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CARTOGRAPHY AND THE VISUAL ARTS: CONCEPTUAL AND STYLISTIC CONNECTIONS

Beyond their shared media, there is theoretical justification for the linkage between cartography and visual art, since both maps and paintings present informational content in the form of visual representations. In other words, map content, like pictorial content, often takes the form of analogues meant to reproduce certain characteristics of the objects represented—characteristics that are apprehended visually. Because of this shared mode of representation, historians of art and cartography have previously speculated about connections between cartography and the visual arts but have felt hampered by a lack of map artifacts.53 In recent years artifacts for the Han have been discovered, but even without artifacts the evidence for connections between maps and painting is compelling. Like Liu Xie’s conception of literature, the idea of painting also has links to geography—it is perhaps connected etymologically to land configuration. According to the Han dictionary Shuowen jiezi (Explanation of writing and explication of graphs), the graph hua (to paint, painting) means “boundary” and “represents the four boundaries of a field [tian].”54 The Shuowen may not be a reliable guide to etymology, but it at least serves as a useful indicator of Han opinion and misconceptions about it. In the case of painting, the Shuowen’s opinion seems to have been influential. Since at least the Song dynasty, landscapes have constituted the most highly valued genre of painting, and maps by Zhang Heng and Pei Xiu appear in Zhang Yanyuan’s catalog of paintings.55 Zhang Yanyuan provides another indication that Zhang Heng enjoyed some repute as a painter: he records an anecdote in which Zhang Heng paints a strange beast with his toes.56

53. See, for example, Sullivan, Birth of Landscape Painting, 35–37 (note 12); Wang, Zhongguo ditu shi gang, 25–28 (note 2); and Alexander C. Soper, “Early Chinese Landscape Painting,” Art Bulletin 23 (1941): 141–64, esp. 149. Soper states that it is unlikely that Han mapmaking “had any important effect on the development of a landscape art,” but he seems to leave open the possibility of influence in the opposite direction.


55. See Zhang, Lidai minghua ji, chap. 3 (76) (note 28).

FIG. 6.5. DETAIL OF A MAP OF CHANG’AN, 1080. This detail of a lithographic copy of a rubbing of a stone map of Chang’an, by Lü Dafang (from a modern reproduction of the copy), appears to use ruled lines. To the left is a fragment of the stone map.
Size of the entire original estimated to have been 200 × 136 cm. Kyōto University Humanities Research Institute. From Hiraoka Takeo, Choan to Rakuyo: Chiyo (Chang’an and Luoyang: Maps), T’ang Civilization Reference Series, no. 7 (Kyōto: Jibunkagaku Kenkyusho, Kyōto University, 1956), map 2.
Photograph of the fragment courtesy of Cao Wanru, Institute for the History of Natural Science, Academia Sinica, Beijing.

Another anecdote, besides illustrating the military significance attached to maps, suggests that mapmaking called for the skills of a visual artist:

Lady Zhao in the court of the lord of Wu was the younger sister of the prime minister Zhao Da. She was skilled in painting; her technique had no peer. Between her fingers, using colored silk, she could weave brocades with clouds and dragons. The large ones were a full chi in size; the small ones were one cun square. In the palace she was called the matchless weaver. Sun Quan [r. 228–48, first emperor of Wu] often lamented that the states of Wei and Shu had not been con-
FIG. 6.6. THE PINGJIANG TU (MAP OF PINGJIANG PREFECTURE [PRESENT-DAY SUZHOU, JIANGSU PROVINCE]). This is a rubbing of the Pingjiang tu, carved on stone in 1229 and seeming to use ruled lines. The map depicts more than 640 features of the landscape, both human and natural. Human features include temples, administrative and military organizations, workshops, bridges, and roads. Natural features include hills and mounds, rivers, lakes, marshes, and streams. Directions are marked on the map; north is at the top. Compare figures 6.5, 6.7, and 6.8.

Size of the original: 279 x 138 cm. Photograph courtesy of Cao Wanru, Institute for the History of Natural Science, Academia Sinica, Beijing.
FIG. 6.7. WOODBLOCK MAP OF THE SEAT OF LOCAL GOVERNMENT AT JIZHOU IN PRESENT-DAY HEBEI PROVINCE. Besides its use of what appear to be ruled lines, this example is notable for its variable perspective, used on city maps since the Han dynasty. Compare figures 6.5, 6.6, and 6.8. Size of the original: 19.5 × 29 cm. From Jizhou zhi (Gazetteer of Jizhou, 1831), 1.25b–26a. Reproduced courtesy of the Harvard-Yenching Library, Harvard University, Cambridge.

quered. To facilitate troop movements, he was thinking of getting someone skilled in painting to make maps of their mountains, streams, topography, and military positions. Zhao Da then presented his younger sister, and Sun Quan asked her to draw the rivers and lakes of the nine regions and their mountains. The Lady said: "It is extremely easy for pigments to fade; they cannot be preserved for long. But I am able to embroider a map." She made the various principalities on a square piece of silk, and drew the five peaks, the [Yellow] River and the sea, and cities, as well as the disposition of troops. When the map was finished and presented to the king of Wu [Sun Quan], people called her the "wonder of needlework."57

One style of painting seems particularly close to the drafting style often associated with mapmaking: jiehua (ruled-line painting), the only category of painting that involved tools other than the brush. It was used for detailed and scaled depiction of objects, especially architectural subjects (see fig. 6.4). Practitioners of this style of painting were skilled not only with drafting tools such as the calibrated ruler, compass, and square, but also with surveying instruments such as the water level and plumb line and with building calculations (mingjia suanfa).58

Although the use of rules and compasses in drawing dates back to antiquity, the category jiehua and its terminology seem to have developed in the Song. In fact, one source credits Guo Zhongshu, a painter of the Northern Song, with mastering and defining the measured drawing or "boundary" style. In the beginning, jiehua seems to have been somewhat of a pejorative term among

57. Wang Jia, Shuyi ji (Gleanings, fourth century), Baihu congshu jieheng edition, 8.2a–b. A less detailed account of Lady Zhao's map appears in Zhang, Lidai minghua ji, chap. 4 (105–6) (note 28).
the scholarly elite; it derived from an artisanal craft with tools borrowed from the carpenter’s trade—tools that Lu Ji, one will recall, had urged artists to discard. *Jiehua*, like many maps, seems to have occupied a zone between fine art and practical craft, and a number of maps seem to have been produced with the aid of straightedges: for example, city plans and gazetteer maps (figs. 6.5 to 6.8).

The links between painting and cartography seem to have gone beyond technique. There is also some evidence of a conjunction between painting theory and cartographic theory. Pei Xiu’s emphasis on correspondence, as I mentioned previously, parallels an emphasis on verisimilitude in aesthetics. Xie He, for example, formulated six principles of painting, two of which are “correspondence to objects, that is, resemblance to forms,” and “division and planning, that is, placement and arrangement.”

59. Xie He does not elaborate on these principles, but correspondence and arrangement are concerns that Pei Xiu shares. Even before Xie He, Zong Bing (375–443) had thought about the idea of scale in relation to landscape painting: “Now, if one spreads thin silk to capture the distant scene [of the Kunlun Mountains], the form of Kunlun’s Lang Peak can be encompassed in a square *cun*. A vertical stroke of 3 *cun* will equal a height of thousands of *ren* [equal to 80 *cun* or 8 *chi*], and a horizontal stretch of several *chi* will form a distance of 100 *li* [equal to 1,800 *chi*].”


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**Fig. 6.8. Woodblock Illustration or Map, 1894.** This image is of the examination hall in Guangping Prefecture in present-day Hebei Province (compare figs. 6.5 to 6.7). Size of the original: 23 cm. From *Guangping fuzhi* (Gazetteer of Guangping Prefecture, 1894), chap. 1, map 9. Reproduced courtesy of the Harvard-Yenching Library, Harvard University, Cambridge.
In Chinese painting, however, pictorial scale tends to dominate natural scale; that is, the size of an object depicted was determined by needs of design and not rules of geometric perspective. Foreground features might be diminished to avoid obstruction and overemphasis, while distant objects might be enlarged to act as countertop to the middle distance and foreground. The practice of variable scale obviously conflicts with Pei Xiù’s insistence on consistent map scale to “preserve actualities.” Many mapmakers, however, apparently chose to adhere to the pictorial technique of variable scale well into the Ming and Qing (1644–1911), as suggested by an artifactual record containing an abundance of maps that do not maintain a consistent scale. This and other examples of the conjunction between painting and mapmaking perhaps help explain the ambiguity of the graph $tu$ in its application to drawings and pictures or to charts and maps.

A shared conception of space also strengthens the bond between mapmaking and painting. To state some broad generalizations, the experience of space was dynamic and fluid, intimately related to one’s experience of time. Space, emptiness, was regarded almost as an entity in itself—as such it was boundless and unlimited. Objects could be measured and defined; space could not be so fixed, since it changed with vantage point and time. As a result, no abstract geometrical system governed space, and points within it were not definable or delimitable in any absolute terms. This conception of space, consonant with what Needham has described as an organismic and
processual worldview, differs from the one that has prevailed among European cartographers and artists since about the fifteenth century—a conception that defines space abstractly, as an entity that is bounded, static, and therefore organizable and measurable. Under this conception, which accords with the scientific tendency toward what Pepper has called "discrete mechanism," space can be viewed as particulate rather than as a continuum and can be represented as a mathematical equation. It is conceived as being made up of a coordinate system of points, each of which has its own discrete identity and can be treated objectively from a single vantage point.61

The difference in the two treatments of space leads to differences in the graphic treatment of perspective, the projection of three-dimensional space on a plane surface. In European Renaissance art, depth was represented as a continuously receding ground plane directed toward a vanishing point on the horizon, with a correlative diminution in the height of verticals. The geometry essential to the European artist's use of convergent perspective, however, was generally unknown to, or at least unused by, traditional Chinese painters. The problem of perspective, or yuanjin (far-near), in the graphic arts was resolved by different conventions.

able without restriction or else multiple. Each portion of the composition is drawn with its own viewpoint perpendicular to it at some distance. This convention was useful for composing a spatially dynamic sequence of scenes on, for example, scrolls, one of the traditional media for Chinese painting and maps. Unlike paintings in frames, scroll paintings are often too long to be viewed all at once. A moving viewpoint seems well suited for a medium in which the image passes before the observer section by section as it is unrolled. On sheet maps of restricted length, this technique could be adapted to create multiple ground planes: one might have to imagine oneself rotating, instead of moving laterally, in order to view the depicted objects correctly.

There were, however, exceptions to the general application of variable perspective. Shen Kuo recognized the merits of certain experiments that pointed toward convergent perspective. He says that painters who employed a stationary viewpoint were able to diminish heights and distances accurately but attached too much importance to this diminution. Shen advocates the use of a large viewing area in which the artist combines the vantage points of multiple observers:

In general, the method of landscape painting is to take a large view of the small, as when a person observes an artificial mountain. If it were the same as the method for viewing a real mountain, looking up from below, one would see only a single layer of the mountain; how can one see layer on layer, or its valleys and gorges and other details? Similarly in the case of dwellings and houses, one would not see what was happening in their courtyards and in the lanes behind them.

Elsewhere the idea of multiple viewpoint is described in terms of three depths or perspectives: gao yuan (high "distance" or perspective), shen yuan (deep distance or perspective), and ping yuan (level distance or perspective). The three perspectives are also explained in a Qing dynasty manual of painting:

Mountains have three perspectives: looking at a peak from below is called gao yuan; looking from a mountain in front to one in back is called shen yuan; and looking from the near to the far is called ping yuan. The effect of high perspective is a precipitous view; the effect of deep perspective is the repetition of layers [or planes]; the effect of level perspective is of an expanse. These principles govern the overall composition. If it is deep but without perspective, it will seem

Fig. 6.11. Rubbing of a Stone Map, T'ai Shan Quan Tu (Complete Map of T'ai Shan [Mount Tai], Probably Qing Dynasty). T'ai Shan, in central Shandong Province, is one of the five sacred mountains of China. This map was apparently meant as a guide for pilgrims to the mountain: it shows the route from the temple of the god of T'ai Shan at the foot to the shrines at the summit and identifies places and buildings. The mountain and buildings are presented in elevation, while temple grounds and walls are presented in plan, which creates a multiplicity of ground planes. In addition to this variable perspective, the map makes use of variable scale: the temple complex at the foot of the mountain is disproportionately large, apparently to permit the buildings within it to be represented.

Size of the rubbing: 110 x 62 cm. By permission of the Field Museum of Natural History, Chicago (235581).

One was the use of variable viewpoint (see figs. 6.9 to 6.11 for examples of variable perspective in maps). The standpoint of the observer, instead of being fixed, is mov-
shallow. If it is level but without perspective, it will seem too close. If it is high but without perspective, it will seem low. Distance is represented by height so that objects behind or beyond another object are placed above it on a two-dimensional surface. The resulting composition is a series of plane ground surfaces or terraces, each with its own vanishing point.

MAPS AS PAINTINGS/PAINtINGS AS MAPS

The parallels between maps and paintings in the use of perspective seem too striking to be a case of independent development—a suspicion supported by textual sources already cited. To judge from Zhang Yanyuan’s lists of paintings, maps were considered a genre of painting during the Tang. Existing artifacts suggest that this view of maps as painting may have been prevalent well before then. This is not to say that purely planimetric representation was unknown. The mausoleum map (zhao yu tie) and wooden maps dating from the Zhanguo period, stone maps from the Song, and some manuscript and printed maps from later periods do seem to employ an essentially planimetric mode. But Chinese maps characteristically present a mixed mode of representation. For example, a tomb mural from the Former Han dynasty (206 B.C.—A.D. 8) discovered at Horinger (Holingol), Inner Mongolia, presents a city plan of Fanyang (present-day Chuwang village in Henan Province) (fig. 6.12). All the structures depicted are presumably on the same horizontal plane, as suggested by the representation of the surrounding walls in plan. The depiction of buildings in elevation, however, creates the impression that there are several horizontal planes. The human figures also seem to be exaggerated in size; they are as large as buildings. The plan may perhaps be taken as an illustration of a technique of variable scale.

A more complex example (fig. 6.13) comes from the same tomb as the Fanyang city plan. This is a city plan of Ningcheng. All the objects represented in the plan are on the same ground plane, some are depicted obliquely, some in plan, and some in elevation, so that they seem to occupy different ground planes. In the upper left quarter of the plan, the facade of a building is presented in elevation. The scene inside the building is also depicted, and the artist recognizes that a different perspective would allow a fuller representation of that interior scene. Thus, in accordance with what Shen Kuo would write centuries later on variable perspective, the interior of that same building is presented obliquely so that everything inside can be seen.

The use of variable perspective is not restricted to artifacts from the tomb at Horinger. It also appears on two of the silk maps discovered in one of the Han tombs at Mawangdui in 1973. One depicts buildings in a manner that forces a viewer to rotate in order to maintain proper orientation (see fig. 3.7 above). The same style of rendering can be seen at the center of the other map in a representation of a military headquarters (plate 8). This map has been described as a garrison map because of the centrality of the headquarters and the map’s depiction of various military installations. The scholars responsible for the initial reports on which almost all subsequent work

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