

SOME NOTES ON THE STRUCTURE OF PICTURE-MAPS AND SPATIAL COGNITION IN MEDIEVAL JAPAN

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Abstract The aim of this paper is to investigate clues for understanding picture-maps in medieval Japan, and to probe into the relationship between their structure and spatial cognition in past times. To this purpose, the author considered the directionality from which the direction of representation of the picture-map symbols, such as the mountains and man-made structures, were drawn. He could classify it into ten types analytically, and further summarize them into the following three group prototypes : 1. maps in which features are radially concentric around a center; 2. maps where features are depicted as in traditional Chinese landscape painting; 3. maps which show a reversed up-down representation of secondary features based on the linear axes of primary features. These group prototypes have close relations with the ego-centric spatial cognition patterns characteristic of East Asia and particularly Japan.

1. Introduction

The subject of spatial cognition studies has been concentrated mainly on contemporary problems, but not so much on past times. One of the main reasons is that informants do not exist now, who lived at that time. But that does not mean there are no materials for study of past spatial cognition. All materials which were drawn up during past times are available for the reconstruction of spatial cognition of past times.

Particularly old maps are extremely useful materials. The map is essentially appropriate for conveying spatial information which it is difficult to do by other media. Without spatial cognition, we cannot represent spatial information, or in other words, we cannot make a map. Consequently, the map is one of the most important and useful materials for reconstructing spatial cognition. A good example is that of K. Lynch (1960), who abstracted the image of the city from many free-hand maps. There are however not so many studies which reconstruct spatial cognition of past times by using old maps. Moreover, methods have not been completely developed for analyzing old maps for this purpose. But some recent studies are throwing light on these problems. Katsuragawa Ezu

Kenkyu-kai (Research Group of Picture-maps) (1984), a member of which is the author, probed by semiological methods into a picture-map in medieval Japan, the picture-map of Katsuragawa, Omi Province (Shiga Prefecture in Central Japan). The author (1983) also mentioned some practical viewpoints in analyzing semiologically picture-maps in medieval Japan. The aim of this paper is to investigate clues for understanding picture-maps in medieval Japan, and to probe into the relationship between their structure and spatial cognition in past times.

2. The *Shoen-ezu* and the Direction of Representation —Materials and Methods—

The maps considered in this paper are the picture-maps of medieval Japan. The picture-maps were not drawn up with a geometrical projection as in modern cartography. Before modern cartography, the representation style of maps was usually a pictorial representation in Japan. As the map-makers drew up the maps on the basis of their own spatial cognition, it is therefore suitable for our purpose.

During the medieval period, pictorial representation of maps prevailed. It is the most characteristic representation in the *shoen-ezu*, which is, in a broad sense, a picture-map of the *shoen* (Japanese manors or estates which had continued to exist from the eighth century to the sixteenth century). Above all, many pictorial *shoen-ezu* were drawn up during the twelfth century to the fourteenth century. Most of them were drawn up to delimit the territory of the *shoen*, when it was established or when troubles over boundaries of it with others occurred. We will call these the *shoen-ezu* in a narrow sense.

Some photographical records of the *shoen-ezu* have been already published. Particularly, *Nippon Shoen Ezu Shusei* (A Collection of Estate Maps in Japan, Two Vols. 1976, 1977) contains reproductions of almost all the medieval picture-maps in Japan. Thirty-four sheets of picture-maps considered in this paper are selected from it on the grounds of their pictorial representation and the representation of the mountains, which is due to the convenience of our analysis, as will be mentioned later.

On the picture-maps the elevation or relief of the features is represented by the drawing of their profile views. In other words, the height of the features is represented by being made to lie flat. It is important in which direction things are made to lie flat, that is to say, from which direction the picture-map symbols were drawn. We call this the direction of representation. The spatial representation of Japanese picture-maps is different from that of the European picture-maps in many ways. Above all, one of the greatest differences is that to draw up the things with various directions of representation is widespread in Japanese picture-maps. This is the first reason why we are analyzing the direction of the representation.

The second reason is why the direction of representation is capable of offering clues for the understanding of spatial cognition. The direction of representation indicates the position from which the picture-map makers represented the landscape. That is, in other words, the origin of the co-ordinates in drawing up the picture-maps. However that does indicate not only the positional relation of the picture-map makers to the features depicted, but also how they had viewed the features. In a word, it indicates their view of

things, and thus of space, namely spatial cognition. The direction of representation is a kind of map symbol which signifies a certain meaning as do the other map symbols.

Such style of spatial representation of the picture-maps and the spatial cognition do not belong to the picture-map makers alone. The picture-maps were accepted not only by the map-makers but also by most of their contemporaries. This is evident on the grounds that the picture-maps had fulfilled their function at that time. Consequently, the spatial cognition, which can be abstracted from the spatial representation of the picture-maps, was shared by all those who accepted such a style of spatial representation in the picture-maps.

From the definition of the direction of representation, we are able to analyze the direction of representation of only those things with height. Almost all of the features with height are mountains and man-made structures on the picture-maps. So we will analyze them only. Most of the mountains drawn have their position on or near the edges of the sheet of the picture-map. These mountains are different from other mountains and man-made structures in that they are larger and have a more important effect on the whole sheet of the picture-map. The other mountains and man-made structures are independently represented. We cannot consider both of them in the same way; thus we will consider them separately.

The procedures of the analysis are as follows: first, we will identify the differences among the directions of representation and classify them. Secondly we will probe into the classified directions of representation, and relate them to the spatial cognition on which they are based.

3. Analysis and Result

The mountains around the edges of the sheet

Generally speaking, the positional relationship of mountains with the edges of the sheet can be classified into the following three categories : category 1) that the mountains'

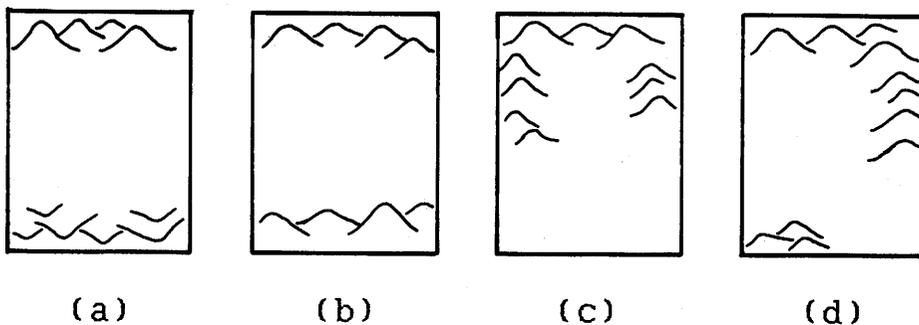


Fig. 1 Types of picture-maps classified by the direction of representation of mountains.

(a): type A picture-map ; (b): type B picture-map ; (c): type C picture-map ; (d): type D picture-map.

peaks face towards the edges of the sheet; category 2) that their bases face towards the edges of the sheet; and category 3) that their sides face towards the edges of the sheet. By these categories we are able to classify the picture-maps in question.

In the first place, we can find twenty-two sheet picture-maps by only category 1); we will call them type A picture-maps (Fig. 1-(a)). On the type A picture-maps, all mountains about the edges of each sheet are drawn in a radially concentric manner as if they were seen from the center of the sheet. Furthermore, we can classify this type into two sub-types. In one type the mountains had been drawn about only one edge of the sheet, and in the other, they were drawn about more than one edge of the sheet. Five examples belong to the former, seventeen examples to the latter. On the picture-map of Kaseda-no-sho, Kii Province (Wakayama Prefecture in Central Japan), which was drawn up about 1183, the mountains are drawn as if they were seen from near the left of Hachiman-gu Shrine (Fig. 2). It is important that the shrine became the origin of the co-ordinates in drawing the picture-map. Because the shrine was probably considered as

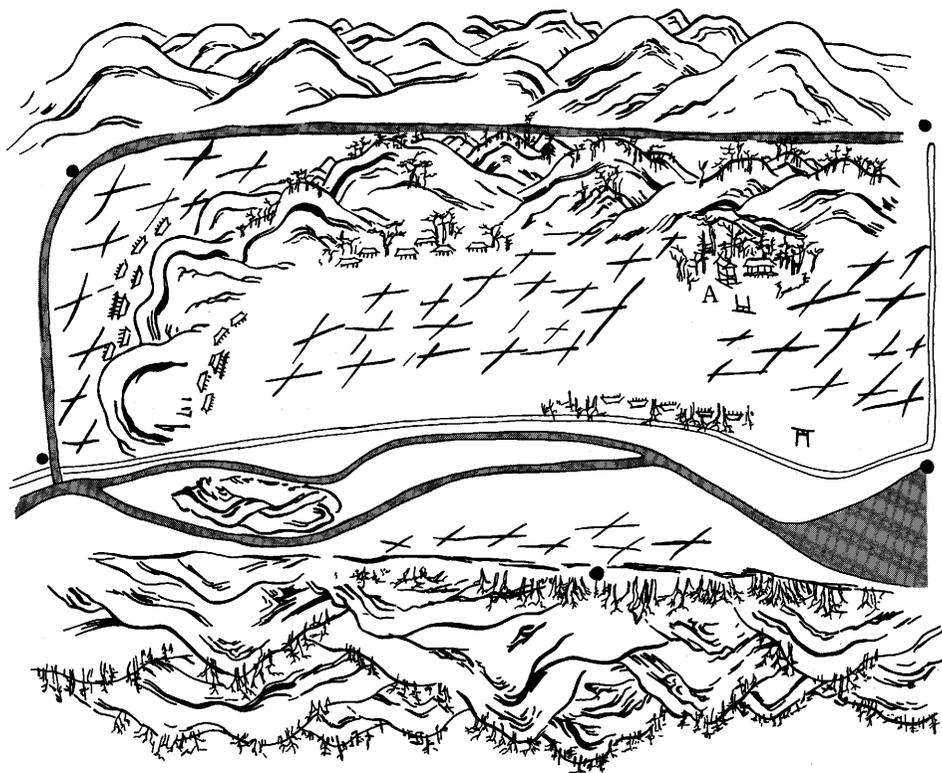


Fig. 2 Simplified rendering of Kaseda-no-sho Ezu. Lettering is omitted. Filled dots represent *boji*. Checkered pattern represents cultivated land. Part with half tone represents the river. A: Hachiman-gu Shrine. 96.1×115.6 cm (Owned by Jingō-ji Temple, Kyoto).

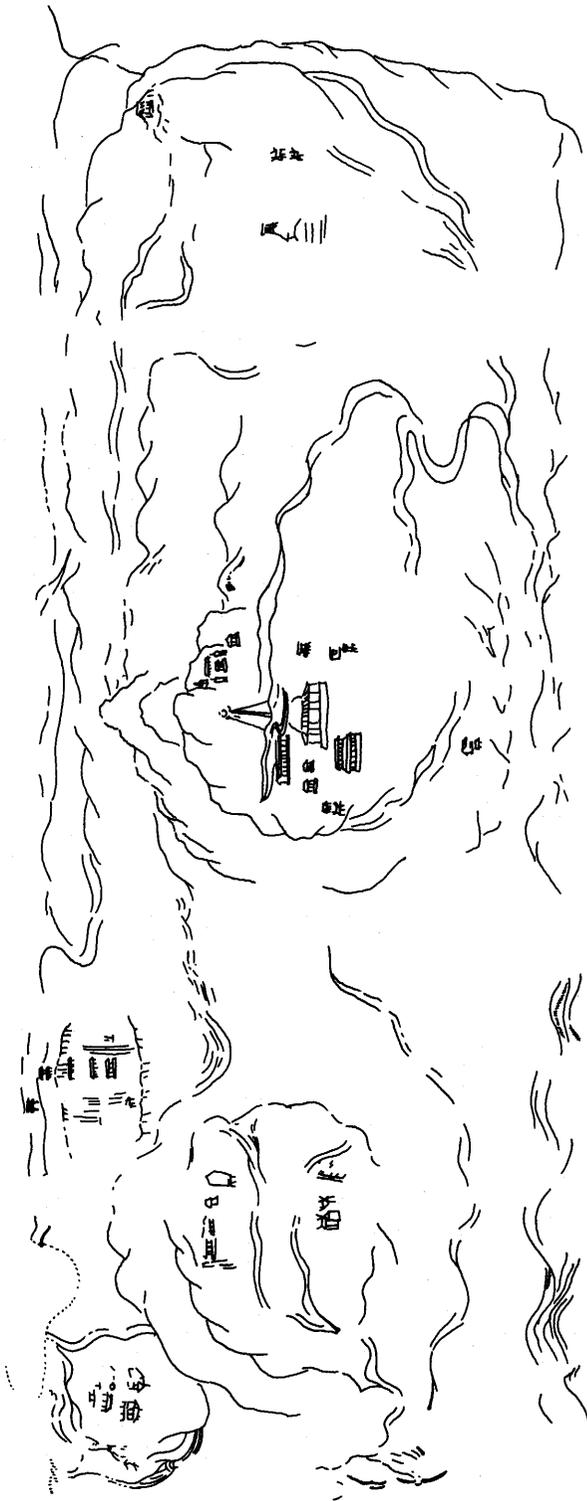


Fig. 3 Simplified rendering of Koya-san Shiishi-boji Ezu. Lettering is omitted.
49.0×131.4 cm (Owned by Koya-san Kongobu-ji Temple, Wakayama).

the center of this region politically, socially and religiously.

Secondly, we can find some picture-maps by both of categories 1) and 2)(Fig. 1-(b)). We will call them type B. Five sheets of picture-maps are drawn by this type of representation. One example of this type is the picture-map of Koya-san *shiishi-boji* (several points of the frontier), Kii Province, of which the date is not clearly known (Fig. 3). The bases of the mountains face the edge of sheet around the lower part of the sheet (category 2)). Around the other edges of the sheet, on the other hand, the peaks of the mountains face the edge of the sheet (category 1)).

Thirdly, there are some picture-maps of type C by both of category 1) and 3)(Fig. 1-(c)). Four sheets of picture-maps can be classified as this type. A typical example of this type is the picture-map of Oyama-no-sho *yosui-sashizu* (map for irrigation), Tanba Province (the eastern part of Hyogo Prefecture in Central Japan), which was drawn up about 1308 (Fig.4). On the left part of this picture-map, the sides of the mountains face towards the edge of the sheet. On the upper part, the peaks of the mountains face towards the edge of the sheet. On the other edges of the sheet, there are drawn no mountains but a stream.

Finally, three sheets of type D picture-maps are classified by all categories(Fig. 1-(d)). A good example of this type is the picture-map of Ashimori-no-sho, Bitchu Province (the western part of Okayama Prefecture in Western Japan), whose date is about 1169 (Fig. 5). Around the upper edge of the sheet the peaks of the mountains face towards the edge

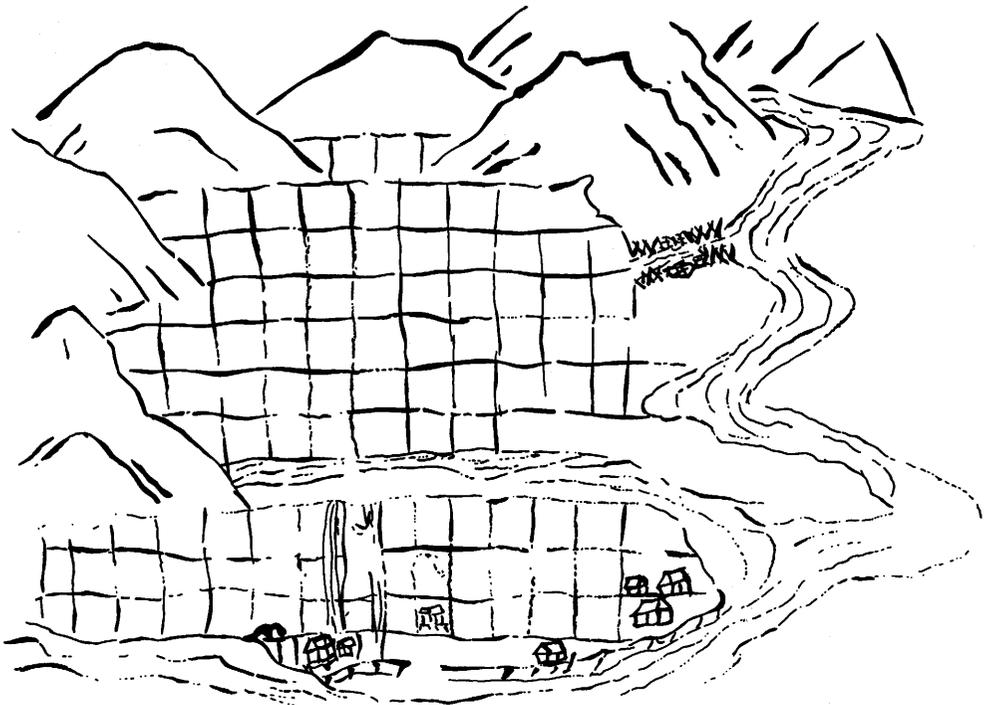


Fig. 4 Simplified rendering of Oyama-no-sho Yosui-sashizu. Lettering is omitted. Checkered pattern represents cultivated land. 28.5×43.5 cm (Owned by Kyoto Prefectural Sogo-Shiryo-Kan).



Fig. 5 Simplified rendering of Ashimori-no-sho Ezu. Lettering is omitted partially. Filled dots represent *boji*. Checkered pattern represents cultivated land. Part with half tone represents the river and the pond. A: Mt. Humoto. B: Mt. Mizuta. 157.2×85.4 cm (Owned by Jingo-ji Temple, Kyoto).

of the sheet, around the right and left edges the sides of the mountains face towards the edge, and around the lower edge the bases of the mountains face towards it.

This examination shows us two things. The first is that there are a lot of type A picture-maps. In Japanese medieval picture-maps, in general, the mountains about the edges of the sheet had been drawn as if they were viewed from the center of the sheet. And the second is that each of categories 2) and 3) is coexistent with category 1) at all times. Moreover, the direction of representation of the mountains by categories 2) and 3) conforms with that of category 1).

Man-made structures

On the Japanese medieval picture-maps, there are, as stated above, various directions of representation for the picture-map symbols. Particularly, for man-made structures, the directions of representation tend to be set up independently. Their direction of representation is, therefore, apt to be various. And it is difficult to find a criterion for classification of them, such as the positional relationship with the edge of the sheet in classifying the mountains' directions. Accordingly, we will classify the direction of representation of man-made structures by a more easily understood criterion. This criterion is to what extent each of the directions of representation conform with the others.

The first type is that the directions of representation of all man-made structures conform. We will call this type E. Furthermore two sub-types can be classified in this case. One is that the direction of representation conforms to the direction of the representation of the mountains around the edge of the sheet: type E-a. The other is that it does not: type E-b. The example of type E-a is the picture-map of Ashimori-no-sho cited above (Fig. 5). All man-made structures, such as temples, houses and isolated hills and trees, are uniform the direction of representation of mountains. Even the direction of writing characters on the picture-map conforms too, with the exception of the names of the four *shiishi-boji* and the names of Mt. Homoto and Mt. Mizuta. (Generally speaking, the direction of characters written on picture-maps, in medieval Japan, are not necessarily always uniform.)

An example of type E-b is the picture-map of Hineno-no-sho (1), Izumi Province (the southern part of Osaka Metropolitan Prefecture in Central Japan), whose date is about 1316 (Fig. 6). On this picture-map the direction of representation of the mountains belongs to type A. But the direction of representation of the man-made structures conforms to a single point of view. In this case the direction of almost all characters are in accord with this direction, too.

We are, secondly, able to find picture-maps on which the direction of representation varies with every group of man-made structures: we will call this type F. That is to say, there are some principles that decide the direction of the representation among each group of man-made structures. According to these principles, this type can be classified into two sub-types, too. One is that the direction of representation is set up by a line, for example the picture-map of Hineno-no-sho (2), whose date is unknown but is possibly the

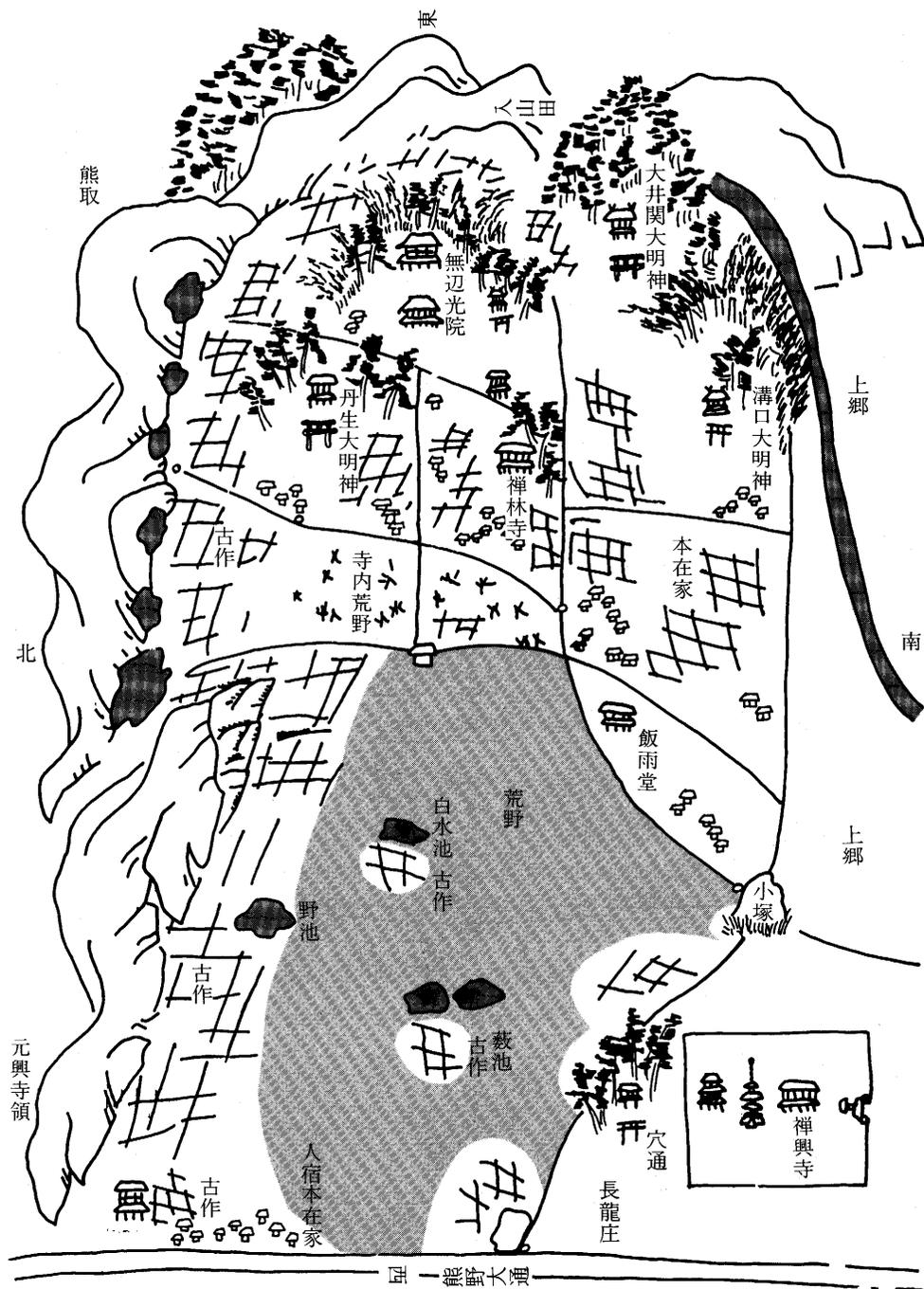


Fig. 6 Simplified rendering of Hineno-no-sho Ezu (1). Lettering is omitted partially. Checkered pattern represents cultivated land. Part with dark half tone represents the river and the ponds; light, the uncultivated land. 85.9×58.6 cm (Owned by the Imperial Household Agency, Tokyo).

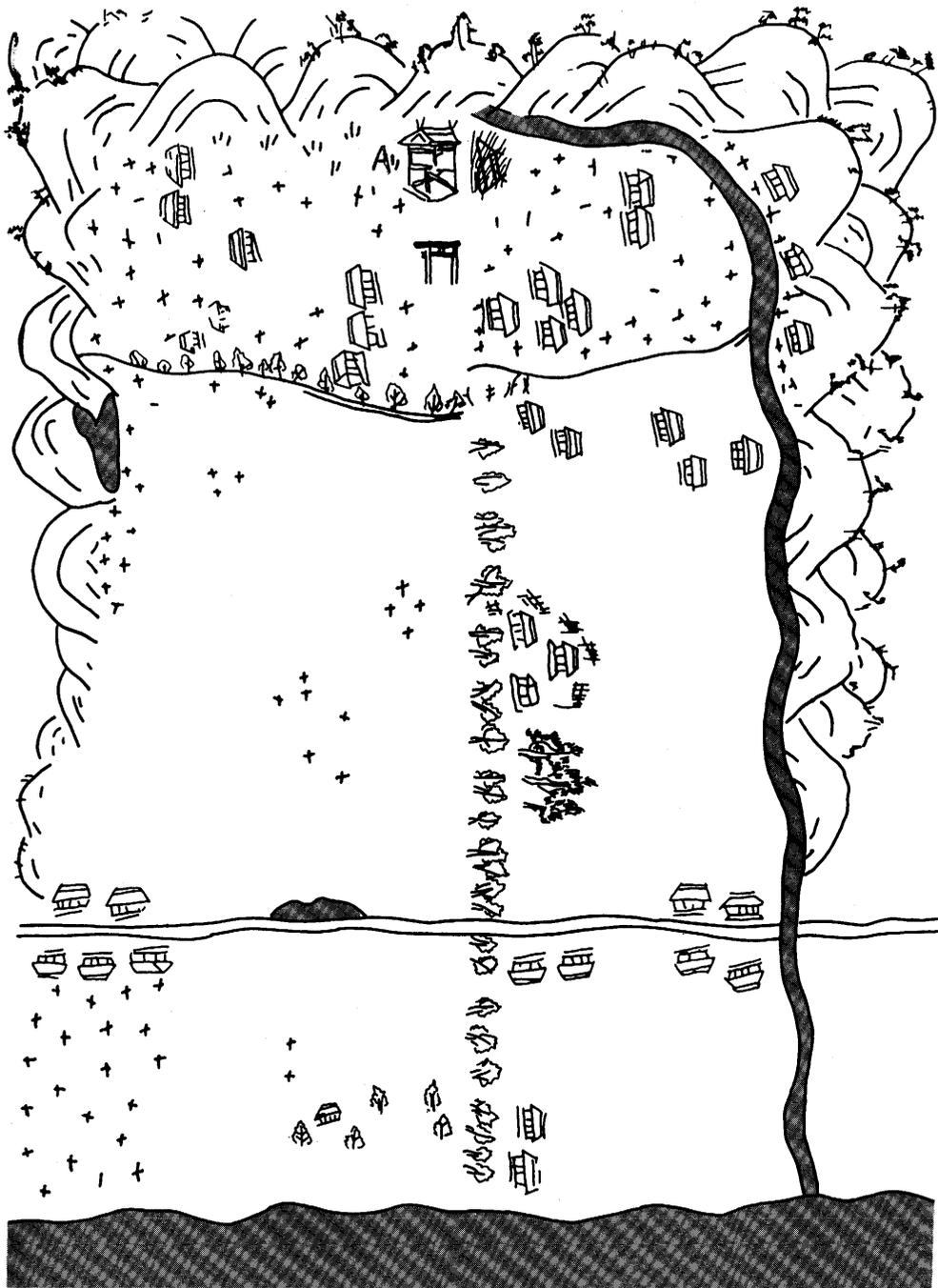


Fig. 7 Simplified rendering of Hineno-no-sho Ezu (2). Lettering is omitted. Checkered pattern represents cultivated land. Part with half tone represents the sea, the river or ponds. A : shrine. 84.0×59.0 cm (Owned by the Imperial Household Agency, Tokyo).

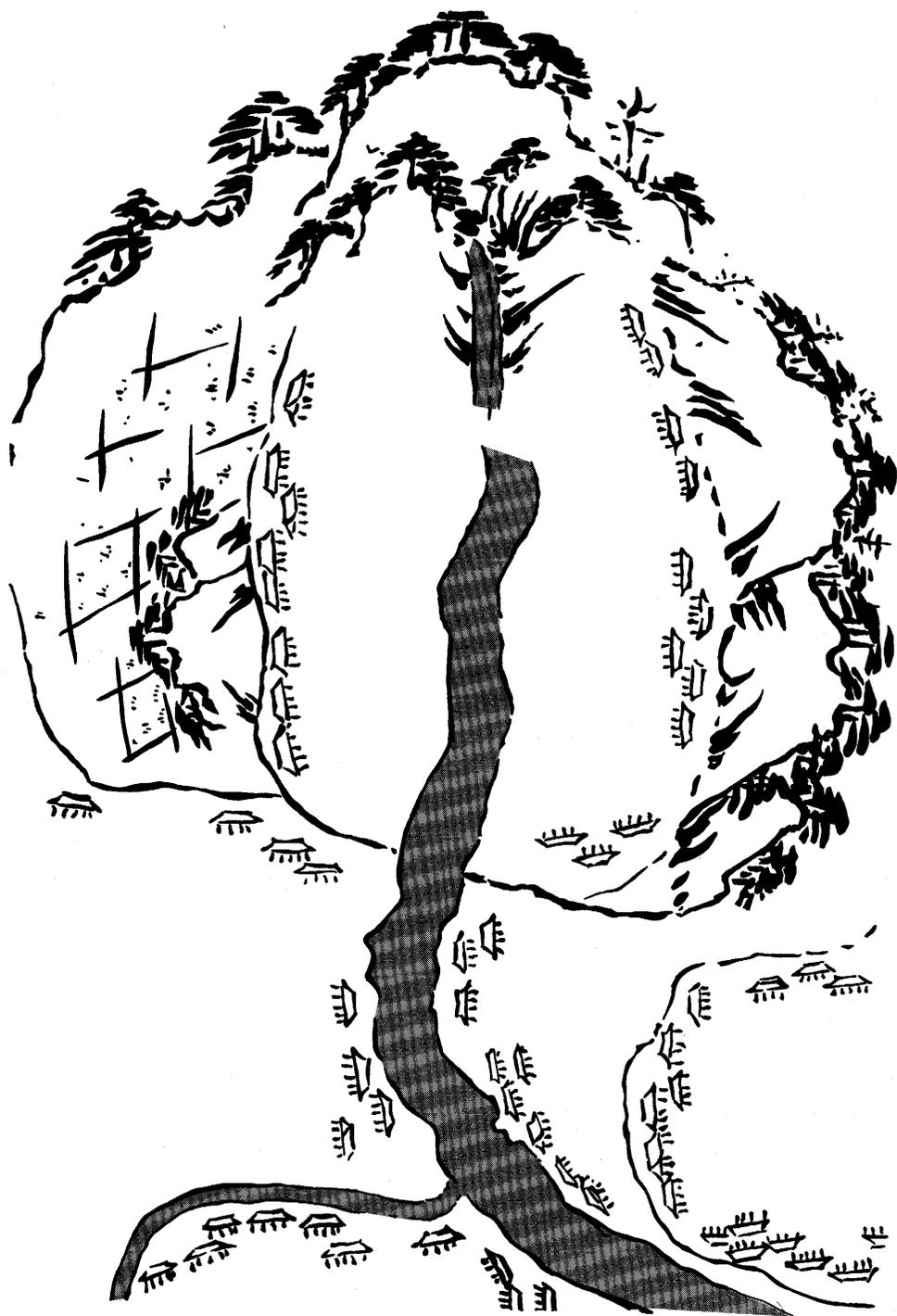


Fig. 8 Simplified rendering of Taie-no-sho Ezu. Lettering is omitted. Checkered pattern represents cultivated land. Part with half tone represents the river. 54.9×35.3 cm (Owned by Daitoku-ji Temple, Kyoto).

same as the picture-map (1)'s date (Fig. 7). We find some houses side by side along the path on the lower side of the picture-map, as if they were viewed in walking along its course. In the same way, the other houses stand along the path from the lower side of the picture-map to the upper side, to the shrine. These paths are, so to speak, the axes of viewing things. We will call the picture-maps drawn in this way type F-a.

The other F-sub-type is that there are multiple points of view on one picture-map. We can, for example, divide the picture-map of Taie-no-sho, Kii Province, whose date is about 1349, into some parts in which the direction of representation of the houses was set up on the same principle (Fig. 8). The principle is that the houses in each part were drawn up as if they were viewed from a certain point in it. On this picture-map, the direction of representation of the houses is integrated in every part that is divided by a stream and by other lines. We will call this kind of picture-map type F-b.

The third type is that the direction of representation of man-made structures varies. Therefore we have to find a separate principle in each case. We will mention two cases.

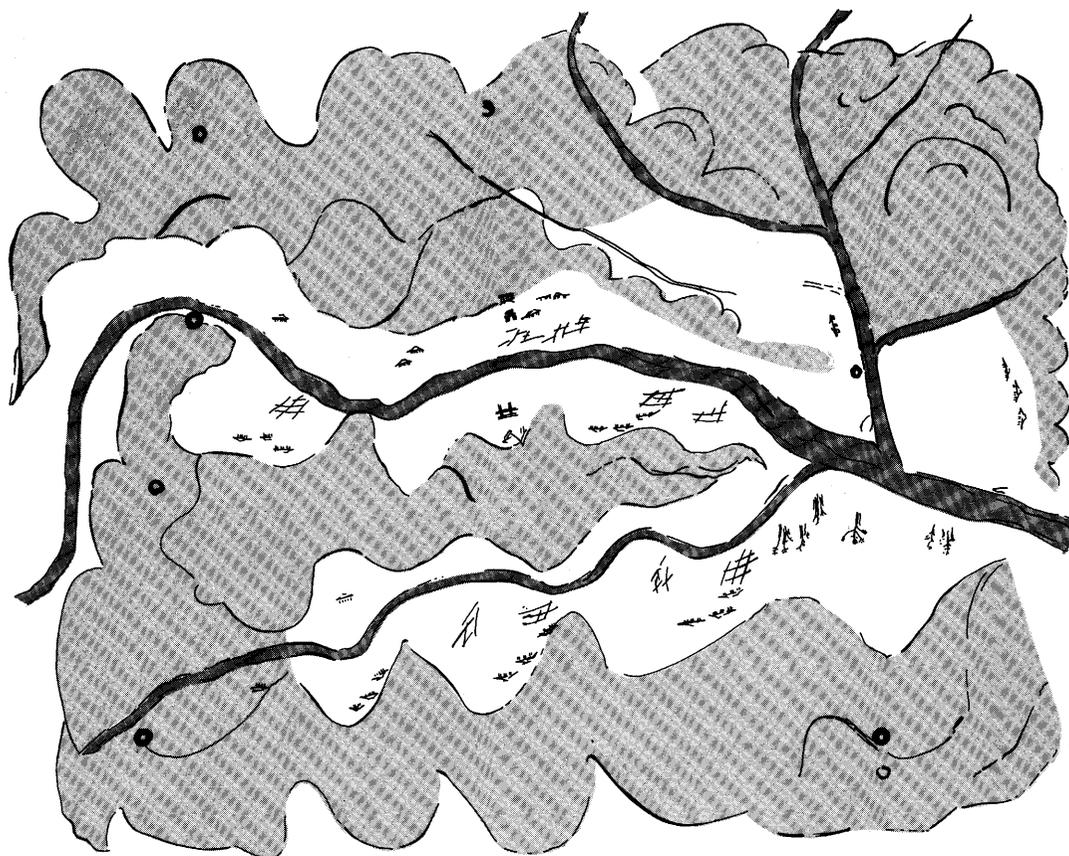


Fig. 9 Simplified rendering of Kono-Makuni-no-sho Ezu. Lettering is omitted. Circles represent *boji*. Checkered pattern represents cultivated land. Part with light half tone represents the mountains; dark, the river. 92.0×112.1 cm (Owned by Jingo-ji Temple, Kyoto).

One is the case where man-made structures exist near a mountain or hill. In this case, the direction of representation of the man-made structure is in accord with that of the mountains or hills. The man-made structure is drawn as if it carried the mountain on its back. We will call this type G-a. An example of this type is the picture-map of Kono-Makuni-no-sho, Kii Province, whose date is about 1143 (Fig. 9). The other case is



Fig. 10 Simplified rendering of Togo-no-sho Ezu. Lettering is omitted. Checkered pattern represents cultivated land. Part with half tone represents the sea, the lake and the rivers. 127.0 × 103.0 cm (Owned by Matsuo-jinja Shrine, Kyoto).

where the man-made structures exist near the sea. In this case, the man-made structures are drawn as if they were viewed from the sea. We will call this type G-b. An example of this type is the picture-map of Togo-no-sho, Hoki Province (the western part of Tottori Prefecture in Western Japan), whose date is about 1258 (Fig. 10).

4. Consideration

The previous chapter shows us that there were ten types of picture-maps, from A to G-b, in medieval Japan. In this chapter, we will probe into the relationship between them and spatial cognition.

These types can, then, be summarized into the following three groups: (1) maps in which features are radially concentric around a center; (2) maps where features are depicted as in traditional Chinese landscape painting whereby what is at the top of the map is distant, what is at the bottom is near, *etc.*; (3) maps which show a reversed up-down representation of secondary features based on the linear axes of primary features. Group 1, the radial, is abstracted from types A and F-b. Group 2 styles of representation are abstracted from types B, C, D, E-a, E-b, G-a and G-b. Group 3 styles of representation are type F-a. These are the prototypes of the direction of representation on the picture-maps in medieval Japan. But this does not necessarily mean that only one of them exist on any given picture-map. They are, in practice, mingled with each other on one picture-map.

These group prototypes are, as stated above, widespread on the picture-maps of medieval Japan. This means that their contemporaries had accepted the way in which the picture-map makers had set up the direction of representation. There must have been a form of spatial cognition behind the way of representation. In the case of the radial maps, *i.e.*, group 1, the mountains and man-made structures had been drawn as if they had been viewed from a certain point on the picture-map, whether they form a part or all of the sheet. The picture-map makers and users must have had put themselves into the space of the picture-map and viewed the landscape radially. This is, so to speak, due to their ego-centric spatial cognition.

Group 2 picture maps, in which down is close and up far away, are those in which the direction of representation of each picture-map symbol conforms with that of the picture-map itself as a whole. They had been drawn as if they were viewed from outside the space of the picture-map. It is, then, a question of how the top or the bottom of the sheet should be decided. On the picture-maps in medieval Japan, the name of a stream is written generally in the direction of flow. If we take types G-a and G-b into consideration too, we are able to state that they had been drawn as if higher places had been viewed from lower places. This is primitive spatial cognition which classifies space between the upper reaches and lower reaches. This is a kind of ego-centric spatial cognition, too.

Group 3 picture-maps, in which features are arranged about linear axis, show us that the picture-map makers or the users brought together a series of scenes while walking along a line. The viewpoint of the picture-map maker seems to shift along the line which has a function as the axis for drawing the picture-map. It is, so to speak, the locus of a

moving viewpoint. It is also the axis for the spatial orientation in perceiving the region.

5. Concluding Remarks

The author investigated the relationship between old maps and spatial cognition. By the direction of representation he reconstructed the spatial cognition of past times. And the direction of representation as a map symbol is effective for this method of study. Of course, it is not possible to reconstruct the whole of spatial cognition only by this means. Therefore, one of the next problems is to find out the other relationships between spatial cognition and the other symbols on the picture-map.

Thus, the variety of directions of representation is a characteristic feature of spatial representation and spatial cognition in Japanese medieval maps. Spatial representation is formed culturally. It is important that we study the spatial representation in the maps in various cultural regions.

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The author wishes to dedicate this paper to Professor Dr. Hiroshi Toya on the occasion of his retirement from Tokyo Metropolitan University.

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(* in Japanese)