in their cartographic corpus.

Somewhat surprising is the seemingly minor role exercised by Southwest and Central Asia (excluding Tibet) in shaping the cartography of the Indian subcontinent and the even smaller influence, if any, in the opposite direction. There can be no question, of course, that the world map of Ṣādiq Iṣfahānī is derived from a Persian prototype; it is clear that the other Islamic world maps we have considered incorporate certain elements from the cartography of regions to the west. Examples include the seven *aqālīm* (climes), the all-encompassing sea, and the mythical land of Gog and Magog, the Wall of Alexander, and the Mountains of the Moon. Yet one wonders that there was not even more exchange and marvels at the seeming immunity of Hindu mapmakers, such as they were, to Islamic influences. In his article on Mughal cartography, Habib cites no obvious debt of Mughal mapmakers, other than Ṣādiq Iṣfahānī, to their coreligionists elsewhere in Asia.[13] Nor have I independently come across such evidence in respect to topographic mapping at any scale. Concerning nautical charts, there does appear to be a sharing of traditions between Indian navigators and those of the Middle East. Although Tibbetts argues that true nautical charts were not employed by Asian navigators, a number of Indian navigation charts have recently been discovered, one set dating back at least as far as 1644.[14] Although there are grounds to suppose that the Indian charts were derived from Arabic prototypes, one should not rule out transmission in the opposite direction.

A priori, there are strong reasons to believe that, from the seventeenth century onward, the influence of Europeans on indigenous South Asian cartography, apart from modern printed maps, was substantial; yet, with only a few exceptions, we cannot establish firmly the times, places, and agencies through which ideas were transmitted. Sir Thomas Roe, who presented the Mughal emperor Jahāngīr an atlas and, in all probability, a painting of Queen Elizabeth standing on a globe, very likely played a role, though the evidence suggests that the atlas was little understood at the time. The Jesuit missionary, Monserrate, who was also at the Mughal court, and other Jesuits who interacted with the scientifically minded Sawai Jai Singh II in both Jaipur, his capital, and Varanasi, where he had also established an astronomical observatory, were probably even more influential. And European military advisors to various Indian states, whether acting as agents of their home governments or of chartered trading companies or functioning as mercenaries, could well have played the greatest role of all, influencing the making of maps first for military purposes and then, indirectly, for more general use. Among these advisors perhaps none was more important than Colonel Gentil, whose long sojourn in Oudh resulted in the remarkable Gentil Atlas (fig. 17.25). A final influence was European painting of landscapes and cityscapes that the court artists in various Indian states were enjoined to emulate. A great deal more archival research will be required before we can specify the lines of transmission of cartographic information.

A number of generalizations may now be about the style and content of traditional South Asian maps. Of cosmographies we may note that their complexity and temporal and spatial scales are far greater than those produced in Europe, that their influence has been more pervasive and enduring, and that they constitute a much greater proportion of the total corpus than is true in the West. Since the dominant alignment of the cosmos of the Hindus, Buddhists, and Jains is vertical, the axis in all cases being provided by Mount Meru, one must condition oneself to seeing many cosmological maps as projected onto a vertical plane, rather than the horizontal plane that has become standard for most modern terrestrial mapping. Many specific elements of the cosmos, however, such as the Jain *adhai-dvīpa* (two-and-a-half-continent) world of man are customarily depicted on a horizontal plane. Although notations as to the dimensions of various elements of the cosmos are often inscribed on the painted cosmographies, the images themselves are almost never scaled proportionally to the figures given, because the geometric progressions commonly employed tend to make a "true" scale representation impracticable.

Terrestrial maps from South Asia also frequently contain numerical designations of distance or of the size of specific features portrayed; but the maps themselves seldom display much concern for scalar fidelity in a geometric sense. Gole has this to say about the rich assemblage of works that she illustrates in *Indian Maps and Plans:*

> None of the maps carry a scale. To those used to maps developed in the West, this may seem to preclude their usefulness for the geographer or traveller. But those who made them seem to have had their own idea of scale, based not on distance but on importance. On the map of Gujarat in the Baroda Museum, the town of Ahmedabad covers a vast area, if the map were drawn on a European idea of scale. Some of the villages too, especially those noted for something special, perhaps the strain of bulls bred there, are drawn larger than one might expect. This reflects a scale of importance rather than measurement, where it is necessary to know the intent of the map-maker, and not

13. Irfan Habib, "Cartography in Mughal India," *Medieval India, a Miscellany* 4 (1977): 122–34; also published in *Indian Archives* 28 (1979): 88–105.

14. These issues are discussed above, chaps. 13 and 18.

> treat the map as an objective item that can have only one interpretation.[15]

Nor does any Indian map, except those of Ṣādiq Iṣfahānī's atlas, have a geographic grid. Only a handful have compass roses (an innovation derived from Europe), though many note cardinal directions at or near the four edges of the map. Relatively few include a neat line. While the size of many maps was such that they had to be drawn on several pieces of paper or cloth and joined together to make up the entire composition, the idea of a map series of sheets covering adjacent or slightly overlapping areas was seldom employed. Exceptions were the already noted Ṣādiq Iṣfahānī atlas and, arguably, the atlas of Kashmir *pargana* maps contained in the *Tārīkh-i qalʿah-i Kashmīr* (fig. 17.16). How well the individual *pargana* maps relate to one another, however, has not been tested. A third map series is the set of Nepalese revenue maps now included in the Hodgson Collection, India Office Library and Records, London (fig. 17.27). Whether this polyglot work deserves to be regarded as truly indigenous is open to question; but the resemblance of its maps to the few known Maratha maps relating to landownership and revenue assessment suggests the possible existence of a widespread genre before the British presence.

Standard symbols were not characteristic of traditional South Asian maps. This is hardly surprising in light of their strong reliance on pictorial representations, along with text, to identify features of particular interest. Although a fair degree of standardization does seem to have marked the Kashmir atlas, on many other works that do use more or less abstract symbols there is no great consistency from one part of the map to another. Nevertheless, as figure 17.8 makes clear, there did seem to be emerging—on topographic maps at any rate—a set of conventions for representing various features, especially settlement, and the notion of portraying a settlement hierarchy had definitely taken hold. Color was also effectively used to show both the nature and the relative importance of certain features. Red and yellow (or gold) were often used to highlight important places, especially cities and towns and their major edifices. Not surprisingly, blue was most frequently used for water and green for vegetation. Mountains were typically shown in brown, orange ocher, or especially on Mughal and Rajasthani maps, in mauve, a color much used in Iran for the same purpose. Distinguishing mountains according to their relative height was a task that South Asian mapmakers seldom undertook.

Relatively few South Asian maps were wholly planimetric. Most combined a planimetric perspective for relatively extensive features (e.g., mountain ranges and cities) with a frontal or oblique perspective for such localized features as individual houses, temples, and forts. City walls, typically, were planimetrically depicted in terms of their overall extent yet shown, section by section, as if viewed from ground level. Similarly, within the planimetrically shown forested areas, trees and other vegetation types were pictorially rendered—often very large—as if seen individually on the ground. On a great many maps, artists seem to abhor empty space. This was especially true for religious maps and least true for utilitarian military maps. Naturally, where trees and flowers fill what would otherwise be a map void, one should not place any faith in the accuracy of depiction. Similarly, roads shown as crammed with pilgrims do not necessarily imply high year-round traffic.

The inclusiveness of South Asian maps varies greatly from one artist and map type to another. One detects no obvious rules for what ought to be included and what it is permissible to leave out. Presumably, available knowledge and the stated interests of those commissioning the works, along with the criteria of presumed importance and the time at the artists' disposal, were the principal determinants of what was shown. In the case of religious maps, tradition was also a major factor. The scale and purpose of the map played a role. Small-scale topographic maps of large regions, of which there are not many examples, would seldom show individual houses, and maps and plans of religious shrines, which were quite common, would not likely emphasize elements of terrain.

Conspicuously missing from virtually all traditional South Asian maps are political boundaries. Obviously, territory in South Asia was politically partitioned among different states as well as between administrative units within states, but clearly delimited (not to mention demarcated) boundaries scarcely existed until they were imposed by the British.[16] There were, of course, fluctuating frontiers between neighboring powers that reflected the shifting tides of their political fortunes, but these were never, to my knowledge, mapped. Nor were maps consciously made to define regions as such. In at least one case, however, the sacred region of Braj, the limits of the maps made—diverse though those maps were—were also symbolically coterminous with the limits of the region. And in the cases of the Vales of Kashmir and Kathmandu, the mountains forming the horizon on

15. Gole, *Indian Maps and Plans*, 14 (note 5).

16. This issue is extensively addressed in Joseph E. Schwartzberg, ed., *A Historical Atlas of South Asia* (Chicago: University of Chicago Press, 1978), xxix–xxx, xxxiii–xxxv, and passim, and also by Ainslie T. Embree, "Frontiers into Boundaries: From the Traditional to the Modern State," in *Realm and Region in Traditional India*, ed. Richard G. Fox, Monograph and Occasional Papers Series, Monograph 14 (Durham, N.C.: Duke University Program in Comparative Studies on Southern Asia, 1977), 255–80.

the four sides of their respective maps also established the limits of natural regions.

In the chapter on cosmography, I considered the likelihood that the Indian belief in *māyā*, which considers the world of the senses an illusion, was a factor inhibiting the making of maps in past centuries. Nevertheless, as I have subsequently shown, hundreds of Indian maps have recently come to scholarly notice. Furthermore, that corpus is in all probability no more than a miniscule fraction of the total South Asian traditional cartographic heritage. What then guided South Asians, especially Hindus and Jains, when they decided that maps were in fact needed? What led them to favor certain types of maps over others and to plot certain features in preference to others? I suggest that religious concerns at all times tended to outweigh concerns of a secular nature (though the distinction in India is often far from clear) and that producing images that conveyed the essence of places was often more important to mapmakers than measuring and reproducing elements of the landscape with geometric exactitude, even though relatively recent works, especially from Jaipur, tended to conform to the latter type. The mapping experiments of the anthropologist E. Valentine Daniel in Tamil Nadu, described in the discussion of cosmography and mental maps above, are noteworthy in this regard. They are also relevant in explaining the almost total absence of boundaries on Indian maps.

The study of the history of cartography in South Asia is still in its infancy. There are undoubtedly many serious lacunae in our knowledge. In all likelihood, only a small portion of the surviving cartographic corpus has yet been brought to light. For large and important areas of South Asia (e.g., Bengal) I am as yet not aware of a single traditional indigenous map. The links in the dissemination of cartographic ideas within South Asia and between South Asia and other parts of the world have yet to be firmly established. But at least we have a platform from which to launch future efforts.

Postscript

After the foregoing chapters on South Asia went to press, I received in the mail—as if in fulfillment of the prediction implicit in the final paragraph—a catalog of a vast trove of maps and plans newly discovered in a palace of the Maharaja of Jaipur. Their time span is from the late sixteenth to the early nineteenth century. Approximately two-thirds of the approximately 350 works included relate to Rajasthan, but many cover other parts of northern India as far east as Bengal and Assam, as well as peninsular India, Afghanistan, and Nepal, while three (presumably based on seventeenth-century European models) include the whole world. The collection includes topographic maps, administrative maps, town plans, engineering plans, and architectural drawings. The range of sizes is great, at least one map measuring about four by four meters. For further particulars, see Gopal Narayan Bahura and Chandramani Singh, *Catalogue of Historical Documents in Kapad Dwara, Jaipur*, part 2, *Maps and Plans* (Jaipur, 1990).