

# 6 • Mapmaking in the Central Andes

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Bruno Adler compiled astonishing accounts of spatial reckoning and ephemeral mapping by indigenous South Americans, yet he could describe only four ethnographic examples of maps, none of them from the central Andes (fig. 6.1). Adler concluded that native South Americans did not normally inscribe their remarkable spatial knowledge on permanent media.<sup>1</sup>

Although informal mapping (the analogical expression or performance of spatial knowledge) may well be a human universal, it has been argued that formal mapmaking (the inscription of spatial knowledge) tends to arise as a discourse function only within highly organized, bureaucratic societies. The conditions necessary for formal mapmaking include “the demands of agriculture, private property, long-distance trade, militarism, tribute relations, and other attributes of redistributive economies.”<sup>2</sup> If this is true, then we should expect central Andean peoples to have an ancient mapmaking tradition. Native Andean peoples have practiced intensive agriculture for several millennia, including irrigation terracing and sophisticated raised fields, at a scale rarely equaled elsewhere in the premodern world.<sup>3</sup> Militarism has also been rampant in the Andes for millennia. Furthermore, there is evidence of regular long-distance trade in precious and staple goods between the Pacific coast, the highlands, and the Amazon dating from the late preceramic period (ca. 2500–1800 B.C.; see fig. 6.2).<sup>4</sup> Last, the collection and redistribution of agricultural products and other goods, as well as labor obligations for the construction of monumental architecture or for the service of elite personages, have existed since the beginning of the early horizon (ca. 900–200 B.C.).<sup>5</sup>

Yet the term “map” is nearly nonexistent in modern archaeological, art historical, and ethnographic analyses of ancient central Andean artifacts and art—except metaphorically—and even then it is extremely rare.<sup>6</sup> Perhaps such individual elements of an organized bureaucracy were not sufficiently articulated in the early through middle horizons (ca. 900 B.C.–A.D. 1000) to foster a mapmaking tradition. But in 1532 the Inkas governed about 7.5 million people over some of the most rugged terrain on earth. They controlled a road network of well over twenty-three thousand kilometers, collected and redis-

tributed astonishing volumes of staple wealth and prestige goods, and organized labor for public works at a scale unprecedented in the New World.<sup>7</sup>

Were maps simply not collected by colonial administrators, even though other artifacts of the Inka bureau-

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1. Bruno F. Adler, “Karty pervobytnykh narodov” (Maps of primitive peoples), *Izvestiya Imperatorskago Obshchestva Lyubiteley Yeststvoznaniya, Antropologii i Etnografii: Trudy Geograficheskago Otdeleniya* (Proceedings of the Imperial Society of the Devotees of National Sciences, Anthropology, and Ethnography: Transactions of the Division of Geography) 119, no. 2 (1910): 171–77. Many thanks to Michelle Szabo of Madison, Wisconsin, who translated these sections of Adler from the Russian.

2. Denis Wood, “The Fine Line between Mapping and Map Making,” *Cartographica* 30, no. 4 (1993): 50–60, esp. 56, and idem, “Maps and Mapmaking,” *Cartographica* 30, no. 1 (1993): 1–9.

3. William M. Denevan, Kent Mathewson, and Gregory Knapp, eds., *Pre-Hispanic Agricultural Fields in the Andean Region: Proceedings, 45 Congreso Internacional de Americanistas, International Congress of Americanists, Bogotá, Colombia, 1985*, 2 vols. (Oxford: BAR, 1987), esp. William M. Denevan, “Terrace Abandonment in the Colca Valley, Peru,” 1:1–43. See also R. A. Donkin, *Agricultural Terracing in the Aboriginal New World* (Tucson: University of Arizona Press, 1989), and William M. Denevan, “Aboriginal Drained-Field Cultivation in the Americas,” *Science* 169 (1970): 647–54.

4. Richard L. Burger, *Chavin and the Origins of Andean Civilization* (London: Thames and Hudson, 1992), 31–33 and 53–54.

5. Michael Edward Moseley, *The Incas and Their Ancestors: The Archaeology of Peru* (New York: Thames and Hudson, 1992), 123–25 and 140–42.

6. One notable exception is William Harris Isbell, “The Prehistoric Ground Drawings of Peru,” *Scientific American* 239, no. 4 (1978): 140–53, esp. 150 and 153. Isbell classifies the Nazca lines as a giant ground map that conveys significant information about the workings of Nasca society. (On Nazca/Nasca, see note 75.)

7. See William M. Denevan, ed., *The Native Population of the Americas in 1492*, 2d ed. (Madison: University of Wisconsin Press, 1992), 291; John Hyslop, *The Inka Road System* (Orlando: Academic Press, 1984); and Terence N. D’Altroy and Timothy K. Earle, “Staple Finance, Wealth Finance, and Storage in the Inka Political Economy,” in *Inka Storage Systems*, ed. Terry Y. LeVine (Norman: University of Oklahoma Press, 1992), 31–61. “Inka” is a widely accepted Quechua spelling that has become common in academic writing.



FIG. 6.1. REFERENCE MAP OF THE CENTRAL ANDEAN REGION. This map shows places and features mentioned in the text.

cracy were?<sup>8</sup> A subtle but pervasive academic explanation for the supposed lack of maps and other examples of Inka government is the severity of the Spanish conquest. However, although Antonio de Mendoza sponsored Juan de Betanzos's authoritative *Suma y narración de los Incas* (1551–57) and collected pictorial manuscripts while in Mexico, he did not collect them in the Andes when, toward the end of his life, he was viceroy of Peru. Likewise, the third viceroy, Andrés Hurtado de Mendoza, did not collect or commission Andean pictorial manuscripts or maps. It is far more likely, as Tom Cummins cogently argues, that Andean conceptions of space and their sym-

boling systems were so abstract and so different from those associated with the European experience that the Spaniards simply ignored them.<sup>9</sup> And without Spanish recognition, the cultural reproduction of Andean symboling systems did not survive the colonial period in its entirety.

It is possible to reach a conclusion very different from Adler's about the existence of mapmaking traditions in the central Andes. However, this requires broadening the definition of "map"—as in other parts of this volume—and poses the question, How does one identify a map from a culture whose conceptions of space, geographic relations, modes of representation, and media are very different from the Western experience?

In trying to answer this question, I will demonstrate that from early horizon through Inka times (ca. 900 B.C.–A.D. 1532) Andean peoples made spatial and landscape representations that functioned as maps. Before examining the chronological development of mapmaking in the archaeological record, we need to establish Andean conceptions of space, geographic relations, and rules of representation from archaeology, ethnography, and history.

#### ANDEAN CONCEPTIONS OF SPACE AND GEOGRAPHIC RELATIONS: PAST AND PRESENT

We will not recognize Andean maps until we attempt to see them through Andean eyes. The content and structure of any map—including Western ones—is determined not only by what is in the environment, but also by social organization, cultural convention, and human perception.<sup>10</sup> Important Andean precepts include the welding of people and landscape in the concept of an *ayllu*; the organization of signs and other representations into radial forms, parallel strips, and gridlike geometric structures; the cultural importance of *huacas* and *parajes*; animal-body-landscape metaphors; and the performative aspects of map reading as reflected in mapping rites. Each precept is

8. The Inkas had a special temple, Poquen Cancha or House of the Sun, that contained picture boards (*tablas*) depicting the life of each Inka ruler, details of conquered lands, and illustrations of Inka rites and fables. José de Acosta suggested that Inka paintings (*pinturas*) and *khipus* were the conduit for important historical information and substituted for writing and letters, which the Inkas lacked. However, no pre-Columbian picture boards or paintings are known to survive. See Cristóbal de Molina, *Fábulas y mitos de los Incas*, ed. Henrique Urbano and Pierre Duviols (Madrid: Historia 16, 1989), 49–50, and José de Acosta, *Historia natural y moral de las Indias*, 2 vols. (Madrid: Ramón Anglés, 1894), esp. 2:165–66.

9. Tom Cummins, "Representation in the Sixteenth Century and the Colonial Image," in *Writing without Words: Alternative Literacies in Mesoamerica and the Andes*, ed. Elizabeth Hill Boone and Walter D. Mignolo (Durham: Duke University Press, 1994), 188–219, esp. 189–91 and n. 11.

10. David Turnbull, *Maps Are Territories, Science Is an Atlas: A Portfolio of Exhibits* (Geelong, Victoria: Deakin University, 1989; reprinted Chicago: University of Chicago Press, 1993).

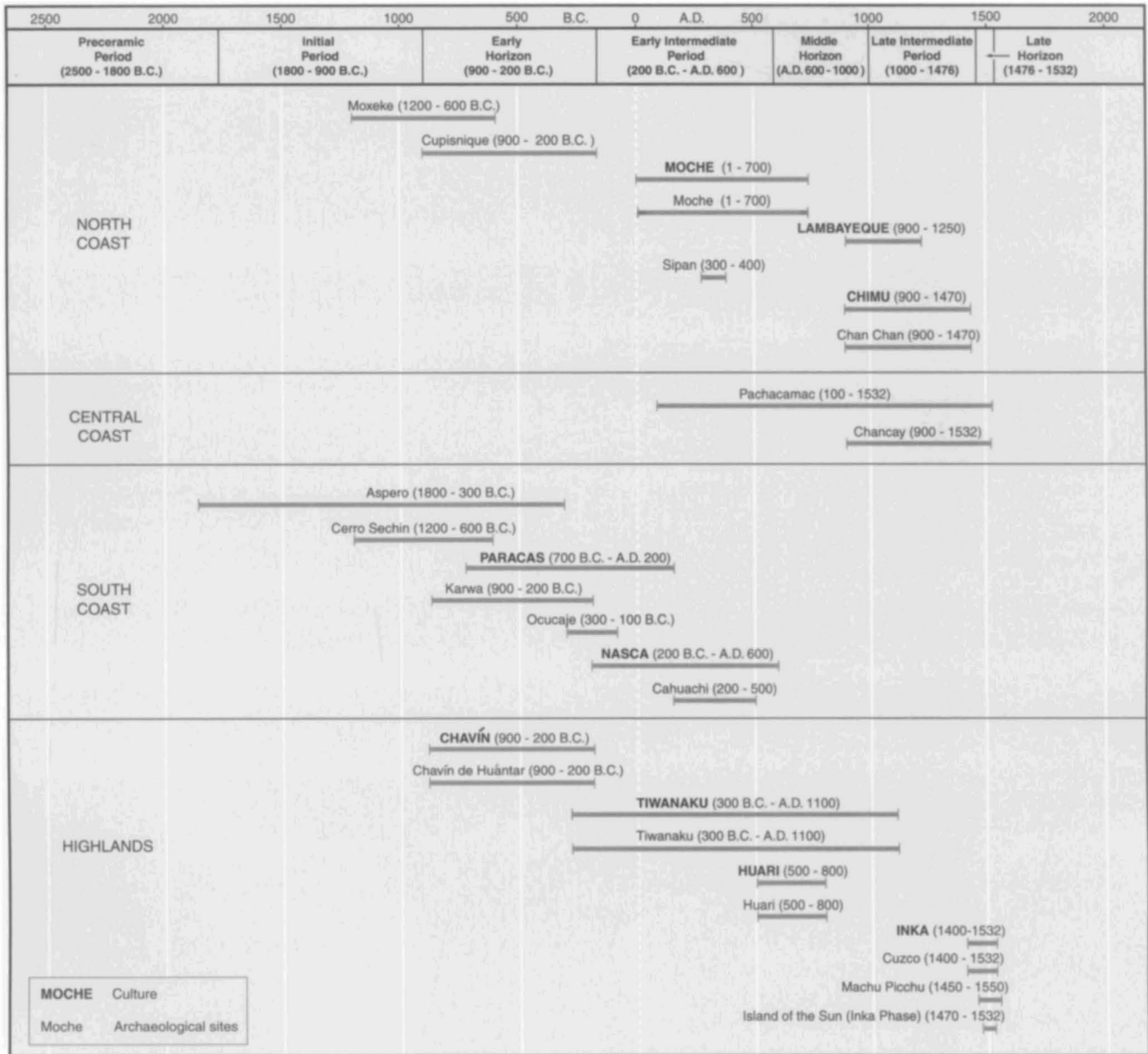


FIG. 6.2. CULTURAL CHRONOLOGY FOR THE CENTRAL ANDEAN REGION. This time line shows archaeological cultures, periods, and horizons of the central Andes.

After Richard F. Townsend, ed., *The Ancient Americas: Art from Sacred Landscapes* (Chicago: Art Institute of Chicago, 1992), 263.

grounded in social discourse, often related to the usufruct to land and water. Furthermore, these rules are grounded in two essential Andean connections between the organization of societies and nature.

The first of these connections is terrestrial and is rooted in the contrasting life zones across the Andes (fig. 6.3). The spatial organization of Andean political economies is closely tied to the specific configuration of bioclimatic life zones, since each zone has a unique set of resources and different production potential.<sup>11</sup> Central Andean peoples developed reciprocal relationships with other communities in different vertical and horizontal zones. Such an ar-

range maximized access to various resources and production zones and minimized risk.<sup>12</sup> This economic

11. See Carl Troll, "The Cordilleras of the Tropical Americas: Aspects of Climatic, Phytogeographical and Agrarian Ecology," in *Geo-ecology of the Mountainous Regions of the Tropical Americas* (Bonn: Ferd Dümmlers, 1968), 15-56.

12. Most modern research concerning the spatial organization of native Andean economies and landscapes has been inspired by the works of John V. Murra. See especially his "El 'control vertical' de un máximo de pisos ecológicos en la economía de las sociedades andinas," in *Visita de la provincia de León de Huánuco en 1562: Iñigo Ortiz de Zúñiga, visitador*, 2 vols., ed. John V. Murra (Huánuco, Peru: Universidad Nacional Hermilio Valdizán, 1967-72), 2:427-76, and "An Aymara

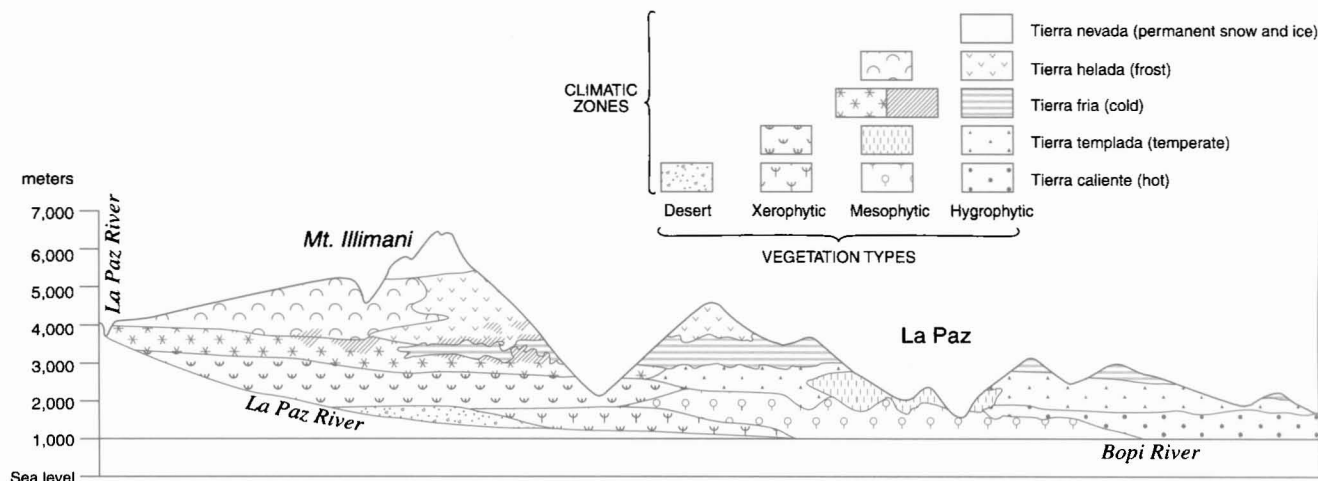


FIG. 6.3. TOPOGRAPHY AND SPACE. Topography and other factors create distinctive sets of bioclimatic life zones in the Andes. Life zones change dramatically with altitude and across east-west and north-south transects at the same elevation. The spatial organization of Andean cultural beliefs and subsistence economies reflects the differentiated landscape. This diagram shows a cross section through the Cordillera Real and the valley of the La Paz River.

After Carl Troll, "The Cordilleras of the Tropical Americas: Aspects of Climatic, Phytogeographical and Agrarian Ecology," in *Geo-ecology of the Mountainous Regions of the Tropical Americas* (Bonn: Ferd Dümmlers, 1968), 15–56, esp. 48.

organization of the landscape is termed "complementarity," which is the simultaneous control of several geographically dispersed ecological tiers by a single ethnic or sociopolitical group. The scale and form of complementarity vary according to geography and history, ranging from a single lineage's landholdings at different elevations within the same valley to the control of distant mountain valleys and lowland areas by the kings of city-states. In both cases complementarity was, and is, maintained through formalized relationships based on reciprocity, redistribution, shared labor obligations, and kinship.<sup>13</sup>

The second essential connection is between Andean systems of spatial reckoning and the movement of the heavenly bodies. For example, in the absence of a bright star near the celestial south pole, Quechua peoples and their ancestors organized the sky by reference to the Milky Way, called *Mayu* or the "celestial river," and its apparent cruciform rotations.<sup>14</sup> In a twenty-four-hour period, the Milky Way forms two intersecting intercardinal axes that divide the heavens into quarters (fig. 6.4). Since the plane of the Milky Way is inclined in relation to the earth's axis, the stars of one quarter will rise as those of the opposite quarter set as the earth rotates. Astronomical phenomena can be tracked with respect to these quarters, which create a systematic means for the spatial and temporal reckoning of the world and its natural and social rhythms (fig. 6.5). This principle is central to pre-Columbian spatial reckoning. The diagonal opposition mirrors the inferred marriage and residence rules for the Inka settlement of the Cuzco Valley.<sup>15</sup> The quartered

circle is a form often replicated in the urban design of the Andean cosmopolis.<sup>16</sup>

#### AYLLU: LINKING TERRITORY TO SOCIETY

The welding of people and landscape is at the heart of the concept of an *ayllu*, the fundamental social and territorial unit of the central Andes. Precise definitions of an *ayllu* will vary with social and ecological circumstances. Furthermore, the role of the *ayllu* as a local kin group con-

Kingdom in 1567," *Ethnohistory* 15 (1968): 115–51, esp. 121–27. The terms "verticality," which stresses the altitudinal dimension of complementarity, and "archipelago," which stresses the horizontal dimension of complementarity, are often found in this older literature.

13. For a collection of essays on complementarity, see Yoshio Shozo Masuda, Izumi Shimada, and Craig Morris, eds., *Andean Ecology and Civilization: An Interdisciplinary Perspective on Andean Ecological Complementarity* (Tokyo: University of Tokyo Press, 1985).

14. The Quechua peoples of the village of Misminay, department of Cuzco, equate *Mayu* with the Vilcanota River and its irrigation system. In effect, their terrestrial reckoning system mirrors celestial process. Additional associations between dark cloud constellations (silhouettes against the Milky Way) of plants and animals and animal ecology on earth enhance this system. See Gary Urton, *At the Crossroads of the Earth and the Sky: An Andean Cosmology* (Austin: University of Texas Press, 1981), esp. 37–65.

15. R. Tom Zuidema, *The Ceque System of Cuzco: The Social Organization of the Capital of the Inca* (Leiden: E. J. Brill, 1964).

16. See Alan L. Kolata, *The Tiwanaku: Portrait of an Andean Civilization* (Cambridge, Mass.: Blackwell, 1993), 98–103, and John Hyslop, *Inka Settlement Planning* (Austin: University of Texas Press, 1990), 202–21.

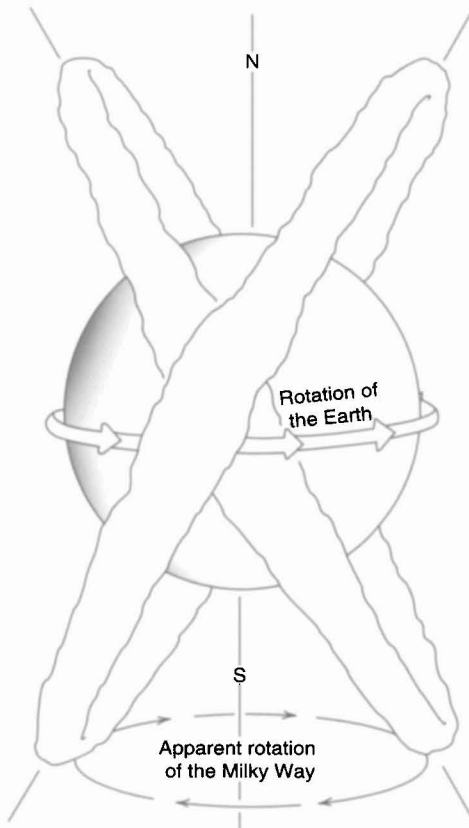


FIG. 6.4. THE QUARTERED CIRCLE AND THE APPARENT MOVEMENT OF THE MILKY WAY. The quartered circle is an image of social and spatial order in many Andean societies and is probably inspired by the apparent nightly rotation of the Milky Way. Celestial movements also mimic the organization of terrestrial space for the modern-day Quechua peoples of Misminay. The Inkas structured their spatial and social environment in a similar fashion, as evinced by the quadripartite division of Inka society into *suyus*. After Gary Urton, *At the Crossroads of the Earth and the Sky: An Andean Cosmology* (Austin: University of Texas Press, 1981), esp. 58 (fig. 19).

trolling territory is also historically conditioned.<sup>17</sup> At a minimum, *ayllus* are distinguishable sociopolitical groups whose membership is based on some combination of landholding arrangements; shared labor responsibilities for the maintenance of community infrastructure such as roads, civic-ceremonial architecture, or irrigation canals; the sponsorship of religious festivals; and some type of formalized kinship relations, perhaps reflected in marriage and residence rules or real or fictive descent from an ancestor.<sup>18</sup>

The size of a geographic area synonymous with an *ayllu* varies with cultural and ecological circumstances. *Ayllus* are often grouped into larger sociopolitical entities such as *suyus* and moieties.<sup>19</sup> A *suyu* is a part of a whole; a moiety is one of two units into which a community is divided based on unilateral descent. *Suyus* may be

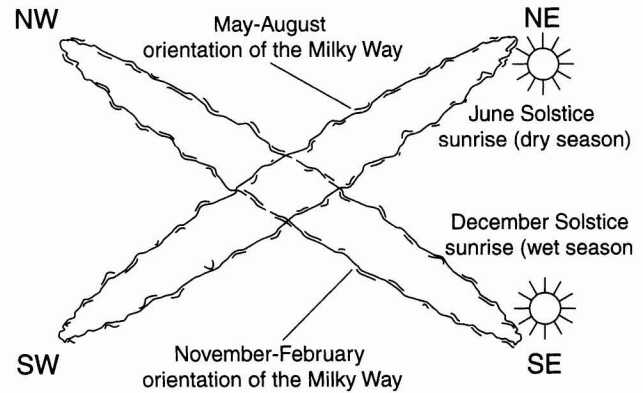


FIG. 6.5. THE MILKY WAY'S APPARENT SEASONAL ROTATION. In addition to the Milky Way's nightly rotation, over the course of a year it again divides the heavens into quarters. First appearing in the evening sky during the dry season, the Milky Way (*Mayu*) stretches from the northeast to the southwest. During the rainy season, its early evening orientation is from the southeast to the northwest. These seasonal rotations find correlates in terrestrial, social, and cosmological organization. After Gary Urton, *At the Crossroads of the Earth and the Sky: An Andean Cosmology* (Austin: University of Texas Press, 1981), esp. 62 (fig. 22).

equated with a quadripartite division, as in Tawatinsuyu (land of the four parts), the Inkas' term for their empire.

17. Compare, for example, Frank Salomon, *Native Lords of Quito in the Age of the Incas: The Political Economy of North Andean Chiefdoms* (Cambridge: Cambridge University Press, 1986), 167–69; Steve J. Stern, *Peru's Indian Peoples and the Challenge of Spanish Conquest: Huamanga to 1640*, 2d ed. (Madison: University of Wisconsin Press, 1993), 42–43; and Karen Spalding, *Huarochari: An Andean Society Under Inca and Spanish Rule* (Stanford: Stanford University Press, 1984), 176–79.

18. Jeanette E. Sherbondy, "Water and Power: The Role of Irrigation Districts in the Transition from Inca to Spanish Cuzco," in *Irrigation at High Altitudes: The Social Organization of Water Control Systems in the Andes*, ed. William P. Mitchell and David Guillet (Arlington, Va.: Society for Latin American Anthropology, American Anthropological Association, 1993), 69–97, esp. 72–78; Harold O. Skar, *The Warm Valley People: Duality and Land Reform among the Quechua Indians of Highland Peru*, 2d ed. (Göteborg: Göteborgs Etnografiska Museum, 1988), 166–72; Joseph William Bastien, *Mountain of the Condor: Metaphor and Ritual in an Andean Ayllu* (St. Paul, Minn.: West, 1978), xxiii–xxv and 189–92; Spalding, *Huarochari*, 28–30; and Billie Jean Isbell, *To Defend Ourselves: Ecology and Ritual in an Andean Village* (Austin: Institute of Latin American Studies, 1978), 105–8.

19. Patricia J. Netherly, "The Management of Late Andean Irrigation Systems on the North Coast of Peru," *American Antiquity* 49 (1984): 227–54. Netherly uses the Spanish term *parcialidad* instead of the Quechua *ayllu* and suggests that *ayllu* may have been used instead of *parcialidad* during the colonial period to emphasize the kinship dimension of the social group. Generally, the *ayllu* can be considered a subgroup or component of the *parcialidad*. See also Gary Urton, "Andean Social Organization and the Maintenance of the Nazca Lines," in *The Lines of Nazca*, ed. Anthony F. Aveni (Philadelphia: American Philosophical Society, 1990), 173–206, esp. 195–96.

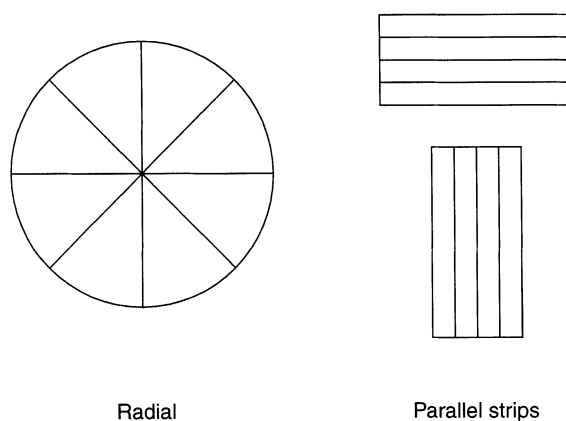


FIG. 6.6. THE GRAPHIC STRUCTURING OF ANDEAN SPATIAL THOUGHT. Two geometric structures signify social and territorial space in traditional Andean societies, as reflected in the large-scale organization of household usufruct to land and water: radial and parallel strips. They are both ultimately inspired by nature, that is, by the movement of the Milky Way and the spatial configuration of bioclimatic life zones, respectively. The organization of icons, symbols, motifs, and pictorial narratives into radial or parallel geometric structures can thus signify a geographic relation in Andean spatial thought. Grids are a conceptual subcategory of parallel strips. See, for example, figure 6.10 below.

Moieties are a dual division of society and space, and such divisions are ancient in the Andes. The late pre-ceramic period (ca. 3000–2000 B.C.) sites of Río Seco, La Galgada, and Kotosh all have twin platform mounds, an architectural manifestation of dual social and territorial organization.<sup>20</sup> Principles of dual and quadripartite organization are also evident in carved gourds found at the preceramic period site of Huaca Prieta.<sup>21</sup>

#### RADIAL AND PARALLEL STRUCTURE

Two geometric structures for landholdings, radial organization and parallel strips, are forms inspired by nature and the heavens (fig. 6.6). As we have seen, the quartered circle references the apparent movement of the Milky Way. Parallel strips of landholdings mirror the verticality of Andean life zones.

Perhaps the most famous form of Andean social and territorial division is a radial one. Figure 6.7 illustrates the social and territorial organization of the community of San Andrés de Machaca, department of La Paz, Bolivia. Here *ayllu* landholdings are grouped into moieties. In the ideal form, a prominent natural or cultural feature, such as a river or road, would serve as a territorial boundary equally dividing the two moieties. Because of geographic reality the radial structure is less than perfect. Community tensions arise owing to this departure from the ideal. The existence of other community structures and the

derivation of landholding from the ideal demonstrates that *ayllus* as territorial units are always part of a social discourse (fig. 6.8).<sup>22</sup>

Andean landholdings are also organized into parallel rectangular strips. Figure 6.9 illustrates an eighteenth-century copy of a sixteenth-century sketch map of native canals and landholdings ordered by the Spaniard Gregorio Gonzalez de Cuenca, who recorded native land and water rights as a basis for Spanish colonial administration during his inspection tour (*visita*) of north coast valleys. Each tertiary canal in figure 6.9 bears the name of the *parcialidad* or *ayllu* responsible for canal upkeep. Both field size and the area in standing crops were measured with respect to small feeder canals, as reflected in the sixteenth-century *visita* landholding entry “five ditches [canals] of maize.”<sup>23</sup> Although *parcialidades* were organized into larger sociopolitical groups, the evidence suggests that equating canals with territory arose at the local level. However, parallel strips of landholdings may also reflect bureaucratic decisions, as exemplified by the Inka resettlement of the Cochabamba Valley (central Bolivia), where fourteen thousand Indians were grouped into *suynus* and assigned parallel strips of land that cut across the Rocha River.<sup>24</sup>

The notion that critical points of the irrigation or agricultural system may have a territorial function is corroborated by the early seventeenth-century native chronicler Felipe Guamán Poma de Ayala in his fifteen-hundred-page illustrated letter to the king of Spain. In his drawing of the planting season (fig. 6.10), a stone-lined spring or reservoir (*estanque*) is adjacent to a grid pattern of agricultural fields (*chakras*). The shallow ditches present dur-

20. For an example of dual organization and its role in the built landscape, see David Guillet, *Covering Ground: Communal Water Management and the State in the Peruvian Highlands* (Ann Arbor: University of Michigan Press, 1992), 18–19, 85–98, and 104–5.

21. Junius Bouton Bird, “Pre-ceramic Art from Huaca Prieta, Chicama Valley,” *Ñawpa Pacha* 1 (1963): 29–34, esp. pl. II.

22. Javier Albó, “Dinámica en la estructura inter-comunitaria de Jesús de Machaca,” *América Indígena* 32 (1972): 773–816, esp. 780–82 and 804. The actual pattern of land use may deviate from Andean forms because of local ecology and the social relations of production. See Karl S. Zimmerer, *Changing Fortunes: Biodiversity and Peasant Livelihood in the Peruvian Andes* (Berkeley: University of California Press, 1996), 117–26; idem, “Agricultura de barbecho sectorizada en las alturas de Paucartambo: Luchas sobre la ecología del espacio productivo durante los siglos XVI y XX,” *Allpanchis*, no. 38 (1991): 189–225, esp. 213–20; and Daniel W. Gade and Mario Escobar, “Village Settlement and the Colonial Legacy in Southern Peru,” *Geographical Review* 72 (1982): 430–49.

23. Netherly, “Late Andean Irrigation Systems,” esp. 239 (note 19).

24. Nathan Wachtel, “The *Mitimas* of the Cochabamba Valley: The Colonization Policy of Huayna Capac,” in *The Inca and Aztec States, 1400–1800: Anthropology and History*, ed. George A. Collier, Renato I. Rosaldo, and John D. Wirth (New York: Academic Press, 1982), 199–235, esp. 205–13.

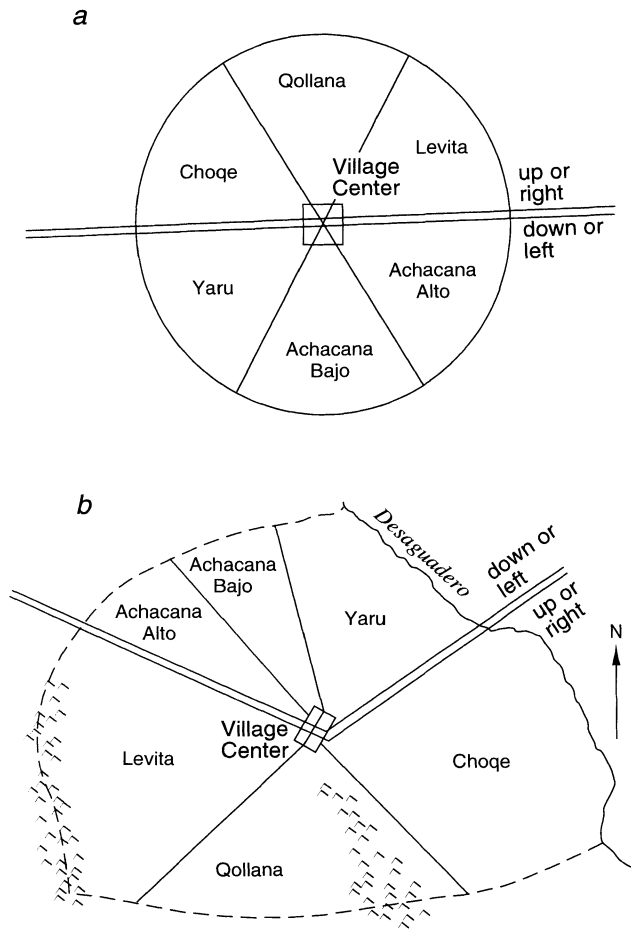


FIG. 6.7. THE RADIAL ORGANIZATION OF ANDEAN LANDSCAPES. These two maps illustrate the ideal (a) and the actual (b) pattern of wedge-shaped landholdings belonging to the *ayllu* of San Andrés de Machaca, Bolivia. *Ayllu* landholdings are grouped into two moieties, separated by the double lines that are alternatively distinguished as upper and lower or right and left. Rivers, mountains, roads, and agricultural works often form social and territorial boundaries in Andean communities.

After Javier Albó, "Dinámica en la estructura inter-comunitaria de Jesús de Machaca," *América Indígena* 32 (1972): 773–816, esp. figs. 1 and 2.

ing the growing season are obscured by crop growth in Guamán Poma's illustration of the harvest season. One function of the shallow ditches was to separate family landholdings.<sup>25</sup>

Modern Quechua- and Aymara-speaking peoples who inhabit the western shores of Lake Titicaca use maps in their negotiations with government officials over the control of highly productive lacustrine reed beds. Benjamin Orlove has analyzed a number of these maps, which he refers to as "state maps" and "peasant maps."<sup>26</sup> Although each map differs in its cultural assemblage, all the peasant maps in his sample blend Western and Andean representational precepts (fig. 6.11). The Andean com-

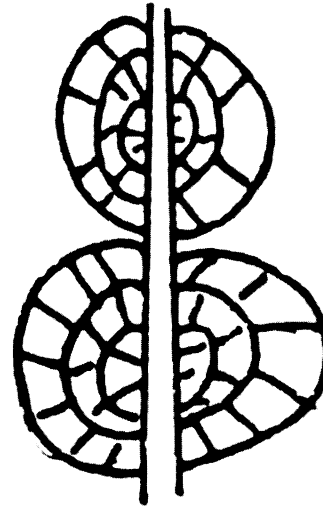


FIG. 6.8. INTERPRETATION OF Q'ERO AGRICULTURAL LANDHOLDINGS. This map of agricultural landholdings belonging to two Q'ero moieties was drawn by the anthropologist Gail P. Silverman-Proust according to Lorenzo Quispe's interpretation of a textile made by his village of Chuwa Chuwa, department of Cuzco, Peru. The double line in the center represents the Pausi River, which separates the agricultural fields of the two Q'ero moieties. The three half circles and accompanying radiating lines on either side of the river represent agricultural fields organized by elevation.

From Gail P. Silverman-Proust, "Weaving Technique and the Registration of Knowledge in the Cuzco Area of Peru," *Journal of Latin American Lore* 14 (1988): 207–41, esp. 234.

munity that made the map is not interested in creating a scaled representation or a temporal sequence of events. Rather, we can infer from it that the mapmakers want to show the unchanging topological relation between village territories and the Lake Titicaca reed beds. Natural and cultural features often constitute village boundaries in the Andes, and the water channels perform this function in figure 6.11. The three streams divide the landholdings of several communities into strips of contiguous territory

25. Urton, "Andean Social Organization," 201–2 (note 19). For the careful surveying associated with *chakras*, see Bernabé Cobo, *Inca Religion and Customs*, trans. and ed. Roland Hamilton (Austin: University of Texas Press, 1990), 240; idem, *History of the Inca Empire: An Account of the Indians' Customs and Their Origin, Together with a Treatise on Inca Legends, History, and Social Institutions*, trans. and ed. Roland Hamilton (Austin: University of Texas Press, 1979), 211; and Juan Polo de Ondegardo, *El mundo de los Incas*, ed. Laura González and Alicia Alonso (Madrid: Historia 16, 1990), 59–60 and 63–65. The grid or orthogonal pattern is a variation of parallel strip territorial organization. See Hyslop, *Inka Settlement Planning*, 192–202 (note 16).

26. Benjamin S. Orlove, "Mapping Reeds and Reading Maps: The Politics of Representation in Lake Titicaca," *American Ethnologist* 18 (1991): 3–38; idem, "Irresoluciuñ suprema y autonomía campesina: Los totorales del Lago Titicaca," *Allpanchis*, no. 37 (1991): 203–68; and idem, "The Ethnography of Maps: The Cultural and Social Contexts of Cartographic Representation in Peru," *Cartographica* 30, no. 1 (1993): 29–46.

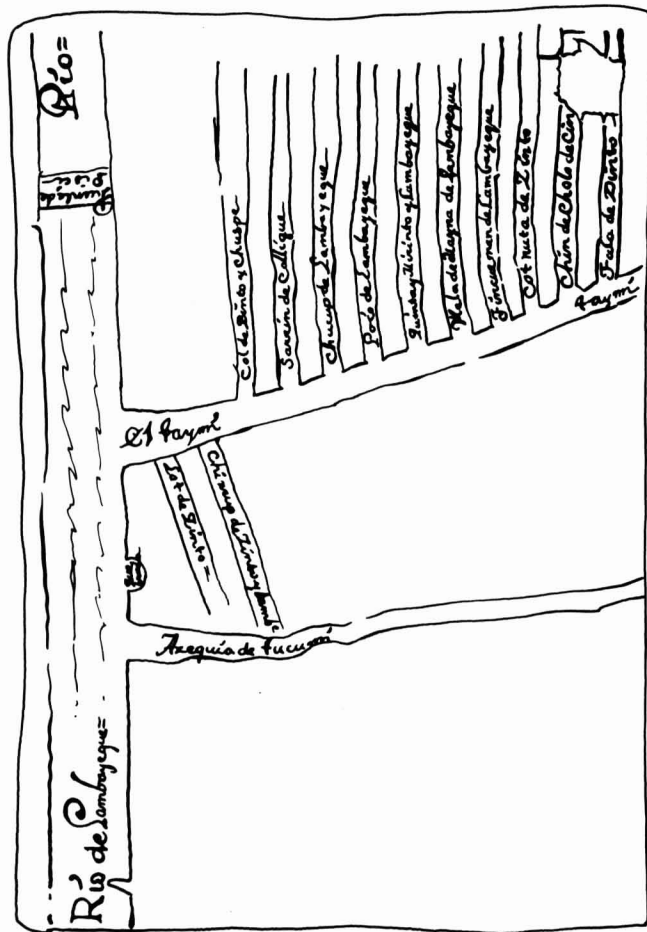


FIG. 6.9. THE ORGANIZATION OF ANDEAN LAND-HOLDINGS INTO PARALLEL STRIPS. This eighteenth-century copy of Gregorio Gonzalez de Cuenca's sixteenth-century sketch map of the Lambayeque River shows the nearly perpendicular intersection of the river (actually a primary canal) with two secondary irrigation canals. Twelve tertiary canals intersect the Taymi canal, and each bears the name of the *parcialidad*, a bounded socioeconomic group responsible for maintaining it. These canals divide agricultural lands into parallel strips that correspond to land and water usufruct among different *parcialidades*.

Archivo Arzobispal Trujillo, Trujillo, Peru (Causas 66.6, 1753, ff 47). By permission of Patricia J. Netherly.

perpendicular to the shore of Lake Titicaca. This non-scaled representation is, in effect, a statement of political parity and equal access to the reed resource by each community. Like the other native maps produced during the reed conflict, figure 6.11 affirms that each village controls a specific territory and that together the communities control the region.<sup>27</sup>

Central Andean peoples graphically represent the partitioning of society and territory on a medium not often considered by the cartographic historian—ceramics. Modern pottery from Quinua, central Peru, reflects the distribution of household landholdings and *ayllu* residence



FIG. 6.10. THE ORGANIZATION OF ANDEAN LAND-HOLDINGS AS A GRID. In addition to radial and strip divisions of land, grids were also employed in Andean spatial organization. A grid of shallow ditches separates Inka agricultural plots during the planting and growing seasons in this drawing by Felipe Guaman Poma de Ayala. Springs, reservoirs, ditches, and canals functioned as social and territorial boundary markers in traditional Andean society.

Size of the original: ca. 18 × 12 cm. Photograph courtesy of the Royal Library, Copenhagen (Nueva crónica y buen gobierno, fol. 1162).

patterns in the organization of design bands and motifs (fig. 6.12). Quinua territory consists of resource zones at several elevations along an eastern slope in the central Ayacucho basin. The community is divided into two moieties based on the irrigation system, which acts as an administrative boundary between Quinua's two barrios. The arrangement of design bands on ceramics reflects the structural principles that organize the environmental and social spaces of the community. Vertical, stacked designs

27. Orlove, "Mapping Reeds," 25–27. Government representatives consider the peasant maps crude imitations of state ones, probably because the peasant maps cannot be combined to form a unified, scaled, bird's-eye view of the area.





FIG. 6.11. MAP OF THE SHORE OF LAKE TITICACA, PUNO, PERU. Modern Aymara and Quechua maps, such as this one from Lake Titicaca, often combine Western and native cartographic precepts. This map, from the files of the Peruvian National Forestry Center (CENFOR), was part of a claim made by peasant communities regarding the control of reed beds. Following Western convention, rivers and the Lake Titicaca shoreline are illustrated in plan view, water is separated from land by a line, the map is drawn on a rectangular piece of paper, and the text is in Spanish. Vernacular features

include the non-north orientation (in this case west is at the top) and the depiction of individual houses in frontal perspective. Water channels that separate village territories are spaced to create parallel strips that reflect parity in political power and control of the resource based on community rights. Andean peoples consider the sequence and shape of community territories more important than linear distance.

From Benjamin S. Orlove, "The Ethnography of Maps: The Cultural and Social Contexts of Cartographic Representation in Peru," *Cartographica* 30, no. 1 (1993): 29–46, esp. fig. 6.

reflect resource zones, while designs divided by a vertical strip reflect social divisions. Other ecological, cultural, and symbolic spaces are represented in design band organization, decorative motifs, and vessel shape.<sup>28</sup>

#### THE ROLE OF SACRED HUACAS AND PARAJES

Map content obviously reflects landscape components deemed culturally important by mapmakers and map users. Two significant cultural elements in the central Andes are *huacas* and *parajes*.

*Huaca* is a broad term designating a sacred thing. Mountains, springs, trees, river junctions, boulders, mummies, and artifacts can all be *huacas*. The significance of *huacas* to Andean spatial representation goes well beyond the simple observation that showing a tree or boulder on a map may signify more than its physical location. Powerful *huacas*, those deemed responsible for the current order of things, had elaborate social and political institutions built around them.<sup>29</sup> Hydrology, political structure, religion, and territory are all intertwined in the concept of the *huaca*. When the Inkas resettled the Cuzco Valley, they reassigned the rights and duties for more than three

hundred *huacas*, many of them associated with water, in order to legitimize the new world order.<sup>30</sup>

According to Cristóbal de Molina, among the painted boards at Poquen Cancha was a pictorial narrative of the mythical origin of the Inkas. This myth essentially states that at Tiwanaku the creator deity made clay likenesses of all indigenous peoples and decorated them according to the garments and hairstyles peculiar to each group. The creator also gave each group its languages, songs, and foods. When the creator finished shaping and painting the human lumps of clay, clay likenesses of one man and woman from each group passed underground and re-emerged at the exact places and landscape features that

28. Dean E. Arnold, "Design Structure and Community Organization in Quinua, Peru," in *Structure and Cognition in Art*, ed. Dorothy Koster Washburn (Cambridge: Cambridge University Press, 1983), 56–73.

29. Frank Salomon, "Introductory Essay: The Huarochirí Manuscript," in *The Huarochirí Manuscript: A Testament of Ancient and Colonial Andean Religion*, trans. Frank Salomon and George L. Urioste (Austin: University of Texas Press, 1991), 1–38, esp. 16–19.

30. Jeanette E. Sherbondy, "Water Ideology in Inca Ethnogenesis," in *Andean Cosmologies through Time: Persistence and Emergence*, ed. Robert V. H. Dover, Katherine E. Seibold, and John H. McDowell (Bloomington: Indiana University Press, 1992), 46–66, esp. 59–60.

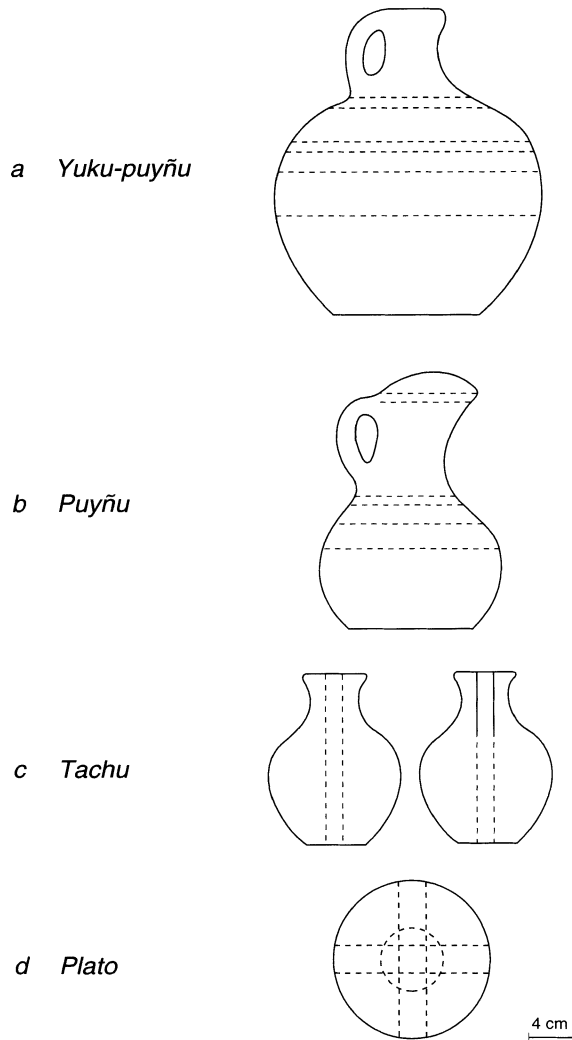


FIG. 6.12. SPATIAL ORGANIZATION AND CERAMIC DECORATIVE BANDS ON QUINUA POTTERY. The four types of pottery shown here are common utilitarian vessels used by Quinoa inhabitants. The vessels encode important spatial knowledge critical to the social structures of the community. Vertically stacked design bands on vessels *a* and *b* reflect landholdings and resource zones that are organized at multiple elevations. On *c*, a single vertical strip divides the vessel and mirrors the division of the community by a primary irrigation canal. Each individual in Quinoa is a member of two kin groups, and this bilateral descent may be reflected in the bilateral symmetry of particular motifs on *c* and *d*. The circle at the center of the bowl, *d*, is analogous to the village as the center of the social and ecological environment. After Dean E. Arnold, "Design Structure and Community Organization in Quinoa, Peru," in *Structure and Cognition in Art*, ed. Dorothy Koster Washburn (Cambridge: Cambridge University Press, 1983), 56–73, esp. figs. 5.5–5.8.

the creator had assigned to them. This version of the Inka origin myth outlines the welding of landscape and society that is at the heart of the *ayllu* as well as the geographic significance of *huacas* in commemorating mythohistorical

beginnings and explaining the current configuration of things. "Because they issued forth from these places and began to multiply, and had the beginning of their lineage from them, they made *huacas* and places of worship in remembrance of their beginnings. Each nation wears the costume with which they dressed their *huacas* of origin. Thus, the *huacas* they use and worship are all of different forms."<sup>31</sup> Individual *huacas* are of cartographic significance, since they represent the place of origin for a particular Inka lineage and also identified territorial apportionments by their mythological associations and links to specific administrative districts.<sup>32</sup>

Oral traditions detailing the history of *huacas*, such as the Huarochirí Manuscript from central Peru, are exegeses of landscape. The cultural importance of *huacas* is such that, in the case of the Huarochirí Manuscript, modern researchers have generated maps using *huaca* names recorded four hundred years ago.<sup>33</sup> *Huacas* often are personified in Andean oral traditions detailing the mythicized histories of landscape formation and the founding of an *ayllu* lineage. Such ancestor *huacas* are more than cosmological signifiers or potential objects on an Andean map. They are part of a social discourse because they legitimize territorial apportionments by rights of lineage.<sup>34</sup> More than four millennia ago, the Chinchoros of northern Chile and the central Peruvian Palomans established the enduring Andean tradition of social formations based on the veneration of tangible common ancestors.<sup>35</sup>

The representation of a *huaca* on a textile produced by modern Quechua-speaking peoples from the Q'ero Valley, department of Cuzco, Peru, utilizes geographic and temporal motifs (figs. 6.13 and 6.14). The incarnation of the ancestor *huaca* Inkarrí, the first Inka, is depicted along with *k'iraqey puntas* (literally "toothlike points")—a motif that represents mountain peaks that function as the natural boundary markers identifying Q'ero territory.<sup>36</sup> The textile map is a pictorial narrative of Inkarrí's role in shaping the Q'ero landscape.

The Q'ero *pallay* maps time onto space by using shadow to represent the direction of sunlight.<sup>37</sup> The quartered diamond circumscribed into a rectangular frame,

31. Molina, *Fábulas y mitos*, 49–51, quotation on 51 (note 8).

32. Polo de Ondegardo, *El mundo de los Incas*, 100–103 (note 25). See also Juan de Matienzo, *Gobierno del Perú*, ed. Guillermo Lohmann Villena (Paris: Institut Français d'Études Andines, 1967), 128–31.

33. Gerald Taylor and Antonio Acosta, trans., *Ritos y tradiciones de Huarochirí: Manuscrito quechua de comienzos del siglo XVII* (Lima: Instituto de Estudios Peruanos, 1987), esp. 39.

34. Salomon, "Introductory Essay," 19–24 (note 29).

35. Moseley, *Incas and Their Ancestors*, 93–94 (note 5).

36. Gail P. Silverman-Proust, "Weaving Technique and the Registration of Knowledge in the Cuzco Area of Peru," *Journal of Latin American Lore* 14 (1988): 207–41, esp. 219–23.

37. Silverman-Proust, "Weaving Technique," 227–32. Some Andean peoples, past and present, have told time by observing shadows cast by



FIG. 6.13. Q'ERO PALLAY TEXTILE PORTRAYING MOUNTAINS. Quechua peoples living in the Q'ero Valley weave a two-sided cloth called a *pallas*. See figure 6.14. From Gail P. Silverman-Proust, "Weaving Technique and the Registration of Knowledge in the Cuzco Area of Peru," *Journal of Latin American Lore* 14 (1988): 207–41, esp. fig. 19.

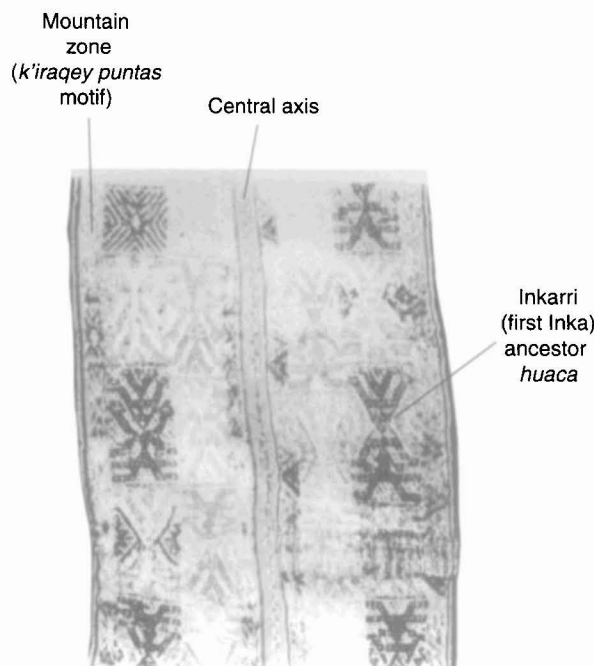


FIG. 6.14. EXPLANATION OF THE Q'ERO PALLAY (FIG. 6.13). Q'ero peoples identify a specific valley by the type of mountain peaks that enclose it. The sawtooth motif (*k'iraqey puntas*) represents the mountains that enclose the Q'ero Valley. Subtle changes in the shape and size of the motif may signify specific mountain attributes. The figure standing with arms upstretched and lowered is the incarnation of the ancestor *huaca* Inkarrí, while the central axis represents a natural or cultural boundary between villages such as the Q'ero River.

called *tawa inti qocha*, is one of several *inti* motifs that indicate sunrise, sunset, the sun at the zenith (noon), or the sun at the antizenith (midnight), depending on the weaver's purpose (fig. 6.15).<sup>38</sup>

A textile illustrating the spatial relation of landholdings and land features is the two-color Qheswa *pallas* in figure 6.16. It is woven with the *tawa t'ika qocha* motif composed of a quartered diamond that is separated into two halves by a *sonqocha* line. Like other examples of dual spatial organization in Andean societies, the partitioning of the diamond is a general reference to the ideal division of social and territorial space. The *tawa t'ika qocha* motif is also outlined in red and white rectangles, called *órgano*, which are aligned repetitively (fig. 6.17). According to Silverman-Proust, the *órgano* weave signifies a series of square furrows that form individual agricultural plots. In short, the individual diamonds on the Qheswa *pallas* are organized into a grid representing agricultural landholdings.<sup>39</sup> Although the idea is speculative, the altitudinal locations of the household's agricultural fields may be signified by multicolored bands (*listas*) that border the *órgano* motif. *Listas* signify a color classification scheme for agricultural products. For example, a yellow

stripe signifies yellow maize or yellow potatoes, a red stripe signifies red maize or red potatoes. Because particular crops have an optimal altitudinal life zone, the number and sequence of *listas* may symbolize the altitude of landholdings.<sup>40</sup>

Andean peoples often name a particular resource zone (*paraje*) after some local physical feature, such as a spring, a place where a certain plant grows, a rock outcrop, or an animal habitat. The names of these zones should not be conceptualized as clearly bounded areas. Although *parajes* denote a specific area, the locales have diffuse boundaries between them.<sup>41</sup> The mapping signifi-

the sun. One method is to note the change in shadow length projected onto a mountain.

38. Silverman-Proust, "Weaving Technique," 209–11. During interviews with Silverman-Proust, Quechua peoples from Q'ero produced a series of landscape drawings and celestial maps to explain the Q'ero *pallas*.

39. Silverman-Proust, "Weaving Technique," 236.

40. Gail P. Silverman-Proust, "Significado simbólico de las franjas multicolores tejidas en los wayakos de los Q'ero," *Boletín de Lima* 10, no. 57 (1988): 37–44.

41. David H. Andrews, "The Conceptualization of Space in Peru" (paper presented at the sixty-fifth annual meeting of the American An-



FIG. 6.15. Q'ERO PALLAY WITH INTI MOTIFS. This Q'ero textile incorporates four *inti* motifs that represent sunrise (*inti lloqsimushan*), sunset (*inti chinkiapushan*), sun at noon (*hatun inti*), and sun at midnight (*tawa inti gocha*), depending upon the weaver's use of different yarn color and pattern combinations. Quechua women incorporate these motifs into their textiles according to the time of day they wish to portray, represented by the amount of sunlight available and shadow used.

From Gail P. Silverman-Proust, "Weaving Technique and the Registration of Knowledge in the Cuzco Area of Peru," *Journal of Latin American Lore* 14 (1988): 207–41, esp. fig. 1.

cance of *parajes* is that the representation of a single feature on a map may in fact be interpreted by Andeans as standing for a larger area. An example of the concept of *parajes* is the multicolored *listas* of figure 6.16, on which the color signifies a particular crop and its altitudinal growing zone.<sup>42</sup>

#### LANDSCAPE METAPHORS

Several art historians and anthropologists have noted the importance of metaphor in the art of pre-Columbian Andean societies like the Nasca.<sup>43</sup> The body-landscape metaphor was certainly used in Inka times.<sup>44</sup> Modern-day ethnographers have also noted the central Andean use of animal-landscape and human body-landscape metaphors in wayfinding and during mapping rites.

The greater Kaata community, in the department of La Paz, Bolivia, consists of Aymara and Quechua speakers who have personalized the landscape in terms of the human body. For example, the highland Roop and Green



FIG. 6.16. QHESWA PALLAY TEXTILE FROM PISAC, PERU. The Qheswa *pally* is a textile that represents spatial concepts. This textile may signify the location of agricultural landholdings in the Pisac Valley. See figure 6.17.

From Gail P. Silverman-Proust, "Weaving Technique and the Registration of Knowledge in the Cuzco Area of Peru," *Journal of Latin American Lore* 14 (1988): 207–41, esp. fig. 2.

Lakes are the left and right eyes, mountain slopes are the chest (*kinre*), and the Huruku and Ayllu Rivers are the left and right legs. Individual communities are known by

thropological Association, Pittsburgh, 19 November 1966). Cobo, *Inca Religion and Customs*, 183 (note 25), notes that all Andean toponyms are compound signifiers of some attribute unique to the location. For a specific example, see Karl S. Zimmerer, "Transforming Colquepata Wetlands: Landscapes of Knowledge and Practice in Andean Agriculture," in *Irrigation at High Altitudes: The Social Organization of Water Control Systems in the Andes*, ed. William P. Mitchell and David Guillet (Arlington, Va.: Society for Latin American Anthropology, American Anthropological Association, 1993), 115–40, esp. 122–23.

42. Silverman-Proust, "Significado simbólico," 41–42 (note 40).

43. For example, George Kubler, *The Art and Architecture of Ancient America: The Mexican, Maya, and Andean Peoples* (Baltimore: Penguin Books, 1962), 289–92, and Catherine J. Allen, "The Nasca Creatures: Some Problems of Iconography," *Anthropology* 5, no. 1 (1981): 43–70, esp. 44–46.

44. Constance Classen, *Inca Cosmology and the Human Body* (Salt Lake City: University of Utah Press, 1993).

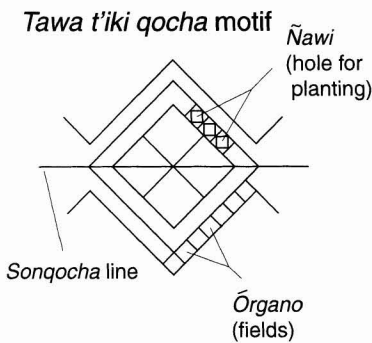
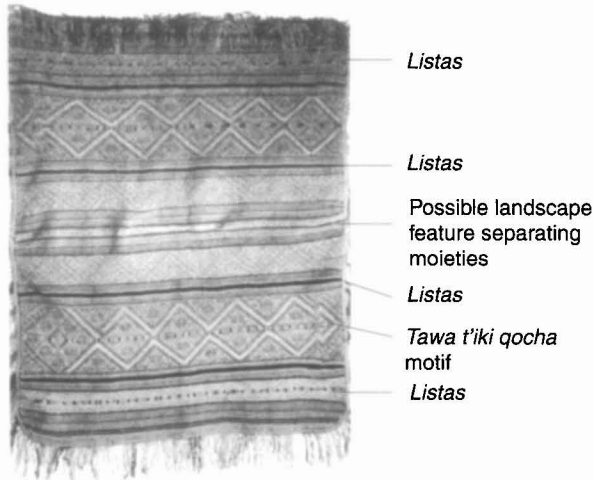


FIG. 6.17. EXPLANATION OF THE QHESWA PALLAY (FIG. 6.16). A set of central horizontal bands likely represents a landscape feature, such as a road or river, separating the landholdings of two *ayllus* or moieties, and the *tawa t'ika qocha* motif encodes additional geographic information. Silverman-Proust identifies the alternating colored rectangles with a dot in the middle as a *ñawi* motif, which means “hole for planting,” and identifies the alternating red and white rectangles as *órgano* or agricultural fields. The altitude of the fields is referenced by the *listas* that frame the diamond-shaped *tawa t'ika qocha* motif. Silverman-Proust notes that the number and color of *listas* that frame the motif vary with the location of textile production.

their position within the metaphorical mountain body and are often assigned ritual tasks according to their locations.<sup>45</sup>

MAPPING RITES AND EPHEMERAL MAPS

Various central Andean rituals, which may be called “mapping rites,” require an ephemeral map of a specific landscape in order to achieve their goal. There are two general types of mapping rites. One is associated with religious mapping, which uses ephemeral maps to locate or influence preterhuman and extramundane forces or direct them to a locale. Participants in a religious mapping rite arrange amulets representing landscape features and

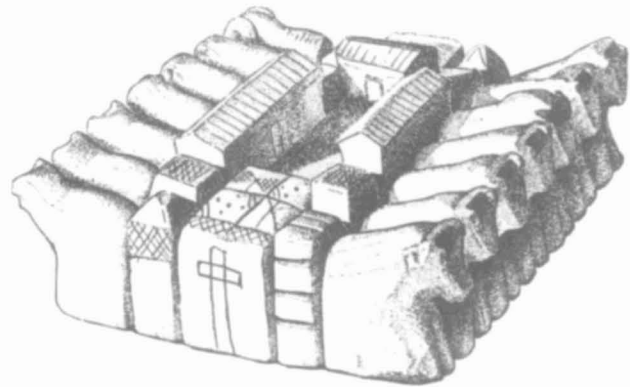


FIG. 6.18. LANDHOLDING AMULET FROM THE DEPARTMENT OF LA PAZ, BOLIVIA. This amulet depicts a specific village plaza with a realistic rendering of various buildings and a church (identifiable by an inscribed cross on the exterior wall). Seven llamas appear on each side of the village square, probably representing the livestock held by the *ayllus* composing the two village moieties. This type of amulet is usually used in animal increase rites. A magician constructs a ceremonial *mesa* (tabletop shrine)—literally an ephemeral map representing the larger valley and an imagined spirit world—from the carved stone amulet and other ritual items, then directs spiritual forces to the locale signified by the amulet and the livestock it is associated with.

From Harry Tschopik, “The Aymara of Chucuito, Peru,” *Anthropological Papers of the American Museum of Natural History* 44 (1951): 137–308, esp. 237 (fig. 5).

landholdings with respect to an object that acts as a portal to the spirit world—often a *huaca*. The *mesa* (an arrangement of power objects) is often laid out on a portable tabletop or a blanket.<sup>46</sup> The second type of mapping rite outlines the apportionment of territory and social responsibilities within a community.

Aymara “magicians” of Chucuito, Peru, use amulets to represent the livestock holdings of a particular community during animal increase rituals and other fertility rites (for a similar Bolivian example, see fig. 6.18). Only the magician may own a stone amulet representing a social unit and its worldly possessions, since the artifact influences and directs the patron spirits of the household. The magician arranges amulets and other artifacts representing a single household’s corral and animals on a sacred cloth and then identifies and locates the nature spirits responsible for pastoral or agricultural fertility and directs their blessings toward the family’s landholdings.<sup>47</sup>

45. Bastien, *Mountain of the Condor*, 43–50 (note 18).

46. Table shrines (*mesas*) are widely used throughout the New World in shamanistic rituals. See Douglas Sharon, “Distribution of the *Mesa* in Latin America,” *Journal of Latin American Lore* 2 (1976): 71–95, and Stephen C. Jett, “Cairn Trail Shrines in Middle and South America,” *Conference of Latin Americanist Geographers Yearbook* 20 (1994): 1–8.

47. Harry Tschopik, “The Aymara of Chucuito, Peru,” *Anthropo-*

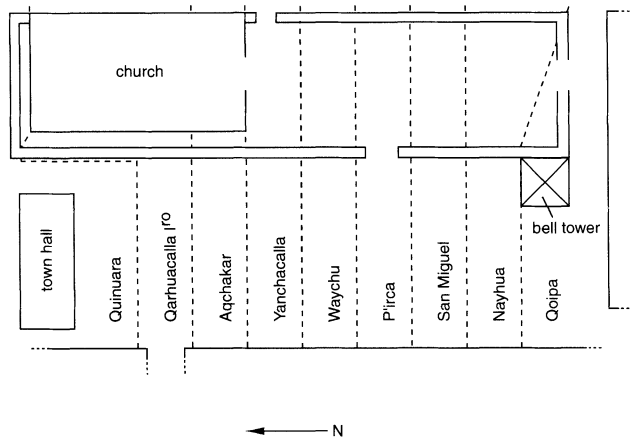


FIG. 6.19. *CHHIUTAS* IN THE PACARIQTAMBO CHURCHYARD AND PLAZA. During religious festivals at Pacariqtambo, Peru, *ayllu* representatives ritually “clean” assigned *chhiutas*, rectangular strips of ground in the churchyard and plaza representing usufruct over parcels of land. The ritual cleaning of *chhiutas* symbolizes the commitment of each *ayllu* to maintaining village infrastructure. A topologic sequence for the *chhiutas* is implied by the grouping of strips by *ayllu* and moiety. The sequence is anchored by the southernmost strip, which is the responsibility of Qoipa, a small village to the south of Pacariqtambo.

After Gary Urton, “Andean Social Organization and the Maintenance of the Nazca Lines,” in *The Lines of Nazca*, ed. Anthony F. Aveni (Philadelphia: American Philosophical Society, 1990), 173–206, esp. 180 (fig. IV.5).

Although a general cosmographic symbolism permeates all religious mapping rites, many such rites reference a specific landscape. For example, the aforementioned Kaata community also constructs a specific *mesa* representing Mount Kaata during the Feast of the Dead, and on that *mesa* it symbolizes Mount Aqhamani during a lineage rite.<sup>48</sup>

The Quechua-speaking village of Pacariqtambo, in the Paruro region of Cuzco, has ten *ayllus*, each belonging to one of two moieties. Every *ayllu* is responsible for sponsoring a religious festival between the harvest and planting seasons and for pledging labor to maintain community infrastructure. The main event during one of these festivals is the procession of the honored saint through the churchyard and plaza. Villagers inscribe nine parallel strips of territory, called *chhiutas*, on the churchyard and plaza (fig. 6.19). Eight *chhiutas* are swept and maintained by the four oldest *ayllus* from each moiety. The ninth *chhiuta* is maintained by a neighboring village, Qoipa, a short distance south of Pacariqtambo. The Qoipa *chhiuta* is on the south end of the plaza, suggesting that the *chhiutas* are locationally sequenced according to the contiguous landholdings of each *ayllu*. *Chhiutas* have flexible boundaries and configurations that must be renegotiated before each religious festival and that reflect the changing

landholdings and social responsibilities of each *ayllu*. Sweeping the *chhiutas* thus symbolizes the responsibility of each *ayllu* to maintain a portion of community infrastructure. The procession of Pacariqtambo’s patron saint through the churchyard and plaza sanctifies the mapping rite that legitimizes the apportionment of territory and social responsibilities within the community.<sup>49</sup> *Chhiuta*-like representations have archaeological manifestations in ancient architecture, and the variation in the size and number of parallel strips reflects the unique geographical and historical circumstances of the site setting.<sup>50</sup>

Mapping rite amulets are often found at the many pre-Columbian cosmopolises in the Andes (fig. 6.24 below, for example). Cosmopolises are sites that replicate an idealized vision of the earth and cosmos through design alignments and architecture.<sup>51</sup> Mapping rites become a form of sacred technology when performed within an Andean cosmopolis or *huaca* shrine, since the architecture is designed to change elements of the earth and cosmos by representing them.

## ROCK ART

Rock art as a whole is generally multireferential and cannot simply be “read” by modern viewers. I am unaware of any systematic excavation of Andean rock art sites, and thus context as well as dating remains a major problem in interpreting images. There are nevertheless strong formal similarities between some rock art images and pre-Columbian artifacts.<sup>52</sup> Although stylistic analyses and image content strongly suggest that many reported examples of rock art are pre-Columbian, such appraisals only establish a terminus post quem.

*logical Papers of the American Museum of Natural History* 44 (1951): 137–308, esp. 190–99, 239–40, 253, and 275–77.

48. Bastien, *Mountain of the Condor*, 51–56, 135–49, and 178–83 (note 18). The Aymara peoples of Chucuito sometimes use more permanent features as a topographic reference during mapping rites. During a drought, they make a pilgrimage to the stone shrine of Atojja, near the peak of the same name. The “eyes” of the shrine, according to Tschopik, represent Lake Titicaca. See Tschopik, “Aymara of Chucuito,” 197 and 277–78 (note 47).

49. Gary Urton, “Chuta: El espacio de la práctica social en Pacariqtambo, Perú,” *Revista Andina* 2 (1984): 7–43, and idem, “Andean Social Organization,” 179–83 (note 19).

50. Urton, “Andean Social Organization,” 184–93.

51. For a general review of this worldwide practice, see Paul Wheatley, *The Pivot of the Four Quarters: A Preliminary Enquiry into the Origins and Character of the Ancient Chinese City* (Chicago: Aldine, 1971), 225–57 and 411–76; Yi-Fu Tuan, *Space and Place: The Perspective of Experience* (Minneapolis: University of Minnesota Press, 1977), 85–117; and idem, *Topophilia: A Study of Environmental Perception, Attitudes, and Values* (Englewood Cliffs, N.J.: Prentice-Hall, 1974), 129–72.

52. For example, Antonio Núñez Jiménez, *Petroglifos del Perú: Panorama mundial del arte rupestre*, 2d ed., 4 vols. (Havana: Editorial Científico-Técnica, 1986), 109.

Antonio Núñez Jiménez's monumental catalog of Peruvian rock art contains many examples of images that may be maps, although he does not always label them as such.<sup>53</sup> Some of the images use natural or cultural features to separate and frame adjacent places and events, both real and imagined. In landscape scenes cultural and human figures are nearly always portrayed in profile or at a low angle. Geographic space is usually depicted from above, as shown in the probable plan view depictions of river drainages and quebradas. There are several references to probable journeys in Núñez Jiménez's compilation, some of which may use dots and lines to connect places or events both real and imagined. Celestial objects are occasionally rendered with respect to horizon features. Several images are reminiscent of spatial themes discussed earlier, including landscape-animal-body metaphors and the possible use of rectangular blocks to represent households and landholdings.

Figure 6.20, from Salta in the Andean part of Argentina, is one of eleven petroglyphs identified by Ercilia Navamuel as purportedly illustrating the locations of villages, corrals, agricultural landholdings, streams and quebradas, mountains, and springs. Several of the villages depicted in the rock art are apparently known archaeological sites today. In addition, some petroglyphs are of interest because they have been said to illustrate the solar path, a calendar, and possible landscape features on the same stone.<sup>54</sup>

#### A CHRONOLOGICAL PERSPECTIVE ON ANDEAN MAPMAKING IN THE ARCHAEOLOGICAL RECORD

This section traces, by analogy and in chronological order, the cultural and geometric precepts outlined above in the Andean archaeological record. There are many pitfalls in historical and ethnographic analogy. Andean cultural change was often driven by conquest and subjugation, not only by the Spaniards, but also by the Inkas and earlier city-state empires. Spatial and landscape representations will likely change with every conquest. The probability of a disjunction between an archaeologically defined culture, based on artifact assemblages, and a social group defined by cultural and biological reproduction increases dramatically over time. Analogies also tend to homogenize a culture's historical variation, thus obscuring the very basis of cultural evolution.

#### THE OLD TEMPLE AT CHAVÍN DE HUÁNTAR

Chavín de Huántar was the major religious center for the Chavín culture (ca. 900–200 B.C.). Although ancient Andeans extensively modified Chavín de Huántar through time, the original architectural complex, called the Old



FIG. 6.20. PETROGLYPH FROM SALTA, ARGENTINA. According to Ercilia Navamuel, this petroglyph found at the archaeological site of El Duraznito is a map of the nearby pre-Hispanic city of Santa Rosa de Tastil and also shows an access road to the Las Minas quebrada.

By permission of Ercilia Navamuel, Salta, Argentina.

Temple, can be distinguished. Like other Peruvian ceremonial centers, the Old Temple, a U-shaped pyramidal platform mound surrounding a lower circular courtyard, is thought to have had a geomantic function.<sup>55</sup> In addition, thousands of ceramics found in the temple's Gallery of the Offerings may have been part of mapping rites. It has been suggested that some of these pieces, perhaps made in distant villages and possibly representing their myths and *huacas*, were used in ritual offerings.<sup>56</sup>

Unlike its architectural predecessors, the Old Temple opens not toward the headwaters of the local river but rather opposite Huantasán, the highest peak in the Cordillera Blanca. Huantasán is one of the sources for the nearby Mosna and Wacheksta Rivers and is also the incarnation of a *huaca* worshiped in Inka and colonial times.<sup>57</sup> Studies by Urton and Aveni note that the build-

53. Núñez Jiménez, *Petroglifos del Perú*.

54. Ercilia Navamuel, *Atlas histórico de Salta: Conocimiento geográfico indígena e hispano* (Salta, Argentina: Aráoz Anzoátegui Impresores, 1986), esp. 7.

55. William Harris Isbell, "Cosmological Order Expressed in Prehistoric Ceremonial Centers," in vol. 4 of *Actes du XLII<sup>e</sup> Congrès International des Américanistes* (1976) (Paris: Société des Américanistes, 1978), 269–97, esp. 286–95, and Donald Ward Lathrap, "Jaws: The Control of Power in the Early Nuclear American Ceremonial Center," in *Early Ceremonial Architecture in the Andes*, ed. Christopher B. Donnan (Washington, D.C.: Dumbarton Oaks Research Library and Collection, 1985), 241–67, esp. 242–45.

56. Burger, *Chavín*, 139–40 (note 4); Luis Guillermo Lumbreras, *Chavín de Huántar en el nacimiento de la civilización andina* (Lima: Instituto Andino de Estudios Arqueológicos, 1989), 183–216; and idem, *Chavín de Huántar: Excavaciones en la Galería de las Ofrendas* (Mainz: P. von Zabern, 1993).

57. Johan Reinhard, "Chavín and Tiahuanaco: A New Look at Two Andean Ceremonial Centers," *National Geographic Research* 1 (1985):

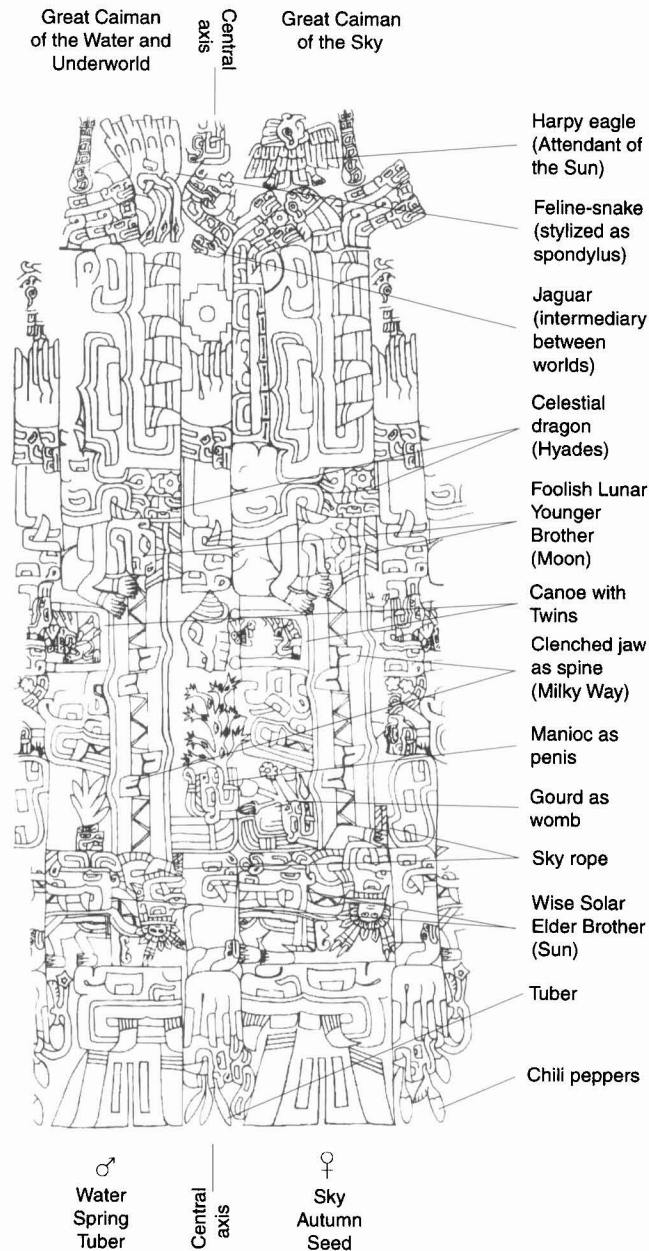


FIG. 6.21. DRAWING AND INTERPRETATION OF THE TELLO OBELISK FROM THE OLD TEMPLE COMPLEX OF CHAVÍN DE HUÁNTAR, 600–500 B.C. The relief sculpture on the Tello Obelisk, a prismatic granite shaft about  $2.5 \times 0.3$  meters, is a caimanic world tree that depicts the sun and the waning moon at opposite sides of the heavens, as they appear at twilight, and fuses terrestrial symbolism with celestial ordinations. The two highly stylized caimans to the left (Great Caiman of the Water and Underworld) and right (Great Caiman of the Sky) of the obelisk's central axis depict cosmographical, celestial, and terrestrial elements. The geometric organization is similar to the inferred social and territorial organization of Chavín de Huántar, even though many of the plants and animals illustrated are from exotic locations, such as the Amazonian harpy eagle and manioc plant or the Ecuadorian spondylus shell. A stylized canoe on the clenched jaw as spine of each caiman represents the celestial canoe that carried the Twins across the Milky Way in various Amazonian myths. Other mythological incarnations include the sun, moon, and constellations.

From a drawing by Janet C. Smith, based on rubbings of the original by John Howland Rowe, in "El arte de Chavín; estudio de su forma y su significado," *Historia y Cultura* 6 (1973): 249–76, fig. 6. By permission of John Howland Rowe. Interpretation by William Gustav Gartner.

second cruciform chamber above, and its base is set deep into the floor, signifying the Lanzón deity's role as an *axis mundi* unifying heavens, earth, and Underworld.<sup>60</sup>

In addition to the Lanzón, one other sculpture is exceptional in its form and considered particularly sacred—the Tello Obelisk (fig. 6.21). Like the Lanzón, and unlike any other sculptures in the Old Temple, it is a carved granite shaft that also acts as an *axis mundi*. The carving has been interpreted as two highly stylized caimans separated by a thick central axis, each one an aspect of the Great Caiman. The caiman is generally known as the master of fishes, a reference to its pivotal role in fish reproduction and the ecology of the Amazonian backwaters. Donald Ward Lathrap takes the importance of the caiman even further. He argues that it represents the entire cosmos and

ings are not laid out according to the cardinal directions but are oriented more than thirteen degrees clockwise of due east—possibly related to celestial phenomena.<sup>58</sup> The Old Temple alignments symbolically unite Huantasán, a source of the temple waters, with the path of the Pleiades, a celestial harbinger of the rainy season.<sup>59</sup>

There are several subterranean passageways, called galleries, within the Old Temple. The most important is the cruciform Lanzón Gallery, at the center of the U. The gallery contains an east-facing granite shaft, 5.5 meters tall, carved with an anthropomorphic figure—the Lanzón, Chavín de Huántar's supreme deity. The shaft was an integral part of the building structure. It protrudes into a

395–422, esp. 398–401. Huantasán is the ultimate source for water that cascades quite audibly through an elaborate and hidden system of enclosed aqueducts within the Old Temple complex. See Luis Guillermo Lumbreras, Chacho González, and Bernard Lietaer, *Acerca de la función del sistema hidráulico de Chavín* (Lima: Museo Nacional de Antropología y Arqueología, 1976), esp. 13–15.

58. Burger, *Chavín*, 132 (note 4), and Gary Urton and Anthony F. Aveni, "Archaeoastronomical Fieldwork on the Coast of Peru," in *Calendars in Mesoamerica and Peru: Native American Computations of Time*, ed. Anthony F. Aveni and Gordon Brotherston (Oxford: BAR, 1983), 221–34, esp. table 1.

59. The rugged terrain towering above Chavín de Huántar does not favor horizon astronomy. It is more probable that astronomical observations were made on nearby summit sites such as Poqoq and Huaqaaq. See Reinhard, "Chavín and Tiahuanaco," 401 (note 57).

60. Burger, *Chavín*, 135–37 (note 4), and Julio C. Tello, *Chavín: Cultura matriz de la civilización andina* (Lima: Universidad Nacional Mayor de San Marcos, 1960), esp. 104–9.



is the most important cosmological symbol in nuclear America.<sup>61</sup>

Each caiman on the Tello Obelisk contains figure panels depicting fused plant, animal, and character elements in profile.<sup>62</sup> Life forms and geographic features abstracted from the realms of water, earth, and sky are organized into associative relationships.<sup>63</sup> Left of the central axis is the Great Caiman of the Water and Underworld, associated with spring, tubers, and vegetatively reproduced plants. Right of the central axis is the Great Caiman of the Sky, associated with autumn and seed plants.<sup>64</sup> Together the caimans signify dualisms, such as animal-plant, wild-domestic, and above-below.<sup>65</sup> The bilateral symmetry of the Tello Obelisk mirrors the dual territorial and social organization of Chavín de Huántar inferred from the archaeological record.

Characters from celestial myths are depicted on the obelisk, illustrating a fundamental astrobiological tenet—heavenly movements are correlated with life cycles on earth. The Wise Solar Elder Brother holds a sky rope to ascend to the heavens, symbolized by the clenched jaw as spine motif that represents the Milky Way. The harpy eagle, also known as the Attendant of the Sun, acts as a guide. A stylized canoe carries the mythical Twins across the Milky Way and toward the Foolish Lunar Younger Brother, who loses his legs to the celestial dragon (the Hyades) as the Pleiades watch.<sup>66</sup> In sum, the Tello Obelisk is a cosmographical map, a pictorial narrative of mythicized histories and ethnoecology, and a visual attempt to integrate exotic information within the everyday geometric structures of Chavín life.

#### PARACAS TEXTILES AND ARTIFACTS

The Paracas cultural tradition spanned a minimum of nine hundred years (700 B.C.–A.D. 100) in the major river valleys around the Paracas Peninsula, south Peruvian coast. Some early Paracas textiles and artifacts clearly reference Chavín art, although differences exist in media, function, technique, and iconography.<sup>67</sup>

Paracas is famous for its beautiful textiles, which commonly depict plants and animals from specific habitats.<sup>68</sup> For ancient Paracas, predators may have functioned as *parajes*, that is, as a means of categorizing loosely defined landscape zones. Plant and animal images may have acted as visual metaphors for ecological zones in Paracas iconography. This may also help explain the preponderance of human figures in animal and plant costumes that dominate Paracas textile imagery. Anne Paul speculates that Paracas leaders wore these textiles during rituals that linked natural features to the social and cosmic order.<sup>69</sup>

Julio Tello examined the Paracas polychrome mantle (fig. 6.22), a textile looted from the Necrópolis of Cerro Colorado on the Paracas Peninsula. He interpreted the

unusually varied imagery of this textile as a calendar and noted that the same individual costumed dancers appear in isolation on other Paracas textiles.<sup>70</sup> This mantle may commemorate a calendrically timed mapping rite among Paracas *ayllus* or other social groups that legitimized the territorial division of sunken gardens or shallow valleys suitable for cultivation along the arid coast (*mahamaes*). The four columns of geometric blocks with a central severed-head motif are fundamental to this interpretation, which expresses bonds to locality through descent.<sup>71</sup>

61. Lathrap, "Jaws," 245–46 (note 55).

62. Tello, *Chavín*, 177–86 (note 60), and Donald Ward Lathrap, "Gifts of the Cayman: Some Thoughts on the Subsistence Basis of Chavín," in *Variation in Anthropology: Essays in Honor of John C. McGregor*, ed. Donald Ward Lathrap and Jody Douglas (Urbana: Illinois Archaeological Survey, 1973), 91–105.

63. John Howland Rowe, "Form and Meaning in Chavín Art," in *Peruvian Archaeology: Selected Readings*, ed. John Howland Rowe and Dorothy Menzel (Palo Alto, Calif.: Peek, 1967), 72–103. Rowe describes these relationships as "kennings," or visual metaphors, which are prevalent in Chavín art. For more on the Chavín style, see Burger, *Chavín*, 146–49 (note 4).

64. Lathrap, "Jaws," 249–51 (note 55).

65. Burger, *Chavín*, 131 (note 4), and R. Tom Zuidema, "An Andean Model for the Study of Chavín Iconography," *Journal of the Steward Anthropological Society* 20, nos. 1–2 (1992): 37–54.

66. Peter G. Roe, "Obdurate Words: Some Comparative Thoughts on Maya Cosmos and Ancient Mayan Fertility Imagery," *Cambridge Archaeological Journal* 5 (1995): 127–30, esp. fig. 4.

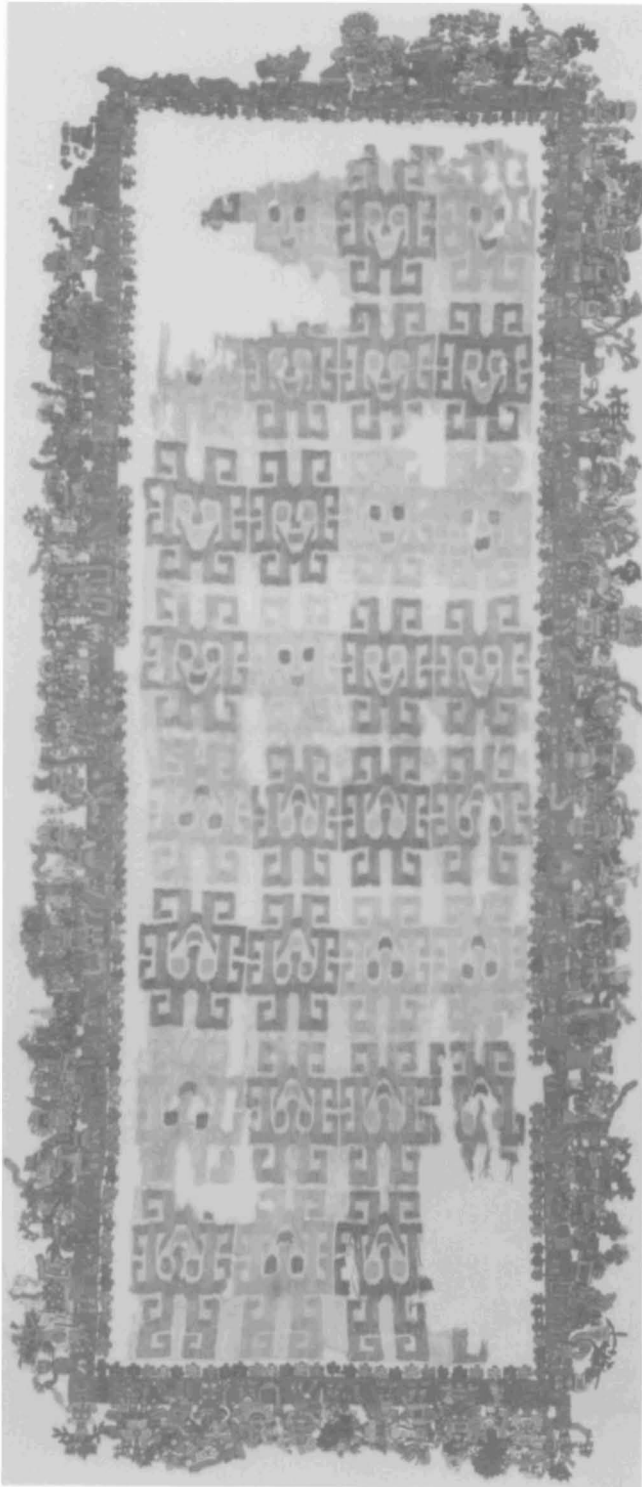
67. This is especially true for Carhua textiles and Paracas pottery from the Ica Valley. See Richard L. Burger, "Unity and Heterogeneity within the Chavín Horizon," in *Peruvian Prehistory: An Overview of Pre-Inca and Inca Society*, ed. Richard W. Keatinge (Cambridge: Cambridge University Press, 1988), 99–144, esp. 120; John Howland Rowe, *Chavín Art: An Inquiry into Its Form and Meaning* (New York: Museum of Primitive Art, 1962), 5–6; and Dwight T. Wallace, "A Technical and Iconographic Analysis of Carhua Painted Textiles," in *Paracas Art and Architecture: Object and Context in South Coastal Peru*, ed. Anne Paul (Iowa City: University of Iowa Press, 1991), 61–109, esp. 104–8.

68. Ann H. Peters, "Ecology and Society in Embroidered Images from the Paracas Necrópolis," in *Paracas Art and Architecture: Object and Context in South Coastal Peru*, ed. Anne Paul (Iowa City: University of Iowa Press, 1991), 240–314.

69. Anne Paul, "Paracas Necrópolis Textiles: Symbolic Visions of Coastal Peru," in *The Ancient Americas: Art from Sacred Landscapes*, ed. Richard F. Townsend (Chicago: Art Institute of Chicago, 1992), 278–89, esp. 285–86 and 288–89. Textiles often depict dancers during ritual movements, frequently facing in the direction of the textile weave. See Mary Frame, "Structure, Image, and Abstraction: Paracas Necrópolis Headbands as System Templates," and Anne Paul, "Paracas Necrópolis Bundle 89," both in *Paracas Art and Architecture: Object and Context in South Coastal Peru*, ed. Anne Paul (Iowa City: University of Iowa Press, 1991), 110–71, esp. 134–44, and 172–221, esp. 177–210.

70. Julio C. Tello, *Paracas*, vol. 1, *El medio geográfico: La explotación de antigüedades en el centro Andino. La cultura Paracas y sus vinculaciones con otras del centro Andino* (New York: Institute of Andean Research, 1959), 70–71 and pl. 79.

71. Trophy headtaking in South American cultures such as the Nasca appears to affirm social and territorial status. See Helaine Silverman,



Thirty-two lineages are grouped into four rows. Each row corresponds to large-scale social and territorial divisions within the core Paracas culture area. The four major Paracas *mahamaes*—along the Pisco, Cañete, Chincha, and upper Ica Rivers—are the probable corresponding landscape divisions. As with the *chhiutas* rite, the public

FIG. 6.22. PARACAS POLYCHROME MANTLE. This textile found at the Necrópolis of Cerro Colorado depicts a large rectangular plaza. The plaza contains four parallel strips of eight geometric-design blocks, each with a central severed-head motif signifying an ancestral lineage and locality through descent. Each column probably corresponds to one of the four major Paracas *mahamaes* (cultivation sites), along the Pisco, Cañete, Chincha, and upper Ica Rivers. The partitioning of the surrounding geometric motif into quarters may have a general landscape association such as the four directions. It has also been suggested that this textile functioned as a calendar. Size of the original: 1.24 × 0.49 m. Photograph courtesy of the Brooklyn Museum, New York.

proclamation of corporate responsibility for community infrastructure reinforces the *ayllu* as a social group and as a territory. Ritual impersonators, wearing masks and full ceremonial regalia, stand at the plaza's periphery. Other geographic relations may be signified by animal and plant elements on the dancers' costumes.

A worldwide cosmological theme is the passage of the soul through a maze situated between this world and the hereafter.<sup>72</sup> A carved gourd, found in a Paracas tomb along with other artifacts necessary in the afterlife,<sup>73</sup> illustrates three souls (heads) within a spiritual labyrinth (fig. 6.23). One soul appears in two positions, signifying that the bold lines and geometric symbols are pathways and imagined landscape symbols. At the bottom of the severed head are the same paired geometric lines as appear below the severed heads in figure 6.22, suggesting a link between blood and social and territorial spaces. The spirit world can be difficult to navigate without the proper tools or instruction, and a spirit map could be part of this preparation.

According to Julio Tello and Mejía Xesspe, figure 6.24 is a faithful reproduction of living quarters at the village site of Arena Blanca.<sup>74</sup> It is also a partial representation of a desert *paraje*. The lower part of the vessel depicts the interiors of different houses, and the upper part depicts the exterior of an apartment compound. This ceremonial vessel ostensibly portrays the household concern with practical and spiritual matters, the latter signified by spirit masks hanging on the house walls. Each mask has subtle stylistic variations, suggesting that they differentiate households.

*Cahuachi in the Ancient Nasca World* (Iowa City: University of Iowa Press, 1993), 218–26, esp. 224–25.

72. Catherine Delano-Smith, "Cartography in the Prehistoric Period in the Old World: Europe, The Middle East, and North Africa," in *The History of Cartography*, ed. J. B. Harley and David Woodward (Chicago: University of Chicago Press, 1987–), 1:54–101, esp. 87–88.

73. For a description of the tomb's contents, see Julio C. Tello, *Paracas*, vol. 2, with Toribio Mejía Xesspe, *Cavernas y necrópolis* (Lima: Universidad Nacional Mayor de San Marcos, 1979), 133–46.

74. Tello and Xesspe, *Cavernas y necrópolis*, 259.

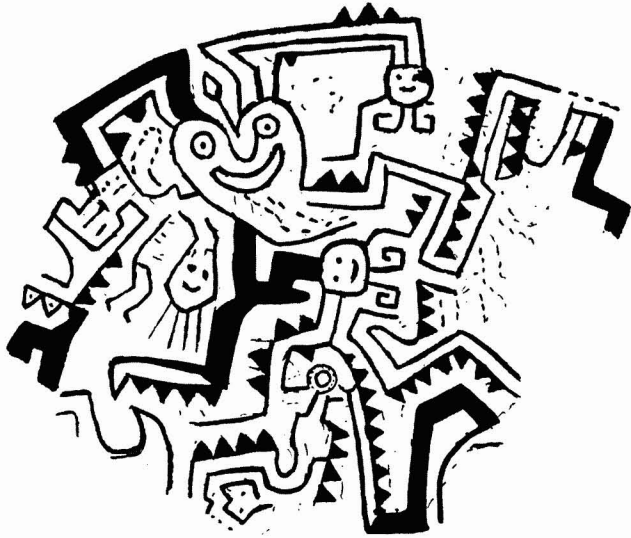


FIG. 6.23. PARACAS SPIRIT MAP ON A CARVED GOURD. This gourd was found in a tomb containing ceremonial and utilitarian artifacts necessary for life in the afterworld. The labyrinthine paths and three severed head as soul figures illustrated might have helped the soul navigate in the spirit world. From Julio C. Tello, *Paracas*, vol. 2, with Toribio Mejía Xesspe, *Cavernas y necrópolis* (Lima: Universidad Nacional Mayor de San Marcos, 1979), 145 (fig. 23). By permission of the Universidad Nacional Mayor de San Marcos, Fondo Editorial, Lima, Peru.

#### NAZCA LINES AND NASCA CERAMICS

During the second century A.D. the center of power in Peru shifted southward from the Paracas Peninsula to the desiccated Nazca plain. Although there are artistic and ideological continuities between the Paracas and Nasca cultural traditions (ca. 700 B.C.–A.D. 200 and 200 B.C.–A.D. 600), one cannot say that the latter is entirely derived from the former.<sup>75</sup>

Nazca is world renowned for a number of large ground drawings, or geoglyphs, known as the Nazca lines. They cover about two hundred square kilometers of the elevated dry plain (pampa) near the coast and between the Ingenio and Nazca Rivers. Constructing geoglyphs involves removing dark, desert-patinated stones to reveal the underlying light-colored deposits. Some Nazca geoglyphs are made with nonoverlapping lines, as if one drew a figure without ever lifting pen from paper. Other geoglyphs have a dense maze of overlapping and confusing intersections. Although proposals have been made, no consistent unit of measure common to all geoglyphs has been discovered.<sup>76</sup> Modern analysis indicates that relatively simple surveying methods, utilizing wooden stakes, uniform lengths of string, and a good eye, are more than adequate to produce Nazca line geometry.<sup>77</sup>

The most famous Nazca geoglyphs are those shaped like plants, animals, costumed performers, or geometric figures. However, the most common ground drawings, thought to have been made later, are straight lines, and

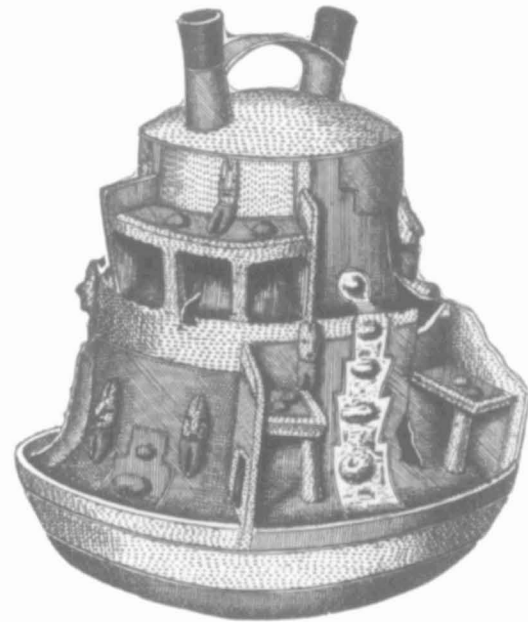


FIG. 6.24. PARACAS HOUSE MODEL FROM THE CAVERNS AT CERRO COLORADO, PARACAS PENINSULA. This ceramic vessel, basal diameter 14 cm, realistically portrays the interiors of Paracas house structures and an apartment compound at Arena Blanca. The prominent position of the masks hanging on house walls and their stylistic distinctiveness suggest that they differentiate households. From Julio C. Tello, *Paracas*, vol. 2, with Toribio Mejía Xesspe, *Cavernas y necrópolis* (Lima: Universidad Nacional Mayor de San Marcos, 1979), 278 (fig. 77). By permission of the Universidad Nacional Mayor de San Marcos, Fondo Editorial, Lima, Peru.

many are connected to form sets of radial lines emanating from a central point.<sup>78</sup> These geoglyphs are perhaps the earliest expression of radial landscape organization

75. Helaine Silverman, "The Paracas Problem: Archaeological Perspectives," in *Paracas Art and Architecture: Object and Context in South Coastal Peru*, ed. Anne Paul (Iowa City: University of Iowa Press, 1991), 349–415. Following other scholars we use the geographic term Nazca to refer to the town, river, plain, area, and geoglyphs on the Nazca pampa. Nasca refers to the early intermediate period culture and peoples.

76. Anthony F. Aveni, "An Assessment of Previous Studies of the Nazca Geoglyphs," in *The Lines of Nazca*, ed. Anthony F. Aveni (Philadelphia: American Philosophical Society, 1990), 1–40, esp. 22. Aveni's book, containing chapters by several leading specialists, is a good introduction to the topic. It evaluates previous literature and examines current scholarly thought concerning the form, function, and makers of the geoglyphs.

77. Evan Hadingham, *Lines to the Mountain Gods: Nazca and the Mysteries of Peru* (New York: Random House, 1988), 135–40. Archaeology supports such surveying techniques: a radiocarbon date of  $525 \pm 80$  A.D. was obtained from a wooden stake pounded into the terminus of a Nazca line, and a textile over 160 feet long, with threads of varying lengths, was uncovered beneath a temple mound at Cauhuachi. See William Duncan Strong, *Paracas, Nazca, and Tihuanaoid Cultural Relationships in South Coastal Peru* (Salt Lake City: Society for American Archaeology, 1957), esp. 14–16 and 46 (table 4).

78. Anthony F. Aveni's introduction to *The Lines of Nazca*, ed. An-

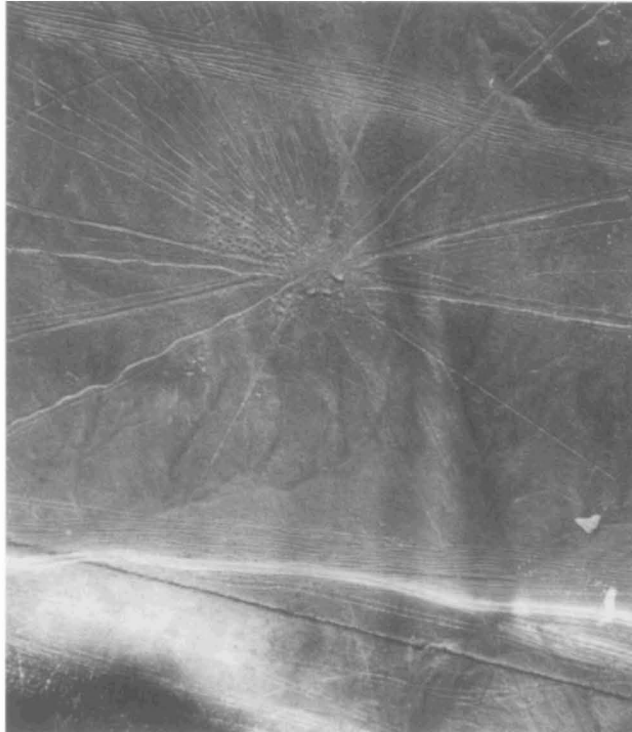


FIG. 6.25. RAY CENTER GEOGLYPH FROM THE NAZCA PAMPA. The most common type of Nazca geoglyph is the ray center, a system of lines emanating from a central point. An obvious manifestation of radial organization, the emanating lines are most often aligned with water sources and are usually perpendicular to topographic contours controlling overland flow. Ray center lines often connect to other ray centers, and some of the lines are not straight but bent. Very few ray centers exhibit astronomical alignments beyond that expected by chance.

By permission of the Servicio Aerofotográfico Nacional, Lima, Peru (0-17123, del 22-6-65).

(fig. 6.25). Sixty-two ray centers have been identified, along with more than 750 member lines. Most of the ray centers are on small natural promontories on the border of the pampa, and all ray centers are on the banks of major rivers or tributaries or at the base of the last hill descending out to the pampa, resulting in the hypothesis that they are connected in some way to water and irrigation.<sup>79</sup> In addition, the radial lines frequently connect to other line centers, distant hills, and other topographic features that affect the overland flow of water (such as bends in rivers or dunes overlooking the banks of rivers).<sup>80</sup>

A few Nazca geoglyphs exhibit astronomical alignments, for example, the Pleiades, the sun at the zenith, and  $\alpha$  and  $\beta$  Centauri.<sup>81</sup> Many celestial objects, including these, have a specific temporal relation to subsistence systems such as the seasonal return of montane meltwaters to Nazcan rivers and canals, or the return of fish to nearshore environments.<sup>82</sup> Although astronomical align-

ments were championed as an early explanation for Nazca line layout, subsequent studies have shown that only a few geoglyphs exhibit them.<sup>83</sup>

The Nazca lines certainly commemorate cosmographical concepts, but ritual performance seems necessary for the geoglyphs to fully convey a geographic understanding of the Nasca world. A number of ray center lines point to Cahuachi, which is the largest ceremonial center in the region and as such may have been a pilgrimage center and focus for ceremonial activities related to agriculture and water.<sup>84</sup> Archaeological reconnaissance indicates that the geoglyphs may have been processional routes, because cairns, offerings, and piles of broken decorative pottery are clustered along them.<sup>85</sup> The lines were certainly walkable, and in addition to ritual pilgrimage, it has been speculated that they may have simply been used as roads across the pampa.<sup>86</sup>

Gary Urton postulates a system of maintenance for the radial geoglyphs analogous to the ritual sweeping of *chhiutas* in Pacariqtambo described above. In his scheme, Nasca sociopolitical organization corresponds to ter-

thony F. Aveni (Philadelphia: American Philosophical Society, 1990), vii-x, esp. viii.

79. Anthony F. Aveni, "Order in the Nazca Lines," in *The Lines of Nazca*, ed. Anthony F. Aveni (Philadelphia: American Philosophical Society, 1990), 40-113, esp. 82-83.

80. Aveni, "Order in the Nazca Lines," 110-11. Statistical analysis has also shown that the lines do not point toward hill summits. See C. L. N. Ruggles, "A Statistical Examination of the Radial Line Azimuths at Nazca," in *The Lines of Nazca*, ed. Anthony F. Aveni (Philadelphia: American Philosophical Society, 1990), 247-69, esp. 268.

81. Aveni, "Order in the Nazca Lines," 98.

82. Gary Urton, "Astronomy and Calendrics on the Coast of Peru," in *Ethnoastronomy and Archaeoastronomy in the American Tropics*, ed. Anthony F. Aveni and Gary Urton (New York: New York Academy of Sciences, 1982), 231-47.

83. See Maria Reiche, "Giant Ground-Drawings on the Peruvian Desert," in vol. 1 of *Verhandlungen des XXXVIII. Internationalen Amerikanistenkongressess (1968)* (Munich: Klaus Renner, 1969), 379-84; idem, *Mystery on the Desert* (Stuttgart-Vaihingen, 1968); and Paul Kosok, *Life, Land, and Water in Ancient Peru* (New York: Long Island University Press, 1965), 49-62, for examples of earlier studies. More recent analysis includes Aveni, "Assessment of Previous Studies," 15-23 (note 76); idem, "Order in the Nazca Lines," 88-98 (note 79); and Ruggles, "Statistical Examination," 261-69 (note 80).

84. Helaine Silverman, "The Early Nasca Pilgrimage Center of Cahuachi and the Nazca Lines: Anthropological and Archaeological Perspectives," in *The Lines of Nazca*, ed. Anthony F. Aveni (Philadelphia: American Philosophical Society, 1990), 207-44, esp. 232-40, and idem, "Beyond the Pampa: The Geoglyphs in the Valleys of Nazca," *National Geographic Research* 6 (1990): 435-56, esp. 444-46.

85. Persis Banvard Clarkson, "The Archaeology of the Nazca Pampa: Environmental and Cultural Parameters," in *The Lines of Nazca*, ed. Anthony F. Aveni (Philadelphia: American Philosophical Society, 1990), 115-72, esp. 136-51, and Silverman, "Beyond the Pampa," 446-47.

86. For example, Aveni's epilogue in *The Lines of Nazca*, ed. Anthony F. Aveni (Philadelphia: American Philosophical Society, 1990), 285-90, esp. 289.

itorial landscape divisions. Individual geoglyphs are maintained through a rotating and reciprocal system of kin-based labor obligations similar to the Inka *mit'a* system (a labor tax that included periodic personal service for state-sponsored agriculture and other activities). The Nazca lines thus may represent a concrete division of territory into social spaces, a graphic manifestation of the *ayllu* as a social group and as a territory.<sup>87</sup> This may explain why younger geoglyphs often truncate older ones, since expressing social and ecological conditions at the time of construction was more important than preserving the image for successive generations.

The large size and orthographic perspective of the Nazca ground drawings have inspired many controversial interpretations. It is likely that Nazca geoglyphs were designed, in part, to attract preterhuman and extramundane forces and direct their blessings of water and fertility toward the landholdings of particular *ayllus*.<sup>88</sup> In this sense the Nazca lines are maps for Andean gods. Another consideration in their use and construction is the part pure artistic expression may have played. Although the complexity and size of these land sculptures do not point toward a single, definitive explanation for their construction and use, it is clear that the Nazca lines will continue to capture our imagination.

Cultural themes are also encoded in Nasca pottery.<sup>89</sup> The design on an unusual ceramic vessel (fig. 6.26) has been interpreted by Anne Peters as resembling *lomas* pastures (fog-supported coastal vegetation), with a mountainlike appearance of undulating snakes. She further suggests that the floating camelids resemble the llama “dark cloud” constellation in the Milky Way.<sup>90</sup>

Figure 6.27 illustrates a class of Nasca pots alternatively called “chieftain” or “*figura mitológica*” vessels. The vessel depicts a specific individual with gaping eyes and a sewn mouth, wearing gold funerary ornaments like those found in south coast mummy bundles.<sup>91</sup> This chieftain possibly represents a mummy bundle, and its careful funerary preparation suggests it is an ancestor *huaca*. Zuidema details symbolic associations between the *figura mitológica* and agriculture, and he notes that native chroniclers described cosmological concepts encoded on these vessels nearly a millennium after they were made.<sup>92</sup> The vessel may represent specific *ayllu* landholdings. Ancient Nasca peoples claiming real or fictive descent from the ancestor *huaca* depicted in figure 6.27 legitimized their access to specific irrigated lands.

The ancient Nasca peoples constructed an elaborate hydraulic system of underground canals called *puquios*, which made agriculture possible on the arid south coast.<sup>93</sup> *Puquios* are shown in figure 6.27 by the linear “streamer” that connects the arms with a leg, then disappears under the leg, and finally reemerges above the rectangular grid of severed heads at the bottom of the vessel. The grid of



FIG. 6.26. NASCA COSMOGRAM OF THE HYDROLOGIC CYCLE, LOMAS HILLS, AND THE HEAVENS. This ceramic water bottle from the south coast of Peru may depict *lomas*, the fog-supported vegetation along the arid Pacific coast and an important seasonal graze for camelids, depictions of which sprout from two giant intertwined snakes representing the pampas hills. A circle and dot motif at every critical point in Andean conceptions of the hydrologic cycle; that is, beneath, within, and on top of a topographic prominence. A circle and dot motif also occurs in the sky—reminiscent of Andean star imagery. Two sets of opposed camelids with bulging eyes, separated by a distorted cross, float above the pampas. The eyes likely signify  $\alpha$  and  $\beta$  Centauri, also known as the eyes of the llama. The opposed llamas may constitute an early conception of the llama dark cloud constellation. By permission of Ann H. Peters, Le Moyne College, Syracuse, New York.

severed heads probably represents agricultural fields, since severed heads are linked to agricultural offerings and since Andean peoples express their relation to terri-

87. Urton, “Andean Social Organization” (note 19).

88. Johan Reinhard, *The Nazca Lines: A New Perspective on Their Origin and Meaning*, 3d ed. (Lima: Editorial Los Pinos, 1987), esp. 9–11 and 55–56, and idem, “Interpreting the Nazca Lines,” in *The Ancient Americas: Art from Sacred Landscapes*, ed. Richard F. Townsend (Chicago: Art Institute of Chicago, 1992), 291–301.

89. Reinhard, “Interpreting the Nazca Lines,” 298; Richard F. Townsend, “Deciphering the Nazca World: Ceramic Images from Ancient Peru,” *Museum Studies* 11 (1985): 116–39, esp. 122–24; and Isbell, “Prehistoric Ground Drawings,” 146 (note 6).

90. Peters, “Ecology and Society,” 281–82 (note 68). On the “dark cloud” animal constellations, including the llama, see Urton, *At the Crossroads*, 170–73 (note 14).

91. Tello and Xesspe, *Cavernas y necrópolis*, 464 (fig. 125) (note 73).

92. R. Tom Zuidema, “Significado en el arte Nasca: Relaciones iconográficas entre las culturas inca, huari y nasca en el sur del Perú,” in *Reyes y guerreros: Ensayos de cultura andina*, comp. Manuel Burga (Lima: FOMCIENCIAS, 1989), 386–401, esp. 399–400.

93. Katharina J. Schreiber and Josué Llancho Rojas, “The Puquios of Nasca,” *Latin American Antiquity* 6 (1995): 229–54. Monica Barnes and David Fleming, “Filtration-Gallery Irrigation in the Spanish New World,” *Latin American Antiquity* 2 (1991): 48–68, argue, however, that *puquios* originated in colonial times.



FIG. 6.27. NASCA CERAMIC CHIEFTAIN VESSEL, SOUTH COAST OF PERU. The so-called Nasca chieftain vessels depict different individuals wearing funeral attire, hence each vessel represents a specific mummy bundle ancestor *huaca*. All Nasca chieftain vessels have the same structure, but they differ markedly in artistic detail. The head, shoulders, and legs of ceramic Nasca chieftains protrude from their vessels, corresponding to Andean anatomical metaphors for the landscape: the head is the summit, the shoulders are the central slopes, and the lower hips signify the coastal plain where mountain rivers diverge. The legs have the sinuous shape of rivers and are dwarfed by the head, just as Andean summits tower over meandering drainage systems. This same sculptural technique is used to depict realistic hillocks on other Nasca vessels. Height of the original: 74.5 cm; widest diameter: 42.9 cm. Photograph courtesy of the Instituto Nacional de Cultura, Museo Nacional de Arqueología, Antropología e Historia del Perú, Lima (C-54196).

tory through descent.<sup>94</sup> The landscape iconography shown here mimics the water movement from mountain rivers to underground *puquios* on the coastal plain to the reemergence of water on Nazca agricultural fields. Indeed, the vessel depicting a mummy bundle ancestor *huaca* holds liquids beneath its surface images just as *puquios* hold water beneath the Nazca desert.<sup>95</sup>

#### MOCHE CERAMICS

The Moche culture flourished on the north coast of Peru from about A.D. 1 to 700, overlapping the late terminal

and classic Nasca traditions on the south coast. Moche art is renowned for its realism, and ceramic landscape models are common. Most Moche portrayals of people and animals, except those on polychrome wall murals, are between five and twenty centimeters high. Sculpted landscape elements usually conform to their natural relative sizes, although people, artifacts, and animals may be greatly exaggerated to emphasize a message.<sup>96</sup> Particular floral and faunal attributes may also be magnified and often appear in isolation on ritual attire. Moche artists depict plants and animals in profile on decorated pottery. The exception is freshwater plant blossoms and non-mammals, several associated with water (e.g., crab, octopus, ray, spider), which are rendered in plan view.<sup>97</sup>

Two Moche landscape vessels (figs. 6.28 and 6.29) conform to the artistic principles outlined above. Mountains and pinnate drainage systems consisting of irrigation canals and rivers are often modeled in Moche ceramics, and many activities depicted in mountain scenes seem to have ritual or symbolic significance.<sup>98</sup> The landscape setting in figure 6.28 shows a single set of high-elevation mountains—possibly the bioclimatic *puna* zone. In figure 6.29 the higher set of mountains may also represent the *puna*, while the lower set represents the comparatively warm, low-elevation *yungas* zone, and the warrior's house is thus situated between the two biomes. Mountain worship is clearly present among the Moche peoples, and specific peaks are associated with particular deities and geographic agents. Many Moche ceramics show deities, often differentiated by their headdresses, emerging from mountain caves or attending various montane sacrificial rites.<sup>99</sup>

Ceramic house models are common in Moche contexts. Diverse types of architecture are represented in

94. Severed heads have many purposes and symbolic associations in Nasca society, not all of them related to lineage or warfare. Browne, Silverman, and Garcia distinguish between trophy and ritual heads when analyzing a Nasca cache of severed heads and suggest they may have also functioned to affirm territorial and resource claims through associations with ancestry and kinship. See David M. Browne, Helaine Silverman, and Rubén Garcia, "A Cache of Forty-eight Nasca Trophy Heads from Cerro Carapo, Peru," *Latin American Antiquity* 4 (1993): 274–94, esp. 277 and 290–91. Silverman, *Cahuachi* (note 71), specifically links severed heads, ancestors, and territory.

95. Townsend, "Deciphering the Nazca World," 297–98 (note 89).

96. For a summary on the Moche use of scale, relative size, and perspective, see Christopher B. Donnan, *Moche Art of Peru: Pre-Columbian Symbolic Communication*, rev. ed. (Los Angeles: Museum of Cultural History, University of California, Los Angeles, 1978), 29–33.

97. Donnan, *Moche Art of Peru*, 33, 37–41, and 73–76, and Rafael Larco Hoyle, *Los Mochicas*, 2 vols. (Lima: Casa Editora "La Crónica" y "Variedades," 1938–39), 1:77–141 and pl. 6.

98. Donnan, *Moche Art of Peru*, 144.

99. Elizabeth P. Benson, *The Mochica: A Culture of Peru* (New York: Praeger, 1972), 27–44.



FIG. 6.28. CERAMIC MOCHE LANDSCAPE VESSEL WITH ANDEAN FOX. This vessel is formed into an Andean fox that stands over mountains of comparable height and a single drainage system. The single set of mountains references high elevation mountains (*puna*). The Andean fox may be a visual incarnation of a toponym or the fox (*atoq*) dark cloud constellation.

Height of the original: ca. 21 cm. Boyer Fund, Logan Museum of Anthropology, Beloit College, Beloit, Wisconsin (cat. no. 7229). Photograph courtesy of William Gustav Gartner.

these models: open structures with simple sloping roofs or overlapping gabled roofs, and closed composite structures with various forms of roof decoration, including crenelated forms and war clubs.<sup>100</sup> Although such structures have not yet been confirmed by archaeological excavation, most other images represented by Moche art are based on artifacts that have been found. There is some evidence that such structures may have sat atop specific pyramid mounds, which may reflect their symbolic and ritual importance. Just as Moche vessels depicting architectural structures may have been used in rituals, models



FIG. 6.29. CERAMIC MOCHE LANDSCAPE VESSEL SHOWING HOUSE AND SHIELD. An exaggerated house and warrior's shield, separated from the rest of the scene by a block of color, are shown between two sets of comparably sized mountains on this Moche vessel. A road connects the warrior's house with the lower set of mountains. Valleys with two pinnate drainage systems represent two primary canals, with lateral lines representing secondary parts of the irrigation system.

By permission of Christopher B. Donnan, Los Angeles, California.

depicting architectural compounds (*maquetas*) may have also served as amulets in mapping rites.<sup>101</sup>

Moche house models also depict spatial relations and territorial apportionment through parallel strip motifs. According to George Kubler, the vertically stacked color bands in figure 6.30 represent pyramidal terraces and platforms. The vessel itself probably depicts a typical Moche-style house group.<sup>102</sup>

#### TIWANAKU

Tiwanaku is near the shores of Lake Titicaca, Bolivia, the highest large lake in the Andes. Tappikala, the civic-

100. Donnan, *Moche Art of Peru*, 79–83 (note 96).

101. Architectural *maquetas* are plan view, scaled representations of the load-bearing walls of individual rooms and structures. See, for example, Cristóbal Campana, *La cultura mochica* (Lima: Consejo Nacional de Ciencia y Tecnología, 1994), 29.

102. Kubler, *Art and Architecture*, 253 (note 43).



FIG. 6.30. CERAMIC MOCHE HOUSE COMPOUND MODEL, VIRU VALLEY. This vessel represents a Moche-period house compound with rectangular enclosures, living quarters, paths, and stairs, on a pyramidal mound. The color bands of the vessel represent discrete elevational surfaces. Distance may also be implied by the color bands. Height of the original: 19 cm; width and depth: 11 cm. Photograph courtesy of the Instituto Nacional de Cultura, Museo Nacional de Arqueología, Antropología e Historia del Perú, Lima (C-54613).

ceremonial core of Tiwanaku culture (ca. A.D. 300–1100), was an architectural manifestation of the earth and cosmos. Surrounded by a moat, Taypikala evokes the image of the sacred island later immortalized in an Inka creation myth.<sup>103</sup> Its monumental architecture is aligned with prominent landscape features and the sunrise at the equinoxes. Akapana, one of the two great pyramid mounds in Taypikala, has surface and subterranean water canals that mimic the unusual hydrology of the Quimsachta range. Since the upper terrace fill of Akapana contains distinctive blue-green pebbles from a Quimsachta mountain, the likeness was surely intentional. As the center of a cosmopolis, Taypikala embodied the perceived order of the universe. It was considered to be a point of cosmic convergence that extended to the social and territorial organization of the Tiwanaku realm.<sup>104</sup>

Ethnohistorical research provides important insights into how ancient Tiwanaku may have represented geo-

graphic relations. Thérèse Bouysse-Cassagne has outlined sixteenth-century spatial concepts for Aymara chiefdoms around Lake Titicaca. The spatial organization of Aymara culture and territory was built around a system of double dualisms (fig. 6.31). *Urco* and *uma* were spatial divisions of the regional sociopolitical landscape. *Alaa* and *manca* signified the social and territorial divisions for low-elevation valleys near the Pacific and Amazon, respectively. The concept of *urco* also encompassed categories such as west, high, dry, high-elevation pastoralism, celestial, male, and perhaps the tuber. *Uma* embodied such concepts as east, low, wet, maize agriculture, Underworld, female, and low-elevation plants and animals.<sup>105</sup>

The integration of chiefdoms at the Amazon or Pacific coast periphery with those around Lake Titicaca at the center fostered a multiethnic form of complementarity governed by the concepts of *urco* and *uma*.<sup>106</sup> Two lords, one from each moiety, ruled the kingdom of Lupaqa, a well-documented sixteenth-century Titicaca chiefdom often used as a sociopolitical model for the region. Lupaqa's moieties comprised multiethnic *ayllus* that ensured comparable access to resources and labor for all corporate groups.<sup>107</sup> Ethnic tensions no doubt arose in such a complex sociopolitical landscape, but they were mediated by rituals in a symbolic space called *taypi*, or "place in the middle." Lake Titicaca was *taypi* in the fragmented sociopolitical landscape of the sixteenth century. During the middle horizon, *taypi* was Tiwanaku.<sup>108</sup>

The Bennett Stela stood in the semisubterranean temple at Tiwanaku, probably facing due west toward the Ponce Stela, another monolith aligned with the Bennett Stela along the solar path.<sup>109</sup> This architectural complex also contained an eclectic assemblage of stone statues arranged in subsidiary positions around the Bennett Stela.<sup>110</sup> Most of these statues were foreign to Tiwanaku

103. Kolata, *Tiwanaku*, 87–88 and 93–94 (note 16). The Inkas believed that Viracocha emerged from Lake Titicaca to create the earth and cosmos at Tiwanaku. Kolata's interpretation of Tiwanaku's urban design is called into question, however, in William Harris Isbell, review of *Tiwanaku: Portrait of an Andean Civilization*, by Alan L. Kolata, *American Anthropologist* 96 (1994): 1030–31.

104. Kolata, *Tiwanaku*, 8–10, 96–98, 108–9, and 111–17, and Reinhard, "Chavín and Tiahuanaco," 415 (note 57). Both Kolata and Reinhard attach significance to the summit of Akapana as one of the few places where one can see the pilgrimage points and weather shrines of Lake Titicaca and the nearly 6,500 meter-high crest of Mount Illimani.

105. Thérèse Bouysse-Cassagne, "Urco and Uma: Aymara Concepts of Space," in *Anthropological History of Andean Politics*, ed. John V. Murra, Nathan Wachtel, and Jacques Revel (Cambridge: Cambridge University Press, 1986), 201–27, esp. 201–13.

106. Bouysse-Cassagne, "Urco and Uma," 215.

107. Murra, "Aymara Kingdom," 117–18 and 125–28 (note 12).

108. Bouysse-Cassagne, "Urco and Uma," 209 and 215–21 (note 105), and Kolata, *Tiwanaku*, 89 (note 16).

109. Kolata, *Tiwanaku*, 143.

110. Kolata, *Tiwanaku*, 135, and Carlos Ponce Sanginés, *Descripción*



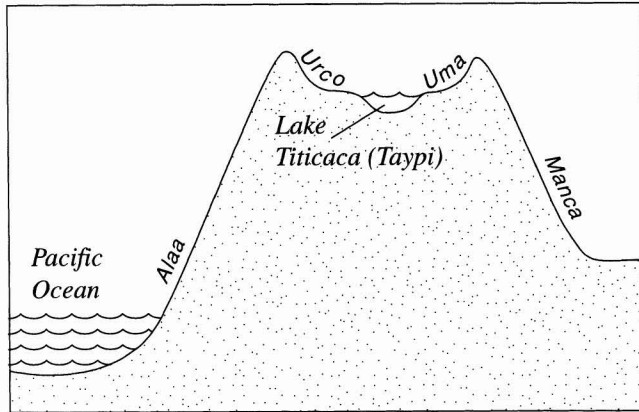


FIG. 6.31. AYMARA CONCEPTIONS OF SPACE. Historical and archaeological studies of Aymara kingdoms surrounding Lake Titicaca demonstrate a social and territorial organization based on “double dualisms,” a geometric structure replicated in the iconographic organization of the Bennett Stela (see fig. 6.32). The axis of *taypi* (Lake Titicaca) separates the realms of *urco* from *uma* and *alaa* from *manca*.

After Thérèse Bouysse-Cassagne, “Urco and Uma: Aymara Concepts of Space,” in *Anthropological History of Andean Politics*, ed. John V. Murra, Nathan Wachtel, and Jacques Revel (Cambridge: Cambridge University Press, 1986), 201–27, esp. fig. 12.2.

and represented captured *huacas* and emblems of distant ethnic groups.<sup>111</sup> Unfortunately, their original spatial arrangement will never be known; however, there are suggestions that they were topologically arranged around the Bennett Stela in a maplike display of Tiwanaku’s power and its conquests.<sup>112</sup>

Two types of geometric organization on the Bennett Stela reflect Aymara conceptions of space (fig. 6.32). A horizontal procession of figure panels occurs at the top of the spine (headband) and another on top of the waistband. A vertical stack of figure panels occurs at the base of the spine. Horizontal strips of figure panels fuse symbols associated with pastoralism and agriculture, the cornerstones of the Tiwanaku subsistence economy.<sup>113</sup> Each horizontal strip also has representative elements associated with high-elevation settings (*urco*), such as llamas, and low-elevation tropical biomes (*uma*), such as parrots. The two horizontal bands containing *uma* and *urco* referents are consistent with Aymara spatial dualism. The

*sumaria del templete semisubterráneo de Tiwanaku*, 5th rev. ed. (La Paz: Librería y Editorial “Juventud,” 1981), 109–76. Ponce Sanginés provides descriptions and locations of the many carved stelae and pillars found in the semisubterranean complex.

111. On the importance of *huaca* capture during Inka times, see Cobo, *Inca Religion and Customs*, 47, and idem, *History of the Inca Empire*, 187–88 and 191 (both note 25).

112. Kolata, *Tiwanaku*, 141–43 (note 16); originally proposed by Lathrap, “Jaws,” 251–52 (note 55).

113. Kolata, *Tiwanaku*, 135–41.

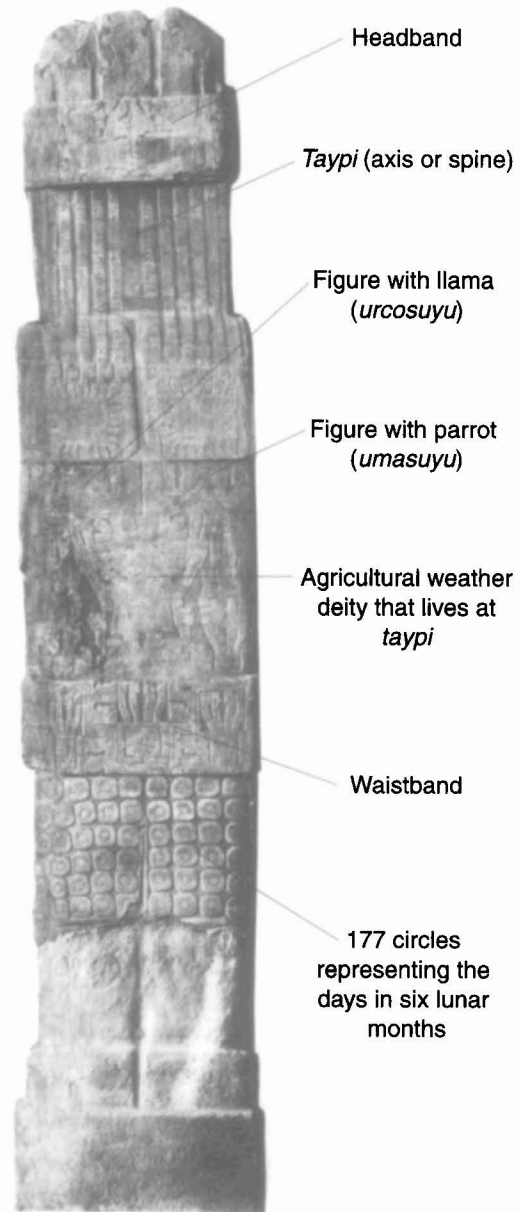


FIG. 6.32. INTERPRETATION OF THE BENNETT STELA AS A COSMOGRAM. The Bennett Stela is a graphic representation of space and time as perceived and controlled by the Tiwanaku peoples. At the bottom of the spine is a representation of the agricultural weather deity who resides at *taypi*, the precursor of the Inka deity Viracocha. The deity’s outstretched arms support two figures, one with tropical parrots signifying *umasuyu* on the right and another with llama heads symbolizing *urcosuyu* on the left. The role of *taypi* in mediating Tiwanaku social and territorial organization is represented by the spine, which organizes the thirty figures and other symbolic elements into the double dualisms of *urco* and *uma*, *alaa* and *manca*.

After Arthur Posnansky, *Tiwanaku: The Cradle of American Man*, 2 vols., trans. James F. Shearer (New York: J. J. Augustin, 1945), vol. 2, fig. 115. Interpretation by William Gustav Gartner.

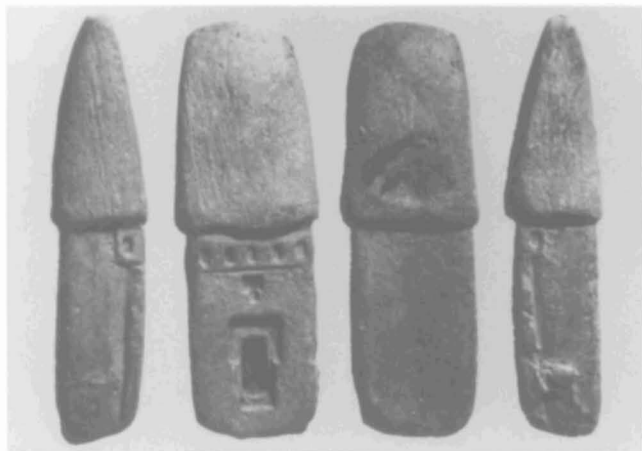


FIG. 6.33. TIWANAKU HOUSE MODEL, 500–300 B.C. This stone house model (four views), with carved door molding and cornice as distinctive architectural features, was found near the temple of Kalasasaya at Tiwanaku. During mapping rites, stone house amulets would have been arranged around a geographic referent, such as the stone *huacas* at Kalasasaya. Photograph courtesy of the Dirección Nacional de Arqueología y Antropología de Bolivia, Secretaría Nacional de Cultura de Bolivia, La Paz.

symmetrical nature of this horizontal imagery illustrates the parity of power between two moieties.

According to Zuidema, the Bennett Stela's lower wrap has 177 circles, representing the number of days in six lunar (synodic) months. The thirty engraved figures signify the days in a solar month. He also interprets the cultivated and wild plants growing from the llamas as a symbol for the seasonal land rotation between pastoralists and agriculturalists.<sup>114</sup> People with distinct headdresses, capes, and staffs—probably symbolizing the multiethnic groups composing the Tiwanaku state—meander across the shoulders and chest of the stela. The spatial symbolism and layout of the Bennett Stela suggest that the spine is *taypi*, or the place in the middle, probably Taypikala, and that it served to fuse social and cosmic divisions manifested spatially by the figures and symbolic elements as a hierarchical and harmonious whole.

Numerous house models have been found at Tiwanaku,<sup>115</sup> probably amulets used in mapping rites performed within Taypikala. A variety of stone houses and whistles were recovered in and around Kalasasaya, another structural complex at Tiwanaku (fig. 6.33). The formal variability in carved cornices and doorways suggests that models like the one in figure 6.33 may represent houses from different regions. Stone house models would have been arranged around some referent during mapping rites to represent a particular locale. Similarly, according to the symbolism of the Bennett Stela, calendrical rites detailed seasonal access to land.<sup>116</sup> Other rites might have called on the power of Puma Punka, one of the twin pyramids at Tiwanaku, to focus the blessings of super-



FIG. 6.34. MAQUETA OF THE TEMPLE UPPER COURT AT MOQUEGUA, PERU. This illustration of a house model (*maqueta*) found at the Omo site in the Moquegua Valley of Peru represents the stairways, terraces, sunken platforms, and the exterior and interior walls of buildings and rooms at the site's upper court. Omo's civic-ceremonial architecture is strikingly similar to that at Tiwanaku. Size of the original fragment: 15 × 13 cm. Photograph by permission of Paul S. Goldstein.

natural forces and direct them to the locale signified by the house model arrangement.

Tiwanaku's influence reached well beyond the Titicaca basin to Moquegua, Peru. Recent excavations at the Omo site have uncovered a ceremonial structure consisting of three courts and what appears to be a stone scale model of the temple's upper court (fig. 6.34). Tiwanaku architectural features such as stairways, terraces, sunken courts, and platforms are in evidence at the site. This supports Goldstein's thesis that the Omo site was an administrative satellite of Tiwanaku.<sup>117</sup>

Arthur Posnansky believed the Tiwanaku people used a surveying device to align their civic-ceremonial archi-

114. R. Tom Zuidema, "Llama Sacrifices and Computation: The Roots of the Inca Calendar in Huari-Tiahuanaco Culture," forthcoming.

115. Carlos Ponce Sanginés, *Tiwanaku: Espacio, tiempo y cultura*, 4th ed. (La Paz: Editorial "Los Amigos del Libro," 1981), figs. 81–83.

116. Zuidema, "Llama Sacrifices" (note 114).

117. Paul Goldstein, "Tiwanaku Temples and State Expansion: A Tiwanaku Sunken Court Temple in Moquegua, Peru," *Latin American Antiquity* 4 (1993): 22–47, esp. 38–40.

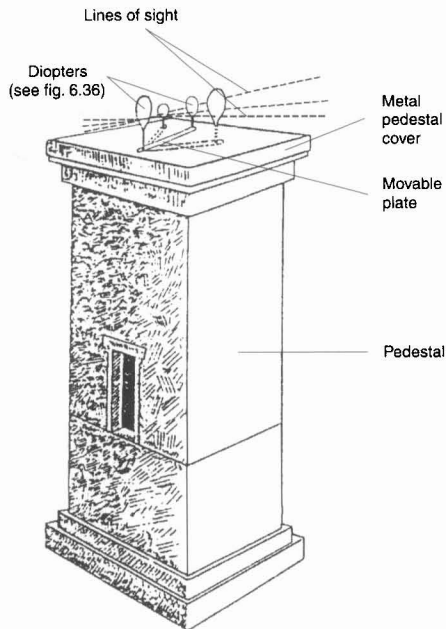


FIG. 6.35. PROPOSED TIWANAKU SURVEY INSTRUMENTS. Arthur Posnansky suggested that Tiwanaku surveyors used a device to lay out their capital city and to align civic-ceremonial architecture with the heavens. According to his speculative scheme, a pedestal is leveled by means of a water-filled container. Surveyors then anchored the appropriate length diopter into a drilled plate on top of the pedestal to obtain a line of sight.

After Arthur Posnansky, *Tiwanaku: The Cradle of American Man*, 2 vols., trans. James F. Shearer (New York: J. J. Augustin, 1945), vol. 2, fig. 18.

ecture with the heavens.<sup>118</sup> In Posnansky's controversial scheme, two metal diopters with drilled holes are set on a hypothetical pedestal leveled by a container filled with water (figs. 6.35 and 6.36). Tiwanaku's architects attained a precise line of sight with landscape and astronomical features by utilizing a standardized set of sighting devices. However, the diopters are more often interpreted as ornaments or ceremonial implements.<sup>119</sup> Still, it is likely that the Tiwanaku people possessed a standardized system of survey. Tiwanaku is one of the few pre-Columbian urban centers to have had subterranean water delivery and waste removal systems. The Tiwanaku people also reorganized canals, raised fields, and roads into an integrated regional system.<sup>120</sup>

A second type of surveying device may also have middle horizon origins. The Chimú kingdom and its capital of Chan Chan were fifteenth-century rivals to the Inkas. However, their rise to power began in the tenth century. About A.D. 1000, the Chimús constructed the longest intervalley irrigation canal in the New World. An unusual ceramic bowl found in the Virú Valley may have functioned as a surveying device for this and other public works projects. According to Charles Ortloff, instru-

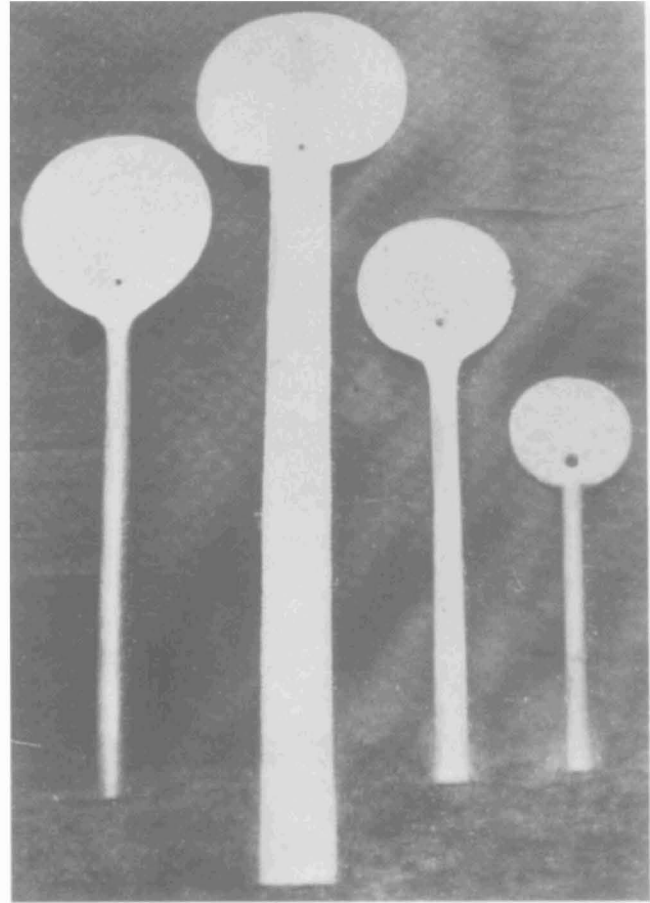


FIG. 6.36. SILVER DIOPTERS FOUND AT TIWANAKU. Several silver diopters with unpointed handles were found near Tiwanaku. Arthur Posnansky believed Tiwanaku builders used these instruments to obtain a line of sight. See figure 6.35. From Arthur Posnansky, *Tiwanaku: The Cradle of American Man*, 2 vols., trans. James F. Shearer (New York: J. J. Augustin, 1945), vol. 2, fig. 16a.

ments that calibrated distance using a leveling bowl filled with water, sighting tube, and staff could have been used to construct the Chicama-Moche canal (fig. 6.37).<sup>121</sup>

118. Arthur Posnansky, *Tiwanaku: The Cradle of American Man*, 2 vols., trans. James F. Shearer (New York: J. J. Augustin, 1945), 2:57–64.

119. Javier F. Escalante Moscoso, *Arquitectura prehispánica en los Andes bolivianos* (La Paz, Bolivia: CIMA, 1993), 386–89, explains that the term *tupu*, or what Posnansky refers to as *topo*, is a homonym in both Quechua and Aymara, alternatively meaning a measurement, animal bedding, an Inka league, the Royal Road, the size of an individual *chakra*, and a breast pin or ornament.

120. Kolata, *Tiwanaku*, 155–56 (note 16), and Alan L. Kolata, "The Technology and Organization of Agricultural Production in the Tiwanaku State," *Latin American Antiquity* 2 (1991): 115–19.

121. Charles R. Ortloff, "Surveying and Hydraulic Engineering of the Pre-Columbian Chimú State: AD 900–1450," *Cambridge Archaeological Journal* 5 (1995): 55–74, esp. 63–67. The utility of this Chimú surveying system might be moot, since the seventy-four-kilometer

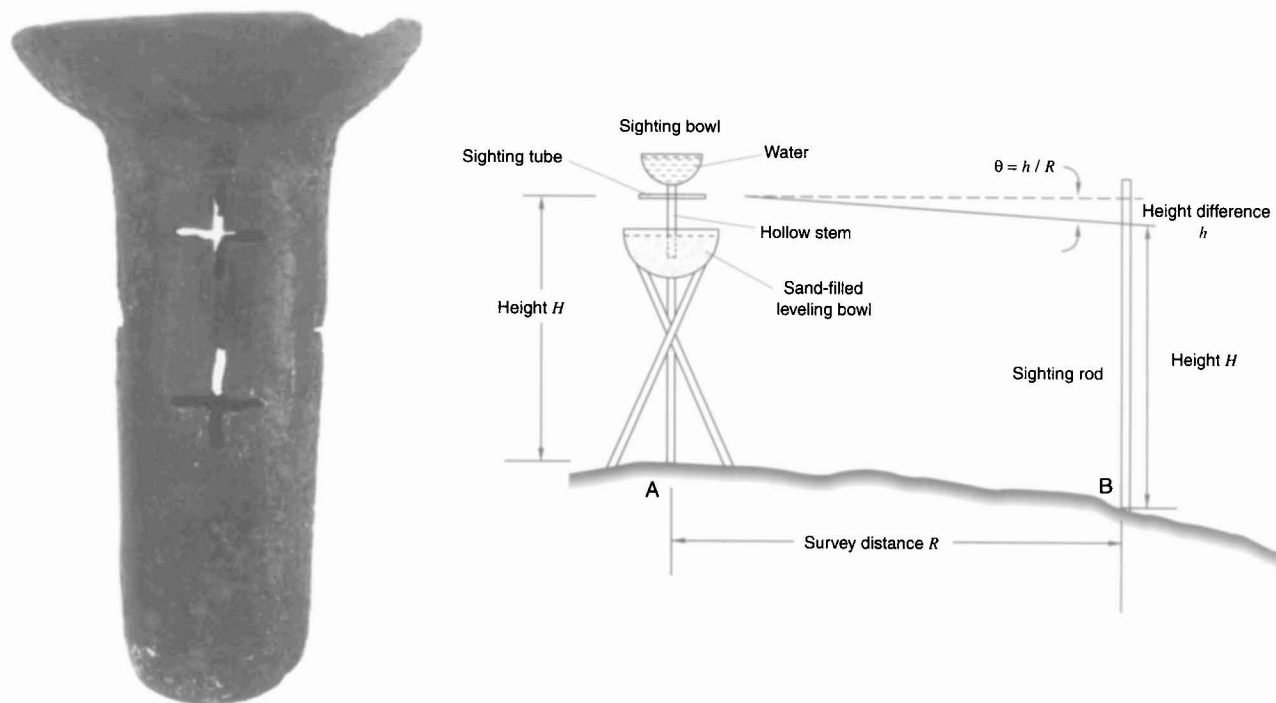


FIG. 6.37. PROPOSED CHIMÚ SURVEY INSTRUMENTS. This photograph and explanatory diagram represent how the fifteenth-century Chimú culture might have used survey instruments in public works projects, particularly canals. This speculative system, developed by Charles Ortloff, was inspired by an unusual ceramic bowl with a cruciform hole through an attached hollow stem found in the Virú Valley. When the water-filled bowl is leveled by adjusting the bowl and attached stem embedded in a bowl of sand until the water reaches the rim, the sighting tube, which is designed to be parallel to the surface of the water, provides an artificial horizon. A desired angle of slope for building a canal can be achieved as follows: using markings on the cruciform openings, a given angle of de-

clination can be set for sighting on a calibrated staff, which can then trace out a contour at the desired height on the surrounding terrain to produce the correct slope. Alternatively, horizontal angles can be observed by moving the sighting tube sideways in the cruciform opening. Surveying field tests with such a device yielded accuracies typical of Chimú canal bed slope angles.

Photograph courtesy of the Museo Arqueológico de Ancash, Instituto Nacional de Cultura-Ancash, Peru. Diagram after Charles R. Ortloff, "Surveying and Hydraulic Engineering of the Pre-Columbian Chimú State: AD 900–1450," *Cambridge Archaeological Journal* 5 (1995): 55–74, esp. 65 (fig. 11).

Although Ortloff's interpretation is speculative, staffs marked at regular intervals are common in middle horizon iconography and lend tangential support to his interpretation.<sup>122</sup>

### INKA MAPMAKING

The writings of Spanish chroniclers intimate a well-developed and highly abstract system of mapping and mapmaking in Inka culture (ca. 1438–1532). The classic works often cited by Andean historians include the writings of the missionaries Bernabé Cobo (1580–1657) and Cristóbal de Molina (1494?–1578); the government officials Juan Polo de Ondegardo (d. 1575) and Pedro Sarmiento de Gamboa (1532?–1608?); and the conquistadores Pedro de Cieza de León (1518–60) and Juan de Betanzos (d. 1576), who married into an Inka royal family shortly after the conquest.<sup>123</sup> This rich corpus of historical works is sometimes criticized for ethnocentric dis-

Chicama-Moche irrigation canal may never have carried water. Parts of the canal apparently run uphill, while roughness and variations in width would restrict flow at certain points. Ortloff, Moseley, and Feldman explain the uphill gradient by evoking tectonic uplift. Kus, on the other hand, suggests that the canal is a form of monumental architecture designed to let reemerging elites publicly display their prestige and economic superiority. See Charles R. Ortloff, Michael E. Moseley, and Robert A. Feldman, "Hydraulic Engineering Aspects of the Chimú Chicama-Moche Intervalley Canal," *American Antiquity* 47 (1982): 572–95, and James S. Kus, "Irrigation and Urbanization in Pre-Hispanic Peru: The Moche Valley," *Association of Pacific Coast Geographers Yearbook* 36 (1974): 45–56, esp. 54–55.

122. Báculo, god with staffs, is discussed in Anita Gwynn Cook, *Wari y Tiwanaku: Entre el estilo y la imagen* (Lima: Pontificia Universidad Católica del Perú, Fondo Editorial, 1994), esp. 183–90 and pl. 7.

123. Cobo, *Inca Religion and Customs*, 9–10, 13, and 17–18; idem, *History of the Inca Empire*, 94, 99, 211–14, 223–27, and 253–54 (both note 25); Molina, *Fábulas y mitos*, 49–50 and 127–28 (note 8); Polo de Ondegardo, *El mundo de los Incas*, 46–50 and 93 (note 25); Pedro Sarmiento de Gamboa, *Historia de los Incas*, 3d ed., ed. Angel Rosenblatt (Buenos Aires: Emecé, 1947), 114–15, 117–20, and 197; Pedro de Cieza de León, *The Incas of Pedro de Cieza de León*, trans.

tortions and omissions, indiscriminate borrowing, and historical inconsistencies. We also have the serendipitous survival of manuscripts by two native Andean writers, Felipe Guamán Poma de Ayala and Juan de Santa Cruz Pachacuti Yamqui Salcamayhua, who wrote less than a century after the conquest.<sup>124</sup> These works have the advantage of a native perspective, but they often shift tenses and mix Spanish with native languages and are thus difficult to interpret.

Perhaps the best-known chronicler is Garcilaso de la Vega (1539–1616), who was of mixed European and native descent. Although Garcilaso provides the most detail on Inka life, his writings suffer from internal inconsistencies, and his statements cannot always be corroborated by other evidence.<sup>125</sup>

Native residents of Muina, a village five leagues south of Cuzco, constructed an ephemeral map of the Cuzco Valley for the Spaniard Damián de la Bandera, a census inspector from the royal chancery in Lima. Garcilaso apparently accompanied Bandera, and he described the map as follows:

I saw the model of Cuzco and part of the surrounding area in clay, pebbles, and sticks. It was done to scale with the squares, large and small; the streets, broad and narrow; the districts and houses, even the most obscure; and the three streams that flow through the city, marvellously executed. The countryside with high hills and low, flats and ravines, rivers and streams with their twists and turns were all wonderfully rendered, and the best cosmographer in the world could not have done it better.<sup>126</sup>

Garcilaso is prone to exaggeration. Yet Betanzos notes that the Spanish often relied on the geographic knowledge of Inka officials after the conquest.<sup>127</sup> And as this chapter illustrates, ethnohistorical, ethnographic, and archaeological records all suggest that ephemeral maps—often created as part of a mapping rite rather than prompted by a European official—were widespread throughout the central Andes.

There are pitfalls in using historical documents, as illustrated by a debate concerning the urban plan of Cuzco and the role of puma imagery and metaphor. Some believe the layout of the central part of Cuzco has the shape of a giant puma. Betanzos and Sarmiento invoke the symbol of the lion (puma) when describing Cuzco. The toponym for the major river junction in Cuzco, Pumap Chupan, means “puma tail.”<sup>128</sup> Zuidema argues that the puma is a symbol of the Inka body politic and a metaphor for Inka settlement of the Cuzco Valley. He also suggests that native toponyms incorporating puma anatomy are often associated with springs, rivers, and irrigation canals because of the animal’s symbolic association with water.<sup>129</sup> Still others suggest that Cuzco’s relation to puma

symbolism was inspired by sixteenth- and seventeenth-century European cartographic convention.<sup>130</sup> This controversy demonstrates the many possible interpretations of historical information and the varied perspectives that may influence its compilation.

#### THE INKA CEQUE SYSTEM

The ninth Inka king, Pachacuti Inka Yupanque (1391?–1473?), planned Cuzco’s layout with figures of clay (*maquetas*), personally surveyed territorial apportionments, and designed Coricancha, the Inka Temple of the Sun. He is also credited with establishing the Inka *ceque* system, a set of forty-one sighting lines that radiated outward from Coricancha and organized the Inka system of *huacas* (fig. 6.38).

[He] outlined the city and had clay models made just as he planned to have it built. . . .

[and] with his own hands, along with the rest of the lords of the city, had a cord brought; indicated and measured with the cord the lots and houses that were to be made and their foundations and structures. . . .

When the city was finished and made to perfection, Inca Yupanque ordered all the lords of Cuzco and the rest of its inhabitants to meet at a certain open field. After they assembled, he ordered that there be brought there the sketch of the city and the clay painting that

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Harriet de Onis, ed. Victor Wolfgang von Hagen (Norman: University of Oklahoma Press, 1959), 128, 135–38, 139–40, 168–69, and 249; and Juan de Betanzos, *Narrative of the Incas*, trans. and ed. Roland Hamilton and Dana Buchanan (Austin: University of Texas Press, 1996), 7–8, 44–111 passim, 155–57, 159, 175, and 278.

124. Felipe Guamán Poma de Ayala, *Nueva crónica y buen gobierno*, 3 vols., ed. John V. Murra, Rolena Adorno, and Jorge L. Urioste (Madrid: Historia 16, 1987), and Juan de Santa Cruz Pachacuti Yamqui Salcamayhua, *Relación de antigüedades deste reyno del Piru*, ed. Pierre Duviols and César Itier (Lima: Institut Français d’Études Andines, 1993).

125. John Hemming, *The Conquest of the Incas* (New York: Harcourt Brace Jovanovich, 1970), 18.

126. Garcilaso de la Vega, *Royal Commentaries of the Incas, and General History of Peru*, trans. Harold V. Livermore (Austin: University of Texas Press, 1966), 124.

127. Betanzos, *Narrative of the Incas*, 278 (note 123).

128. John Howland Rowe, “What Kind of Settlement Was Inca Cuzco?” *Nawpa Pacha* 5 (1967): 59–76, esp. 65–66 and pl. 34; Betanzos, *Narrative of the Incas*, 74 (note 123); and Sarmiento de Gamboa, *Historia de los Incas*, 233 (note 123).

129. R. Tom Zuidema, “The Lion in the City: Royal Symbols of Transition in Cuzco,” *Journal of Latin American Lore* 9 (1983): 39–100, esp. 40–42 and 78–87. The Inkas equated the puma with the hydrologic cycle, since its sinuous tail mimics river bends while its reddish brown coat recalls the color of the sediment-laden river waters around Cuzco during the rainy season.

130. As exemplified, for example, by Nicolaes Visscher’s 1633 map titled *Leo Hollandicus*, sixteenth- and seventeenth-century European maps often stylized the political boundaries of a country as an animal. Monica Barnes and Daniel J. Sliva, “El puma de Cuzco: ¿Plano de la ciudad Ynga o noción europea?” *Revista Andina* 11 (1993): 79–102.

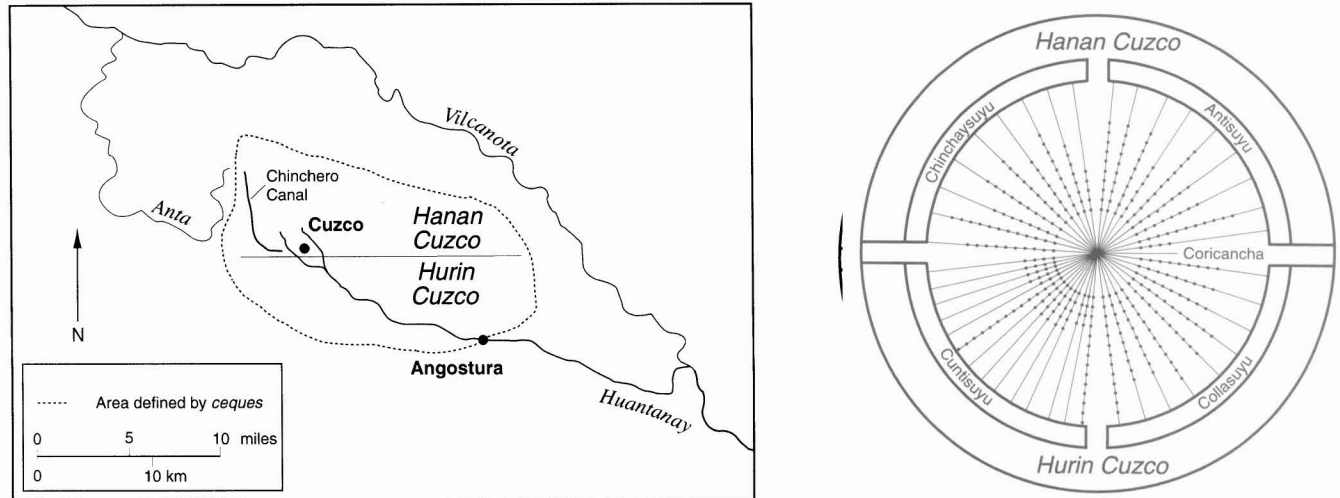


FIG. 6.38. THE INKA CEQUE SYSTEM. On the right is an idealized diagram of the forty-one sighting lines (*ceques*) that radiate out from Cuzco's Temple of the Sun, Coricancha, to points on the local horizon and beyond. The dots represent the 328 *huacas* on the *ceques*, one for each day of the sidereal lunar year. Springs, fountains, and critical points of the Cuzco Valley irrigation system constitute approximately one-third of the *huacas*. Inka rulers used the *ceque* lines as cultural and territorial boundaries when they resettled the Cuzco Valley. A *suyu*, one of the four provinces of the Inka empire, minimally consisted of nine *ceques* with at least one member from each social class (*collana* [Inka], *payan* [honorary Inka], and *cayao*

[non-Inka]). *Suyus* in turn were grouped into *hanan* (upper) and *hurin* (lower) Cuzco. The map on the left illustrates the area defined by all forty-one *ceques*, although certain *ceques* extended to the edge of the Inka empire.

After Jeanette E. Sherbondy, "Water and Power: The Role of Irrigation Districts in the Transition from Inca to Spanish Cuzco," in *Irrigation at High Altitudes: The Social Organization of Water Control Systems in the Andes*, ed. William P. Mitchell and David Guillet (Arlington, Va.: Society for Latin American Anthropology, American Anthropological Association, 1993), 69–97, esp. 75 (fig. 3.1) and 77 (map 3.1).

he had ordered made. With this in front of him, he assigned the houses and lots already built.<sup>131</sup>

Certain families, lineages, and social classes were assigned to particular locales. Lineages were also assigned ritual responsibilities related to the upkeep of *huacas* and calendrical festivities. Pachacuti Inka Yupanque, in carefully welding society and territory within the Inka capital, essentially assumed the role of the Inka creator deity Viracocha in what could be viewed as a dramatic reenactment of the *huaca* origin myth.<sup>132</sup> Careful spatial reckoning of the landscape, ritual mapping, and mapmaking clearly were critical undertakings in both events.

*Ceque* organization was driven by territorial apportionment, topography, astronomy, and cultural history to points on and sometimes beyond the local horizon.<sup>133</sup> Water sources and Cuzco Valley hydrology account for the placement of most *ceque* lines and more than one-third of the *huaca* locations.<sup>134</sup> As elsewhere, canals and rivers in the Cuzco Valley often formed the territorial boundaries between sociopolitical groups. The land apportioned to each Cuzco Valley *ayllu* was reckoned with respect to canals and rivers and was surveyed with uniformly cut ropes.<sup>135</sup> Mountain passes and Inka roads were also important in anchoring the *ceque* system.<sup>136</sup> Few *ceques* exhibit astronomical alignments. However, certain *ceques*

were important referents for rituals associated with the agricultural calendar, for they are related to the 328 *huacas*—the number of days in a sidereal lunar year. The

131. Quotation from Betanzos, *Narrative of the Incas*, 69 and 71 (note 123); see also John Howland Rowe, "An Account of the Shrines of Ancient Cuzco," *Nawpa Pacha* 17 (1979): 1–80, esp. 10.

132. Molina, *Fábulas y mitos*, 58–134 (note 8).

133. R. Tom Zuidema, "Catachillay: The Role of the Pleiades and of the Southern Cross and  $\alpha$  and  $\beta$  Centauri in the Calendar of the Incas," in *Ethnoastronomy and Archaeoastronomy in the American Tropics*, ed. Anthony F. Aveni and Gary Urton (New York: New York Academy of Sciences, 1982), 203–29, esp. 204–11. Certain *ceques* are aligned with the rising and setting of celestial objects, although the only observations made from Coricancha were the December solstice sunset and the helical rising of the Pleiades. *Ceques* are also aligned with topographic features such as mountain passes and points of historical interest. For example, one *ceque* extends from Cuzco to Huanacauri to Vilcanota and finally to the ruins of Tiwanaku nearly three hundred kilometers away. These sites are all related to the birth of the sun in Inka origin myths. Not surprisingly, this *ceque* was an important pilgrimage route.

134. Jeanette E. Sherbondy, "Irrigation and Inca Cosmology," in *Culture and Environment: A Fragile Coexistence*, ed. Ross W. Jamieson, Sylvia Abonyi, and Neil A. Mirau (Calgary: University of Calgary Archaeological Association, 1993), 343–51, esp. 348.

135. Examples of using ropes to measure space are recounted by Betanzos, *Narrative of the Incas*, 45 and 55 (note 123).

136. Zuidema, "Catachillay," 206 (fig. 2) (note 133), and Rowe, "Shrines of Ancient Cuzco," 3–4 (note 131).

Inkas assigned these ritual responsibilities to particular *ayllus* and social groups. *Ceques* also constituted social and kinship boundaries.<sup>137</sup>

The *ceque* system, as presented above, is not without its critics. Some believe that the *ceques* are not straight, but zigzag across the landscape. It may, however, have been the cultural context that determined whether the Inkas viewed the *ceque* as a straight line (as a mental mapping or sighting line for two or more *huacas* sometimes on different *ceques*) or as an irregular line (as a ritual pathway that linked every *huaca* on a single *ceque* line).<sup>138</sup> Questions of astronomical precision and the function of *ceques* in calendrical organization have led to bitter exchanges between various Andeanists.<sup>139</sup> Finally, a few believe the *ceque* system is so complicated that it could not have adequately satisfied the purposes stated above.<sup>140</sup> Nevertheless, the formulation and analysis of the *ceque* system, especially by Zuidema and Sherbondy, are far more compelling than the counterarguments of their critics. The importance of the *ceque* system to the history of Andean spatial representation is well articulated by Zuidema: “The visibility of all the *ceques* from one center meant that a person located in the Temple of the Sun had before him ‘an open book.’ The *ceques* organized space as a map and made the inspection of and reflection upon it as possible as if the person were seeing an actual map.”<sup>141</sup> Similarities between the *ceque* system and the Nazca ray centers include radial organization, ritual function, and the likely role of both structures in conceptually aligning important water sources.<sup>142</sup>

#### HUACAS IN THE CEQUE SYSTEM: CARVED LANDSCAPE MODELS AND MAPPING RITES

Some *huacas* in the *ceque* system were models of specific locations, especially stones and boulders that came from, or resembled, distant places.<sup>143</sup> One *huaca*, for example, consisted of “three stones in representation of the Pachayachachic, Inti Illapa, and Punchau,” all mountains associated with Viracocha in Inka creation myths. On the road of Antisuyu, one of the main boundaries of Cuzco and the Inka empire, one shrine was “shaped like the hill of Huanacauri” and was moved to the end of the road to

137. R. Tom Zuidema, *Inca Civilization in Cuzco*, trans. Jean-Jacques Decoster (Austin: University of Texas Press, 1990), 73–78; idem, *Ceque System*, 40–67, 213–35 (note 15); and idem, “Hierarchy and Space in Incaic Social Organization,” *Ethnohistory* 30 (1983): 49–75.

138. Molina, *Fábulas y mitos*, 127 (note 8), intimates that the *ceques* were straight lines for particular rites only. This implies that for other rites they zigzagged. For more on the linear irregularities of the *ceque* lines, see Susan A. Niles, *Callachaca: Style and Status in an Inca Community* (Iowa City: University of Iowa Press, 1987); Brian S. Bauer and David S. P. Dearborn, *Astronomy and Empire in the Ancient Andes: The Cultural Origins of Inca Sky Watching* (Austin: University of Texas Press, 1995), esp. 93–94, 97–98, and 130–33; and Brian S. Bauer,



FIG. 6.39. INKA MAPPING RITE DRAWN BY FELIPE GUAMÁN POMA DE AYALA, CA. 1615. Topa Inka arranges amulets representing mountain *huacas* of the Cuzco Valley in front of the carved stone *huaca* called Cocopona. Topa Inka's text talks about the perceived role of mountains in the hydrologic cycle and the generation of weather patterns. The construction of ephemeral maps during rituals is millennia old in the Andes and continues to the present. Size of the original: ca. 18 × 12 cm. Photograph courtesy of the Royal Library, Copenhagen (*Nueva crónica y buen gobierno*, fol. 261).

“Ritual Pathways of the Inca: An Analysis of the Collasuyu *Ceques* in Cuzco,” *Latin American Antiquity* 3 (1992): 183–205, esp. 202.

139. See, for example, “Comments,” in *Archaeoastronomy* 10 (1987–88): 22–34.

140. See Mariusz S. Ziolkowski, “Knots and Oddities: The Quipu-Calendar or Supposed Cuzco Luni-Sidereal Calendar,” and Robert M. Sadowski, “A Few Remarks on the Astronomy of R. T. Zuidema’s ‘Quipu-Calendar,’” both in *Time and Calendars in the Inca Empire*, ed. Mariusz S. Ziolkowski and Robert M. Sadowski (Oxford: BAR, 1989), 197–208 and 209–13.

141. R. Tom Zuidema, “Bureaucracy and Systematic Knowledge in Andean Civilization,” in *The Inca and Aztec States, 1400–1800: Anthropology and History*, ed. George A. Collier, Renato I. Rosaldo, and John D. Wirth (New York: Academic Press, 1982), 419–58, esp. 445–46.

142. Aveni, “Order in the Nazca Lines,” 50–71 and 110–13 (note 79).

143. Hyslop, *Inca Settlement Planning*, 102–28 (note 16).

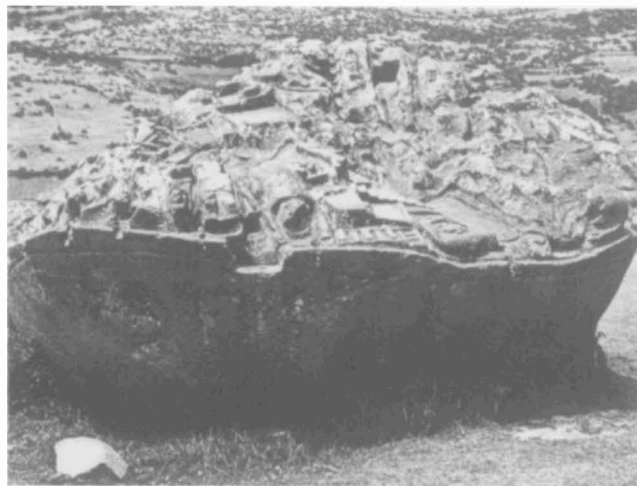


FIG. 6.40. THE SAYHUIITE STONE. The Sayhuite Stone is one of many carved stone landscapes found in the department of Cuzco. Miniature agricultural terraces, grooves representing rivers and irrigation canals, paths, gates, architectural platforms, and altars are found on the stone, suggesting it is a model of a real region. The built landscape is covered with fanciful creatures including monkeys, pumas, camelids, snakes, frogs, lizards, and crabs armed with arrows. The animals may represent geographic information in several possible ways: signifying toponyms or *parajes*; illustrating myths that are location specific; and representing boundaries.

From Enrico Guidoni and Roberto Magni, *The Andes* (New York: Grosset and Dunlap, 1977), 127.

serve as a directional guide. On the road of Collasuyu, another hill-shaped *huaca* contained a maplike arrangement of “many idols of all four suyus.”<sup>144</sup>

*Huacas* were placed at critical points in the sacred geography of the Cuzco Valley and functioned as geographic referents and as portals to the other world during mapping rites. Beneath the *huaca* shrine in one of Guamán Poma’s illustrations are amulets representing prominent mountains and their spirits arranged as an ephemeral map of the Cuzco Valley (fig. 6.39).<sup>145</sup> Topa Inka, the tenth Inka king, reflecting the Andean belief that specific mountains control the weather, asks the mountain spirits, “Who among you is saying, ‘Let it not rain, let it freeze, let it hail?’ Speak immediately.”<sup>146</sup> The anticipated response requires an accurate spatial arrangement of the models. This implies that they represent local geography; the location of individual mountains must be understood.

The Inkas also carved boulders into landscape summaries, some of which were *huacas*. The most famous carved boulder is the Sayhuite Stone, on top of a terraced hill near Curahausi, about 190 kilometers from Cuzco. The Sayhuite Stone is purportedly a representation of the immediate river valley (fig. 6.40). Local canals, terraces, buildings, a plaza, roads, fountains or springs, and a possible reference to another carved boulder known as the

Rumihuasi Stone are all present.<sup>147</sup> Animal representatives from the realms of water, earth, and sky—such as amphibians, sea creatures, felines, and birds—are also shown, possibly signifying their role in water rituals<sup>148</sup> or representing *parajes* or toponyms. Depictions on the stone of crabs carrying weapons also appear on Moche ceramic vessels and may represent the Inka appropriation of ancient myth on the north coast. Felines are often found adjacent to river and canal junctions on the Sayhuite Stone. This may refer to the Inka practice of placing puma skins at such junctions to act as territorial markers.<sup>149</sup>

The Q’inku (Kenko) Stone (fig. 6.41) is also near Cuzco and is said to commemorate the burial of the Inka ruler Inka Yupanque.<sup>150</sup> Near the base of the Q’inku Stone is a model of an unidentified royal sanctuary. The steps and grooves most likely represent the terracing and irrigation system of the Inkas, and in this sense it resembles the Sayhuite Stone.

The Piedra Cansada is another carved boulder mentioned by a number of early chroniclers. Also known as the Tired Stone because it came to rest at this location after a long journey, the Piedra Cansada was a *huaca* in the *ceque* system.<sup>151</sup> Situated just north of Saqsahuaman, the boulder references both this great Inka fortress and the nearby irrigation and terracing system.<sup>152</sup> Although it lacks the animism of the Sayhuite Stone and contains a number of geometric shapes that have yet to be deciphered, ethnohistoric accounts indicate that the Tired Stone is related to a royal *ayllu* of *hanan* (upper) Cuzco.<sup>153</sup>

#### THE INKA ROAD SYSTEM

Although the primary purpose of the Inka road system was transport, it was also a conceptual device for Andean

144. Rowe, “Shrines of Ancient Cuzco,” 21 (shrine Ch-4:8), 35 (shrine An-4:7), and 41 (shrine Co-2:2) (note 131).

145. Guamán Poma, *Nueva crónica*, 1:252–54 (note 124).

146. Rowe, “Shrines of Ancient Cuzco,” 15 (note 131). See also Reinhard, “Chavín and Tiahuanaco,” 396–97 (note 57).

147. Hyslop, *Inka Settlement Planning*, 114 (note 16); John Hemming and Edward Ranney, *Monuments of the Incas* (Boston: Little, Brown, 1982), 164–67; and Maarten van de Guchte, “‘Carving the World’: Inca Monumental Sculpture and Landscape” (Ph.D. diss., University of Illinois at Urbana-Champaign, 1990).

148. Rebeca Carrión Cachot de Girard, *El culto al agua en el antiguo Perú: La Paccha elemento cultural pan-andino* (Lima: Museo Nacional de Antropología y Arqueología, 1955), 10–18.

149. Zuidema, “Lion in the City,” 95 (note 129).

150. Enrico Guidoni and Roberto Magni, *The Andes* (New York: Grosset and Dunlap, 1977), 147 and 167.

151. Hyslop, *Inka Settlement Planning*, 115–17 (note 16).

152. Maarten van de Guchte, “El ciclo mítico andino de la Piedra Cansada,” *Revista Andina* 2 (1984): 539–56.

153. Hyslop, *Inka Settlement Planning*, 115 (note 16), and Rowe, “Shrines of Ancient Cuzco,” 21 (shrine Ch-4:6) (note 131).





FIG. 6.41. THE Q'INKU (KENKO) STONE. The Q'inku Stone portrays many of the same animals and components of the built landscape found on the Sayhuite Stone. However, the configurations of landscape elements differs. The Q'inku and

the Sayhuite Stones depict landscape settings, although it is not clear if their topography is actual, imagined, or a combination of both.

By permission of Edward Ranney, Santa Fe, New Mexico.

cultural geography and an organizational reference for Andean spatial divisions. Four main roads connected the four corners of the empire, acted as territorial boundaries between the four *suylus*, and served as divisions for *ceque* enumeration.<sup>154</sup>

Figure 6.42 illustrates an Inka road official on the road from Cuzco to the Pacific coast. Guamán Poma states that there were “specialized ones who measured and set measurements and marks by every road within the quarters.”<sup>155</sup> Stone markers were placed at a surveyed distance of one to one and one-half Spanish leagues, a length standardized across the empire by the eighth emperor Viracocha Inka (accession to throne A.D. 1400).<sup>156</sup> Such markers were used as territorial boundaries in regions adjacent to Inka roads.<sup>157</sup>

#### THE KHIPU

*Khampus* (*quipus*) are knotted-string devices based on the hierarchical organization of data through a decimal system whereby information is positioned according to ones,

tens, and hundreds.<sup>158</sup> The oldest *khampus* found date from

154. Hyslop, *Inka Road System*, 340–41 (note 7), and Rowe, “Shrines of Ancient Cuzco,” 3–4.

155. Guamán Poma, *Nueva crónica*, 1:358–59 (note 124).

156. Hyslop, *Inka Road System*, 296–97 (note 7). Standardized measurements were relational for the Inkas. For example, the *tupu* is the amount of land area a childless couple needs to subsist depending on the productivity of the land. (The word *tupu* is used in other contexts to express distance.) Since the land’s productivity varied, the size of the measurement varied, even though the definition was the same. Why road distances varied is uncertain. However, travel distances are often related in temporal terms today; for example, point A is four hours’ walk from point B. Such temporal measurements—if a walk is four or five hours long, for instance—will also vary depending on the nature of the terrain, one’s speed, and other factors.

157. Betanzos, *Narrative of the Incas*, 110 and 120 (note 123); Cobo, *History of the Inca Empire*, 211 (note 25); Cieza de León, *Incas of Pedro de Cieza de León*, 137, 140, and 306 (note 123); and Sarmiento de Gamboa, *Historia de los Incas*, 193 (note 123) all discuss the road as a boundary marker.

158. Knotted cords have a worldwide distribution and are also prevalent throughout the native Americas. Most of the archaeologically recovered *khampus* come from elite graves and therefore do not represent the full range of *khampu* function. See Cyrus Lawrence Day, *Quipus and*

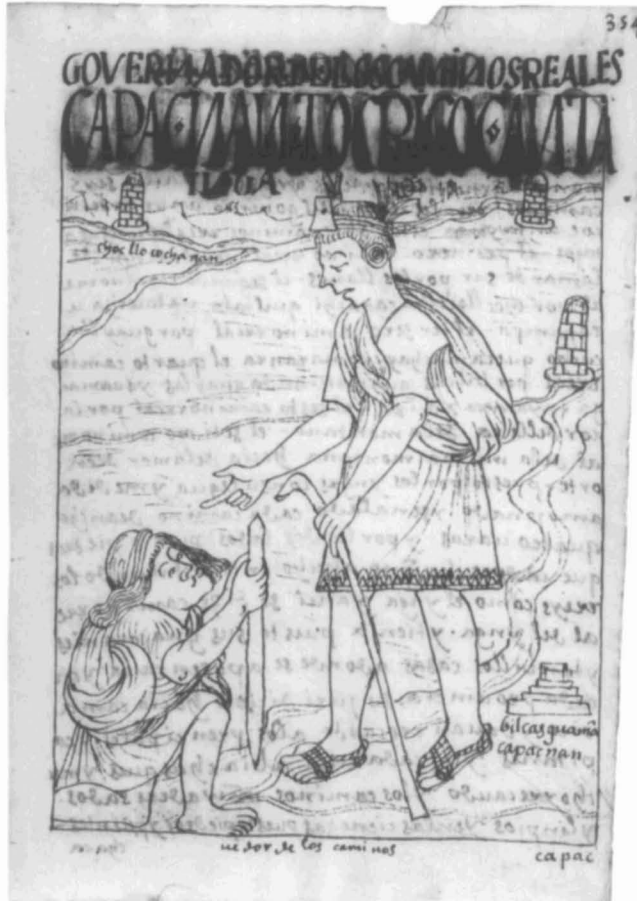


FIG. 6.42. INKA ROAD SYSTEM DRAWN BY FELIPE GUAMÁN POMA DE AYALA. According to historical accounts, Inka administrators conceived of their domain through roads and described the location of peoples and places with respect to the Inka highway. As shown above, stone monuments along the highway marked critical points in the Inka road system and referenced the *tupu*, a standardized measure of one to one and one-half leagues.

Size of the original: ca. 18 × 12 cm. Photograph courtesy of the Royal Library, Copenhagen (*Nueva crónica y buen gobierno*, fol. 354).

the middle horizon and probably evolved from conceptions of space, time, and recordkeeping in the early intermediate period (ca. 200 B.C.–A.D. 600).<sup>159</sup> Guamán Poma refers to accounting, treasury, messenger, and astrological (astronomical) *kipu* secretaries. The *kipu* is so unlike European forms of representation that Guamán Poma identifies the first illustrated *kipu* in his work with a sign with the word “*carta*” written on it—a man holds in his right hand both a *kipu* and the placard (the only artifact in his folio to be labeled in this manner) (fig. 6.43). In Spanish, *carta* refers to a letter, document, chart, or map. Chroniclers wrote that *kipus* were artifacts that recorded historical events, census and tribute information, ceremonial rites and laws, calendrical infor-

mation, and geographical narratives, and that they also served as maps.<sup>160</sup>

*Khipus* are composed of a primary cord and a set of attached secondary strings or pendants (fig. 6.44). Any number of subsidiary strings can be attached to the pendant. Knots were usually tied on the pendant and subsidiary strings at regularly spaced positions reflecting a decimal organization.<sup>161</sup> Color, thread type and weave, knot directionality, and other variables are also potentially important in interpreting *kipus*.<sup>162</sup>

Early research stressed the number and hierarchical arrangement of strings as well as the positional sequence of knots—variables that are of primary interest.<sup>163</sup> *Khipu* knots frequently occur in discrete clusters and represent the number of units in decimal placeholding categories. Pendant strings were often tied together by a knotted cord

*Witches' Knots: The Role of the Knot in Primitive and Ancient Cultures* (Lawrence: University of Kansas Press, 1967), 1–40, and Garrick Malley, “Picture-Writing of the American Indians,” in *Tenth Annual Report of the Bureau of Ethnology to the Secretary of the Smithsonian Institution, 1888–89* (Washington, D.C.: United States Government Printing Office, 1893), 1–822, esp. 223–27.

159. William J. Conklin, “The Information System of Middle Horizon Quipus,” in *Ethnoastronomy and Archaeoastronomy in the American Tropics*, ed. Anthony F. Aveni and Gary Urton (New York: New York Academy of Sciences, 1982), 261–81. Several researchers have explored a possible link between *kipus* and the Nazca ray centers, as well as the roles of both in the radial organization of landscape. See, for example, Tony Morrison, *Pathways to the Gods: The Mystery of the Andes Lines* (New York: Harper and Row, 1978), 122–29, and Aveni, “Order in the Nazca Lines,” 50–71 (note 79).

160. Betanzos, *Narrative of the Incas*, 51, 90–91, and 161 (note 123); Cobo, *History of the Inca Empire*, 94, 99, 142, and 253–56 (note 25); Cieza de León, *Incas of Pedro de Cieza de León*, 77–78, 105, 163, 166–67, 173–75, 177, 187, and 231–32 (note 123); Guamán Poma, *Nueva crónica*, 1:196–97, 338–40, 352–53, and 362–65; 2:858–60 and 966–69 (note 124); Molina, *Fábulas y mitos*, 57–58 and 128 (note 8); Matienzo, *Gobierno del Perú*, 24, 51–56, 116, and 119 (note 32); Polo de Ondegardo, *El mundo de los Incas*, 35 and 111 (note 25); and Vega, *Royal Commentaries*, 98, 124–25, 226–27, 262, 267, 269–70, 274–75, 326, 329–333, and 397 (note 126).

161. Marcia Ascher, “Mathematical Ideas of the Incas,” in *Native American Mathematics*, ed. Michael P. Closs (Austin: University of Texas Press, 1986), 261–89.

162. Marcia Ascher and Robert Ascher, *Mathematics of the Incas: Code of the Quipu* (Mineola, N.Y.: Dover, 1997), esp. 12–35 (originally published as *Code of the Quipu: A Study in Media, Mathematics, and Culture* [Ann Arbor: University of Michigan Press, 1981]). Various combinations of z- and s-patterned spun yarns consistently covary when tied together in left- and right-oriented plies. Urton’s research suggests that spinning and plying variations, along with *kipu* knot directionality, encode binary classes of meaning. See Gary Urton, “A New Twist in an Old Yarn: Variation in Knot Directionality in the Inka Khipus,” *Baessler-Archiv*, n.s. 42 (1994): 271–305, esp. 291–92.

163. L. Leland Locke, “The Ancient Quipu: A Peruvian Knot Record,” *American Anthropologist*, n.s. 14 (1912): 325–32; idem, “A Peruvian Quipu,” *Museum of the American Indian* 7, no. 5 (1927): 1–11; and Erlend Nordenskiöld, “The Secret of the Peruvian Quipus,” in *The Secret of the Peruvian Quipus*, Comparative Ethnographical Studies, vol. 6, pt. 1 (1925; reprinted New York: AMS Press, 1979).

that summed up the value of each string in its group. More complex knots elevated the scale of enumeration to four, five, and even six figures, while an absence of knots meant zero. Some *kipus* lacked a summary cord but had numerical values relevant to solar years, the movements of Jupiter and Mercury, and possibly other celestial movements critical to an agricultural calendar.<sup>164</sup> Henry Wassén compiled historical accounts suggesting that specialized Inka secretaries used *kipus* in conjunction with other media organized decimally, such as the abacal maize tablet (*yupana*) in figure 6.45.<sup>165</sup>

Similarities between the *kipu* and the Inka *ceque* system have been noted by several scholars.<sup>166</sup> A *kipu* map of the *ceque* system certainly existed at one time—Cristóbal de Molina states that he learned the toponyms, locations, and calendrical associations assigned to each of Cuzco's 328 *huacas* from a *kipu* secretary (*kipuca-mayo*).<sup>167</sup> Matienzo wrote that the Spanish chronicler Polo de Ondegardo learned of Cuzco's *huacas* from *kipus*.<sup>168</sup> Unfortunately, the *kipu* map of the *ceque* system has been lost, and neither Molina nor Matienzo provides enough detail to reconstruct this *kipu* map in its entirety. However, it is clear that the Inkas imposed the radial principles and functions of the *ceque* system throughout their empire.<sup>169</sup>

The *kipu* illustrated in figure 6.44 may be a map of the landscape organization imposed on the Ica Valley of southern Peru. According to Zuidema, there are sixty-six pendant cords separated into seven groups. The first group contains six pendants; each one may have represented one of the six *ayllus* that lived at Ica during contact times. The Inka agricultural calendar assigned place-specific rituals to social groups during the interim between the first and second zenith passages of the sun. This period is latitude dependent. At the latitude of the Ica Valley (14.5°S), there are 104 days between the two zenith passages. This is the total sum recorded by the knots on the third, fourth, and fifth pendants. It is no co-



FIG. 6.43. *KHIPU* SHOWN WITH “*CARTA*” PLACARD. Felipe Guamán Poma de Ayala's sixteenth-century letter to the king of Spain illustrated a *kipu* along with a sign that explained it as a “*carta*.” The Spanish term *carta* has been used to signify maps and other documents. Size of the original: ca. 18 × 12 cm. Photograph courtesy of the Royal Library, Copenhagen (Nueva crónica y buen gobierno, fol. 202).

164. Erland Nordenskiöld, “Calculations with the Years and Months in the Peruvian Quipus,” in *The Secret of the Peruvian Quipus*, Comparative Ethnographical Studies, vol. 6, pt. 2 (1925; reprinted New York: AMS Press, 1979).

165. Henry Wassén, “El antiguo ábaco peruano según el manuscrito de Guaman Poma,” *Etnologiska Studier* 11 (1940): 1–30; idem, “The Ancient Peruvian Abacus,” in *Origin of the Indian Civilizations in South America*, ed. Erland Nordenskiöld, Comparative Ethnographical Studies, vol. 9 (1931; reprinted New York: AMS Press, 1979), 189–205; and Orloff, “Surveying and Hydraulic Engineering,” 70–72 (note 121). *Yupanas* have been found throughout the central Andes, and several calculation methods have been attributed to them. It may be significant that some *yupanas* have also been identified as architectural *maquetas*, perhaps signifying a geographically specific use for them. See Carlos Radicati di Primeglio, “Tableros de escaques en el antiguo Perú,” and Hugo Pereyra Sánchez, “La yupana, complemento operacional del quipu,” both in *Quipu y yupana: Colección de escritos*, ed. Carol Mackey et al. (Lima: Consejo Nacional de Ciencia y Tecnología, 1990),

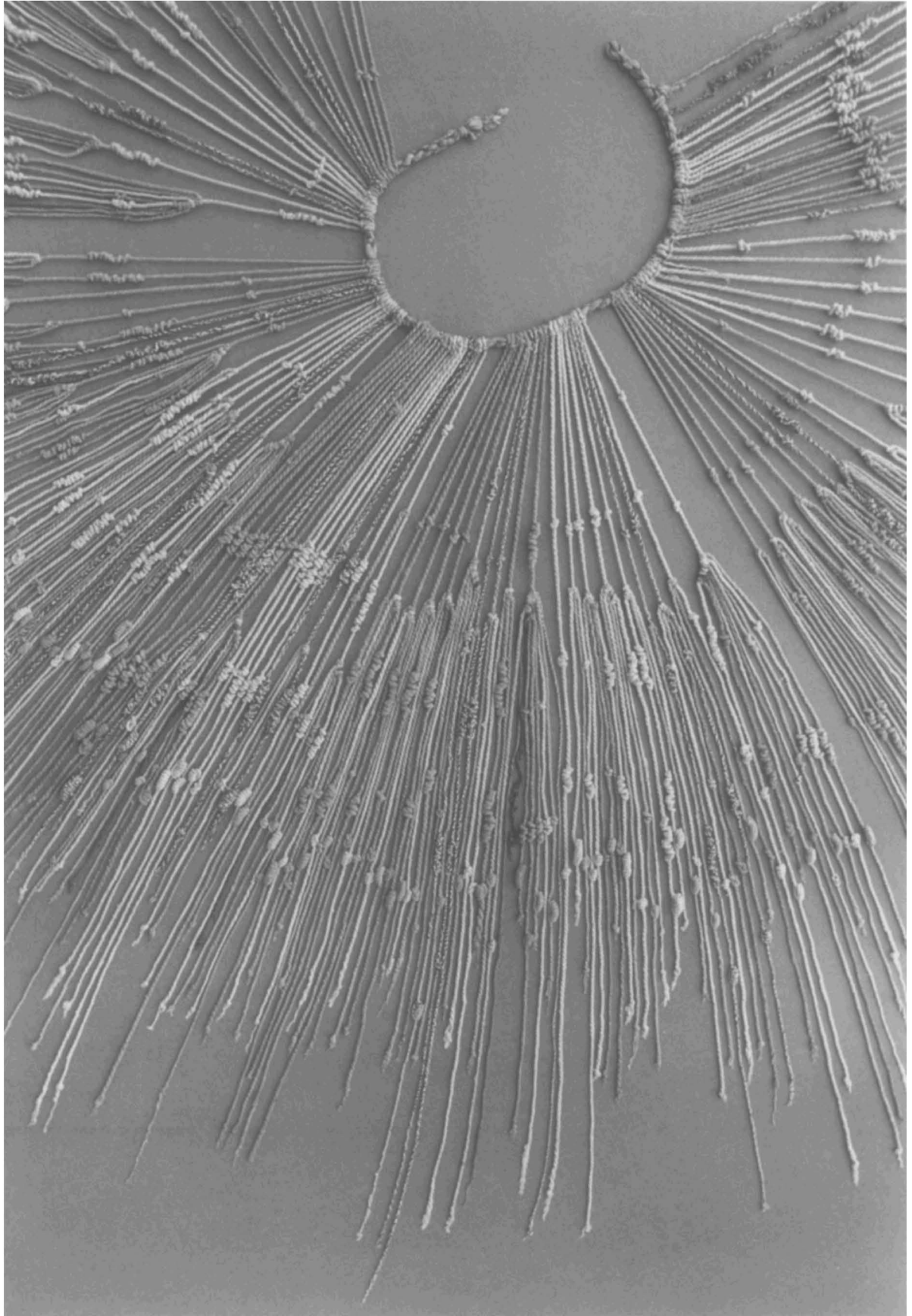
219–34, esp. 221–27, and 235–55, esp. 242–55, and Kubler, *Art and Architecture*, pl. 163b (note 43).

166. For detailed comparisons between *kipus* and the *ceque* system see John Howland Rowe, “Inca Culture at the Time of the Spanish Conquest,” in *Handbook of South American Indians*, 7 vols., ed. Julian H. Steward (Washington, D.C.: Bureau of American Ethnology, 1946–59), 2:183–330, esp. 300, and R. Tom Zuidema, “The Inca Calendar,” in *Native American Astronomy*, ed. Anthony F. Aveni (Austin: University of Texas Press, 1977), 219–59, esp. 231.

167. Molina, *Fábulas y mitos*, 122–23 and 128 (note 8).

168. Matienzo, *Gobierno del Perú*, 119 (note 32).

169. Although most discussions of radial organization center on the *ceque* system of Cuzco, radial systems of thought had architectural and material manifestations throughout the Andes during the late horizon. See Hyslop, *Inka Settlement Planning*, 202–15 (note 16); John Hyslop, *Inkawasi, the New Cuzco: Cañete, Lunahuaná, Peru* (New York: Institute of Andean Research, 1985), esp. 52–56; and Jeanette E. Sherbondy, “Organización hidráulica y poder en el Cuzco de los Inkas,” *Revista Española de Antropología Americana* 17 (1987): 117–53, esp. 118–20.



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FIG. 6.44. *KHIPU* FROM THE ICA VALLEY, PERU, CA. 1500. This *kipu* records the calendrical organization of the Ica landscape and is modeled after the *ceque* system of Cuzco. The *kipu* consists of a primary string to which seven groups of strings are attached: one group of six pendants, each with its own subsidiary string; five groups of eight to ten pendants without subsidiary strings; plus a final group of three pendant strings without knots. The first group of six pendant strings is of primary interest here, since each one may represent the territory of the six known Ica Valley *ayllus*. The total value of the knots on the six pendant strings equals 104, the number of days between the first and second zenith passages of the sun at Ica. It is possible that the *kipu* is a record of *ayllu* ritual responsibilities (R. Tom Zuidema, "A Quipu Calendar from Ica, Peru, with a Comparison to the Ceque Calendar from Cuzco," in *World Archaeoastronomy: Selected Papers from the Second Oxford International Conference on Archaeoastronomy*, ed. Anthony F. Aveni [Cambridge: Cambridge University Press, 1989], 341–51, esp. 345–50).

Museo Nacional de Arqueología, Antropología e Historia del Perú, Lima. By permission of Marcia Ascher and Robert Ascher, Ithaca, New York.

incidence that the pendants are consecutive, since they signify the topological order of *ayllus* belonging to the moiety responsible for interzenith calendrical rituals. The total value recorded in the knots of pendants six, one, and two equals 178—one unit more than the number of days in six synodic lunar months. This signifies the calendrical responsibilities of the other moiety plus a calendrical correction factor. One may read these pendants as a topological sequence when the *kipu* is laid out flat.<sup>170</sup>

Martti Pärssinen has proposed a second kind of *kipu* map, one not related to the Inka calendar or the *ceque* system. According to Pärssinen's hypothesis, geographic information can be numerically encoded on a *kipu*. Chroniclers note that every main town of an Inka province had an assigned number. A colonial document describes the tour of conquered provinces by Topa Inka between 1485 and 1489. This tour may be based on a native narration from a *kipu*, because the document consistently lists the location, event, and persons accompanying Topa Inka in that order—just as *kipus* always retain the same order of hierarchical categories.<sup>171</sup>

As illustrated in figure 6.46, the sentence, "He conquered the province of the Paltas and then the valley of Pacasmayo" can be mapped on a *kipu*.<sup>172</sup> Since provincial capitals are identified by numbers, the two subsidiary strands on the *kipu*'s right side could record the number twenty-two for Palta and twenty-one for Chan Chan. The Pacasmayo Valley is not a provincial capital, but both the place-name and its location can still be recorded on the *kipu* by phonetically recording the Quechua syllables Pa-cas-mayo. Each subsidiary string could represent a category, such as "cultivated plants." A numerical value on that string would represent a particular item such as potatoes (*papa*).<sup>173</sup> The word *papa* would then be



FIG. 6.45. *KHIPU* OFFICIAL WITH *KHIPU* AND ABACAL MAIZE TABLET (*YUPANA*) DRAWN BY FELIPE GUAMÁN POMA DE AYALA. A *kipu* official displays the tools of his trade. Specialized *kipu* secretaries kept census, tribute, and production accounts and may have recorded historical events, ceremonial rites and laws, calendrical and astronomical information, and geographic narratives on their *kipus*. Historical sources indicate that *kipus* were used with other artifacts such as picture boards or *yupanas*.

Size of the original: ca. 18 × 12 cm. Photograph courtesy of the Royal Library, Copenhagen (Nueva crónica y buen gobierno, fol. 360).

linked phonetically with other words on the *kipu* to create a toponym. The Pacasmayo Valley is between Palta and Chan Chan, as signified by the joining of the Pacas-

170. R. Tom Zuidema, "A Quipu Calendar from Ica, Peru, with a Comparison to the Ceque Calendar from Cuzco," in *World Archaeoastronomy: Selected Papers from the Second Oxford International Conference on Archaeoastronomy*, ed. Anthony F. Aveni (Cambridge: Cambridge University Press, 1989), 341–51.

171. Martti Pärssinen, *Tawantinsuyu: The Inca State and Its Political Organization* (Helsinki: SHS, 1992), esp. 31–50.

172. Pärssinen, *Tawantinsuyu*, 36–37 and 45–47.

173. John V. Murra, *Formaciones económicas y políticas del mundo andino* (Lima: Instituto de Estudios Peruanos, 1975), 243–54, describes a 1561 ledger recording transactions in goods between Europeans and the Inkas. The types of categories and the sequence of items within those categories remain consistent with relatively few exceptions.

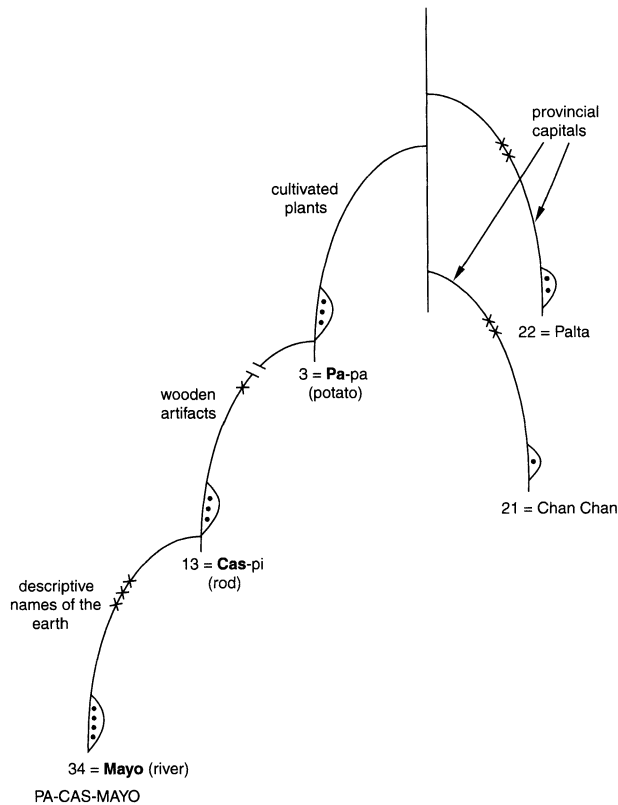


FIG. 6.46. THE *KHIPU* AS A MAP OF THE PACASMAYO VALLEY. Martti Pärssinen has suggested a method whereby the *khipu* could function as a map. The Inkas assigned numbers to all provincial capitals within the empire. Toponyms would consist of syllables derived from categories of production, culture-historical events, and many other possible geographic descriptors. Strands on the right side of the *khipu* indicate the category of provincial capitals. Numbers assigned to the capitals are represented by knots in the tens (Xs) and ones (dots) positions. The number twenty-two is the provincial number for Palta, and twenty-one stands for Chan Chan. Each strand on the left side would correspond to a general category of goods, such as “cultivated plants.” Specific items in each category would be recognized according to their assigned numbers. For instance, potato (*papa*) would be recognized by the number three on the “cultivated plants” strand. Place-names would be formed by joining the syllables of each item together phonetically, and the location of the place would be relative to the provincial capitals. Pacasmayo is between Palta and Chan Chan.

After Martti Pärssinen, *Tawantinsuyu: The Inca State and Its Political Organization* (Helsinki: SHS, 1992), 47.

mayo subsidiary strings to the pendant cord between the two strings representing provincial capitals. One can also imagine a similar system of *khipu* maps based on numbers assigned to stone markers associated with Inka highways (fig. 6.42 above) or *huacas*.

#### TOCAPU DESIGNS

*Tocapu* designs are rectangles that contain abstract geometric designs and are often arranged as a grid. *Tocapu*

design blocks repeat at irregular intervals, with individual blocks probably representing specific sociopolitical groups. *Tocapu* iconography appears to express political and cosmological information.<sup>174</sup> Guamán Poma frequently illustrates tunics, mantles, and waistbands that display *tocapu* designs (see the waistband in fig. 6.39, for example) throughout his letter to the king of Spain.<sup>175</sup> Important personages wear garments with *tocapu* designs during *ceque* festivals and rituals at *huacas*.

Several sixteenth-century Spanish writers attest to the careful and exacting work that went into producing *tocapus*. They also note that *tocapu* abstractions were used with other graphic devices, and together they recorded social, historical, or other information.<sup>176</sup> Zuidema suggests that because certain individual blocks are miniature representations of larger textiles, the irregular repetition of blocks could reflect a “horizontal concept . . . which might lead to a geographic pattern of the actual distribution of *huacas* and their social groups.”<sup>177</sup> The arrangement of *tocapu* designs as grids also suggests some type of geographic relation—perhaps a listing of locations analogous to Mesoamerican cadastral maps.<sup>178</sup>

#### MAPS IN NATIVE MANUSCRIPTS

Santa Cruz Pachacuti’s work about Peru’s ancient kings was completed in 1613. His style of writing and representation is very different from that of his Andean contemporary Guamán Poma. In Guamán Poma’s letter to the king of Spain, which was primarily a plea for kinder treatment of his people by colonial overlords, he adopted certain European conventions, such as the separation of imagery and text, for his presentation of Andean life to European audiences.<sup>179</sup> Conversely, as illustrated in figures 6.47 and 6.48, Santa Cruz Pachacuti did not distinguish between text and image.

Figure 6.47 illustrates the house of Manco Capac, the semimythical Inka king who conquered the upper and lower kingdoms of the Cuzco Valley and founded the Inka dynasty at Pacariqtambo in the mid-thirteenth cen-

174. Zuidema, “Bureaucracy and Systematic Knowledge,” 447–49 (note 141).

175. Some other examples include Guamán Poma, *Nueva crónica*, 1:90–135 and 238–57 (note 124).

176. Cummins, “Representation in the Sixteenth Century,” 199–200 (note 9).

177. Zuidema, “Bureaucracy and Systematic Knowledge,” 448 (note 141).

178. See Barbara J. Williams, “Mexican Pictorial Cadastral Registers: An Analysis of the Códice de Santa María Asunción and the Codex Vergara,” in *Explorations in Ethnohistory: Indians of Central Mexico in the Sixteenth Century*, ed. H. R. Harvey and Hanns J. Prem (Albuquerque: University of New Mexico Press, 1984), 103–25, esp. 117–20.

179. Cummins, “Representation in the Sixteenth Century,” 204 (note 9).

tury.<sup>180</sup> The figure portrays the welding of geographic location and ancestry that is the conceptual heart of the *ayllu*. In keeping with Andean modes of representation, the imagery stresses metaphorical associations over mimetic iconography, such as the trees for ancestry and the squares for geographical place.<sup>181</sup> Manco Capac's mythological house is built on the same principles as the social and territorial partitioning of Cuzco's *ceque* system and the Inka empire. The dual organization of Cuzco's moieties is symbolized by the left and right lower caves, dual descent through the silver and gold trees. The three classes of *ayllus* are represented by the division of each of the caves into three parts. Finally, the land of the four quarters is signified by the four corners of the diamond in the central square, which also defines a space in the middle, surely a reference to Cuzco.

Santa Cruz Pachacuti drew a profile view of one of Coricancha's walls and used symbols and scenes to convey the meanings encoded in the temple's architecture and its associated artifacts and civic-ceremonial rituals (figs. 6.48 and 6.49). The message of the map of Coricancha is clear—it is the focal point from which social and natural order emanates and an architectural codification fostering a spatial and temporal understanding of the Inka world. The cosmographic order of the Inkas expressed on the wall at Coricancha has been analyzed under several different, though not mutually exclusive, rubrics. These include the hydrologic cycle, gender parallelism, astronomy, and ritual.<sup>182</sup>

Guamán Poma's account of Andean cities and towns includes a map of the Inka realm and the Spanish conquest combining Western and native cartographic precepts (fig. 6.50).<sup>183</sup> His choice of map signs and organization is designed to illustrate parallels between Inka and European societies. For example, both the Inkas and the Spaniards had heraldic icons that welded landscape and lineage by their symbolism. The importance of heraldry to Guamán Poma is shown by the presence of a coat of arms in the first folio of his letter and throughout his petition. Another commonality is the organization of geographic relations by means of intersecting sets of lines, manifest in both the European system of longitude and latitude and the grid shown in figure 6.50.

Guamán Poma apparently believed that the grid, as well as the circle, was a universal form of spatial organization. His representation of the pontifical world demonstrates this point (fig. 6.51). The upper panel of the figure illustrates five towns and mountains, with the city of Cuzco labeled at the center. The lower panel shows Castilla (Spain) as a land of four parts organized around



FIG. 6.47. THE HOUSE OF MANCO CAPAC DRAWN BY JUAN DE SANTA CRUZ PACHACUTI YAMQUI SALCAYHUA, 1613. This figure combines Inka ancestral mythology with Inka spatial conventions. Santa Cruz Pachacuti illustrates the “house” of Manco Capac—founder of the Inka royal family—as the cave from which he, his three brothers, and their wives all emerged and began their journey to establish the Inka empire. The windows of Manco Capac’s house (three squares) represent the three openings of the Tampu T’oco cave, identified in Inka oral traditions. The location of these caves is probably at Pacariqtambo, about thirty-five kilometers south of Cuzco. The silver tree on the left signifies Manco Capac’s maternal ancestry, and the golden tree on the right represents his paternal lineage. The text describes the golden tree as a house and the silver tree as a *huaca*. Manco Capac’s right to rule is created from the union of his house (golden tree), or human occupation of the land, with the land itself (silver tree) (R. Tom Zuidema, *Inca Civilization in Cuzco*, trans. Jean-Jacques Decoster [Austin: University of Texas Press, 1990], 9). Photograph courtesy of the Biblioteca Nacional, Madrid (Signatura MS. 3169, fol. 8v).

modern town of Yarisque represents the mythical Haysquisrro. In one version of the myth, ten sociopolitical groups follow Manco Capac from Tampu T’oco. Their names and houses are synonymous with the Inka classes that managed Cuzco’s irrigation districts. The Pacariqtambo myth, and also the map of Manco Capac’s house, well illustrate the intertwining of myth and history that dominates Inka oral traditions and representations. Pacariqtambo is also an important *huaca* in the Cuzco *ceque* system. See Gary Urton, *History of a Myth: Pacariqtambo and the Origin of the Inkas* (Austin: University of Texas Press, 1990), 18–40; Zuidema, *Inca Civilization*, 10–22 (note 137); and Rowe, “Shrines of Ancient Cuzco,” 47 (shrine Co-6:7) (note 131).

181. Cummins, “Representation in the Sixteenth Century,” 202–4 (note 9).

182. See, for example, John Earls and Irene Marsha Silverblatt, “La realidad física y social en la cosmología andina,” in vol. 4 of *Actes du XLII<sup>e</sup> Congrès International des Américanistes* (1976) (Paris: Société des Américanistes, 1978), 299–325, esp. 318–23; Sherbondy, “Irrigation and Inca Cosmology,” 348–49 (note 134); Irene Marsha Silverblatt, *Moon, Sun, and Witches: Gender Ideologies and Class in Inca and Colonial Peru* (Princeton: Princeton University Press, 1987), 40–47; Zuidema, “Catachillay,” 212–15 (note 133); R. Tom Zuidema and Gary Urton, “La constelación de la Llama en los Andes peruanos,” *Allpanchis*, no. 9 (1976): 59–119, esp. 61–67 and 109–10; Urton, *At the Crossroads*, 129–34 (note 14); and Bauer and Dearborn, *Astronomy and Empire*, 118–21 (note 138).

183. Guamán Poma, *Nueva crónica*, 3:1075–1161 (note 124). See also J. B. Harley, *Maps and the Columbian Encounter: An Interpretive Guide to the Travelling Exhibition* (Milwaukee: Golda Meir Library, 1990), 137–39.

180. The Pacariqtambo myth contains a wealth of information concerning specific places and geographic relations. Urton identifies Tampu T’oco with the archaeological site of Pumaurqu and believes that the

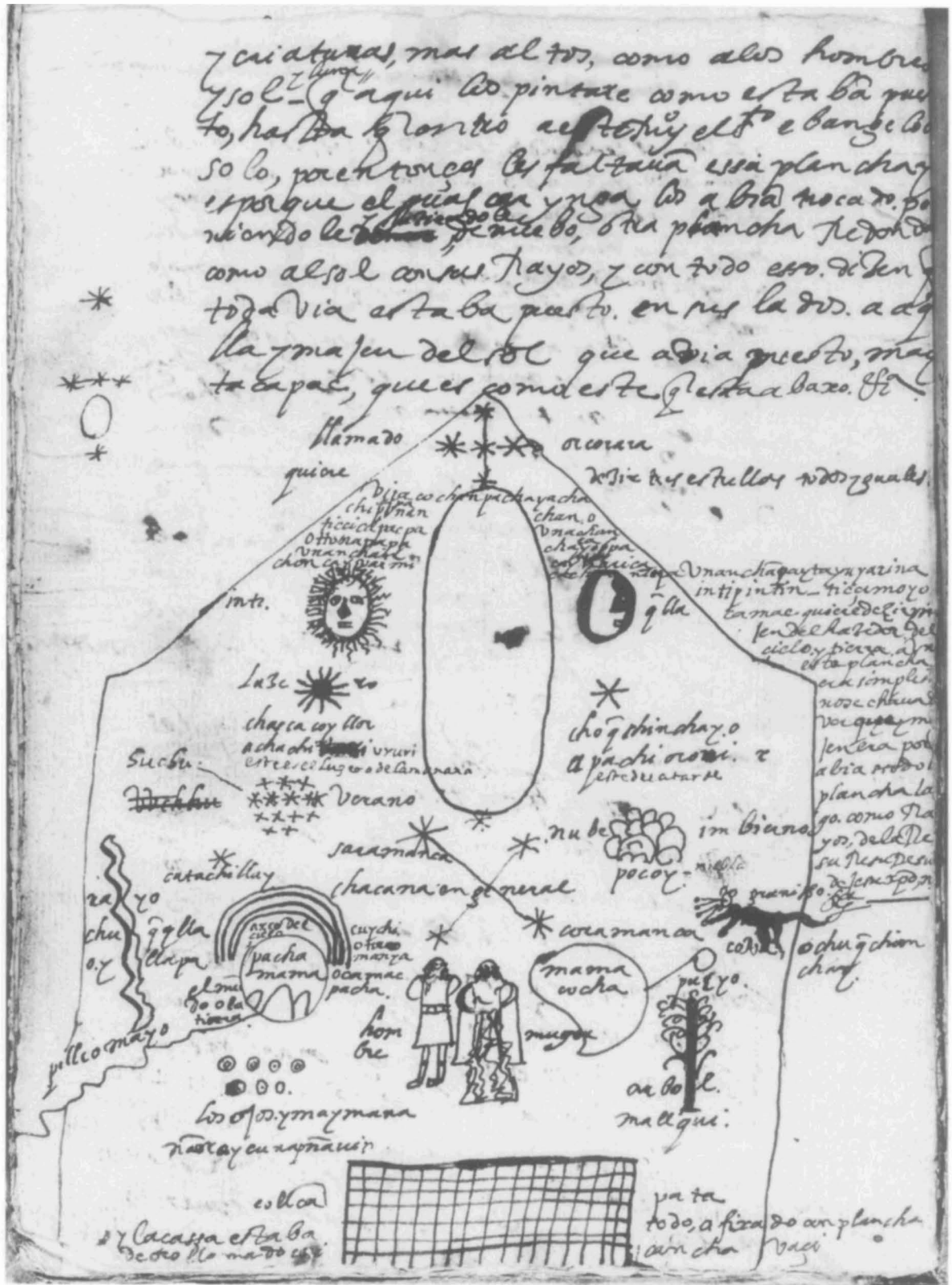


FIG. 6.48. THE TEMPLE OF CORICANCHA, 1613. Native chronicler Juan de Santa Cruz Pachacuti Yamqui Salcamayhua drew this profile view of one of Coricancha's walls to illustrate how the Inkas spatially and socially ordered their environment. See figure 6.49.

Photograph courtesy of the Biblioteca Nacional, Madrid (MS. 3169, fol. 13v).



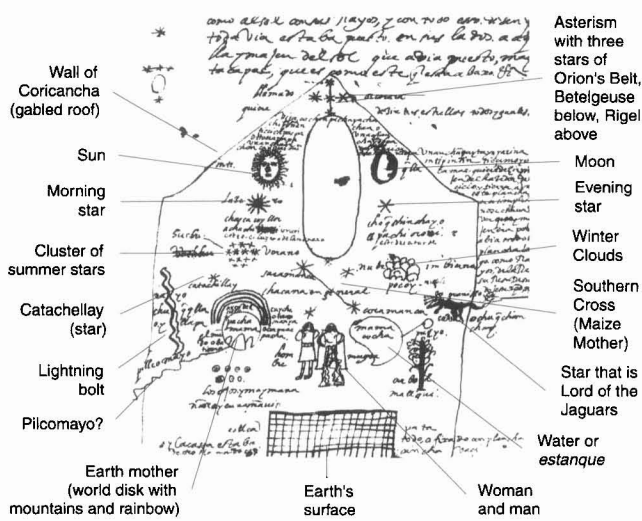


FIG. 6.49. THE SYMBOLISM OF THE WALL AT CORICANCHA (FIG. 6.48). Nine of the symbols and scenes identified in figure 6.48 are astronomical and include representations of the sun, moon, planets (the morning star and evening star), single stars, asterisms, and constellations. The Pillcomayo River (Pillcomayo?) flows from a representation of the *pacha mama*, or earth mother. The earth is shown as a disk, rotated to aid its identification, with mountains illustrated in profile. Above the Pillcomayo is a lightning bolt. At the base of the temple a man and woman stand above a grid representing the surface of the earth. To the right of the woman is a representation of water, or more likely a reservoir (*estaque*) for an irrigation system.

a powerful center just as the four Inka *suylus* are organized around Cuzco in figure 6.50. Two panels are stacked in a manner reminiscent of the dual division of Cuzco (see fig. 6.38 above). It is the Andean world that occupies the position of *hanan* Cuzco, the locus of power in Inka times. Perhaps this upper and lower ordering of Cuzco and Castilla symbolizes indigenous resistance to colonial rule.

### CONCLUSION

Geography, history, social relations, kinship, astronomy, and mythology were all intertwined in Andean culture at the time of the Spanish conquest. Such cultural complexity, coupled with the enormous Inka administrative duties over a huge area, necessitated an accommodating and highly abstract system for charting real and imagined worlds. Yet the systematic expression of spatial knowledge was in place in the central Andes long before the Inkas. Since Chavín times, various manifestations of Andean cultures have been recognized: territorial access to land, resources, water, and agricultural landscapes; the redistribution and trade of precious and staple goods; militarism; labor obligations to elite personages; and the

invoking of preterhuman and extramundane forces to influence the world order.

Researchers have only rarely broached the subject of maps in their analyses of Andean symbol systems and representations. Indeed, how does one recognize a map when the rules of graphic representation and the conception of geographic relations are so very different from the European experience? In this chapter modern ethnographic analogies have been used to develop possible themes of Andean spatial representation. The welding of society and landscape in the concept of the *ayllu*, the use of ancestors and *huacas* to legitimize the territorial order, the abstraction of landscape into a single object or sign, and the geometric structuring of geographic relations are all critical to understanding the role of spatial representation and landscape depiction in central Andean cultures.

The organization of signs and icons into radial, parallel strip, or gridlike geometries can structure the representation of geographic relations in Andean thought. These geometric structures are found in agricultural landholding patterns and are inspired by bioclimatic life zones and celestial movements. Parallel strips are the most common geometric structure found in Andean spatial representations. This structure has an early expression in the two caimans of the Tello Obelisk and some of its stacked figure panels. Other examples include the four parallel strips representing *ayllu* landholdings on the Paracas polychrome mantle and the two parallel strips of figure panels symbolizing elements of *uma* and *urco* on the Bennett Stela. The use of parallel strips to illustrate geographic relations is well documented in ethnography, as illustrated by the location of rivers and canals on modern peasant maps of the shores of Lake Titicaca, the vertical and horizontal design bands on Quinoa ceramics, a Qheswa *pallay* textile signifying agricultural zones, and the differentiation of mountains from valleys and exterior from interior worlds on Q'ero *pallay* textiles. Parallel strips represent the sequential arrangement of *ayllu* landholdings in *chhiutas* mapping rites in Pacariqtambo.

The grid forms a conceptual subcategory of parallel strips. An early archaeological manifestation of the grid is the block of severed heads as souls signifying agricultural landholdings on Nasca chieftain vessels. The grid is closely related to Inka decimal organization, as reflected in the abacal maize tablet (visible in figure 6.45) and in *tocapu* designs. Santa Cruz Pachacuti represents the surface of the earth as a grid in his drawing of the temple at Coricancha, and Guamán Poma's *mappamundi* demonstrates conceptual parallels between the European use of longitude and latitude and a grid.

The Nazca ray center geoglyphs are perhaps the earliest archaeological expression of radial landscape organization, although the Inka *ceque* system is the most fa-

MAPA MUNDI DE REINO DE LAS INDIAS MAR  
OTRO REINO LLAMADO COLLASVIO SALES  
OTRO REINO LLAMADO CHINCHAVISIO PIVISOL  
OTRO REINO LLAMADO DE SVR LLAL MCA



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FIG. 6.50. MAP OF THE INKA EMPIRE DRAWN BY FELIPE GUAMÁN POMA DE AYALA. Guamán Poma's map of the Spanish conquest of the Inkas incorporates both Inka modes of representation and Western cartographic conventions. The four quarters of the Inka empire (Antisuyu, Collasuyu, Condesuyu, and Chinchasuyu) are clearly labeled, reinforcing Inka spatial divisions. The intersecting parallel lines are an obvious—though misplaced—reference to the European system of longitude and latitude. Coats of arms lie adjacent to cities. At the bottom of the map are Spanish ships and the fanciful sea creatures so often depicted on sixteenth- and seventeenth-century European maps. Guamán Poma's map serves as a link between these two cultures.

Size of the original: ca. 18 × 24 cm. Photograph courtesy of the Royal Library, Copenhagen (Nueva crónica y buen gobierno, fol. 983–84).

mous. The Inkas adjusted *ceque* system principles to local geographic and social conditions, as shown by the *kipu* from the Ica Valley that maps the calendrical organization of the Ica landscape. An interpretive drawing of a textile motif illustrates the radial organization of agricultural landholdings by elevation in the Q'ero Valley. Such a radial organization in society usually exists as an ideal today, as illustrated by the *ayllu* landholdings in San Andrés de Machaca, Bolivia.

Performance is a critical component of Andean spatial representation, as reflected in mapping rites. There are many ethnographic examples of such rites, during which an ephemeral map is often made by arranging amulets around a geographic referent or spiritual portal. Ground drawings may also act as a geographic referent in mapping rites. The *chhiutas* rite in Pacariqtambo, Chuquito weather and fertility rites, and Kaata afterlife rites are but a few examples that illustrate the range of performance mapping. Topa Inka arranged amulets representing prominent mountains as an ephemeral map of the Cuzco Valley during a weather rite, and ancient peoples performed a variety of mapping rites on the giant Nazca geoglyphs.

Monuments depicting geographic relations or objects may also have served as geographic referents during ancient mapping rites. Examples include the Tello Obelisk, the Bennett Stela, and *huacas* or carved stone landscapes in the Inka *ceque* system. House models and *maquetas* are common in the archaeological record and are perhaps analogous to Chuquito mapping amulets. Examples of mapping amulets include house models, landscape vessels, *maquetas*, and the mountain spirit amulets depicted in Topa Inka's weather rite.

Since membership in an *ayllu* is often based on real or fictive descent, depicting ancestors is one important way of representing and thus legitimizing territorial access and landholdings. Ancestor imagery is strongly developed along the south coast of Peru, as reflected in the masks



FIG. 6.51. THE PONTIFICAL WORLD DRAWN BY FELIPE GUAMÁN POMA DE AYALA. Guamán Poma adopts Western rules of mimetic naturalism to identify the places and regions of the pontifical world. However, he retains the geometry that Andean peoples have used for millennia to illustrate geographic relationships, such as the quadripartitioning of space around a powerful center and the ordering of social and territorial space into “upper” and “lower” positions. Size of the original: ca. 18 × 12 cm. Photograph courtesy of the Royal Library, Copenhagen (Nueva crónica y buen gobierno, fol. 42).

found on a Paracas vessel that differentiated households, the Paracas spirit map, and the severed head as soul motif representing *ayllu* landholdings. The cultural importance of ancestors is independent of political bureaucracy, as illustrated by the drawing of the house of Manco Capac and the depiction of Inkarrí on a modern Q'ero textile.

Representations of people and animals are often metaphors for the idealized landscape. Caimans represent the realms of earth and sky on the Tello Obelisk. Protrusions on the Nasca chieftain vessel correspond to Andean metaphors for topographic features affecting the flow of water, and carved boulders often depict animals, which may correspond to toponyms or specific resource zones.

Andean artifacts and representations are rarely analyzed as geographic representations or as symbolic manifestations of Andean spatial thought. The purpose of this chapter is to open the door to the possibility that this in-

terpretation can shed light on the conceptions of geographic relations in Andean thought, presented in the context of Andean cultural ecology and cultural history.