
Nature of Old Maps: As Primary Source Materials for Historical Geography

Akihiro Kinda

Kyoto Institute, Library and Archives (KILA), Kyoto, Japan

Email address:

akinda@zeus.eonet.ne.jp

To cite this article:

Akihiro Kinda. Nature of Old Maps: As Primary Source Materials for Historical Geography. *Earth Sciences*. Vol. 7, No. 6, 2018, pp. 260-267. doi: 10.11648/j.earth.20180706.12

Received: August 20, 2018; **Accepted:** September 30, 2018; **Published:** October 29, 2018

Abstract: This paper discusses on the meaning and the nature of old maps of both small and large scales for historical geography. The old map can be an object of research itself as well as a source for research on something else. But both research directions have been closely connected with each other, and also each research direction needs inevitably another. Roughly speaking, small scale old maps mean mainly world maps, although they have no accurate scale. They commonly reflect the enormous expansion of geographical knowledge acquired during periods of exploration of little-known places, and they clearly reflect the perception of space that pertained at the time when the map was drawn. In case of large scale maps like manorial maps and town/village maps as cadastral ones, they express much local information in which local people interested or according to the land system or land planning in different times. Some large/middle scale maps show more formal land planning, those showing grid land planning like *Centuria* in Roman Empire, *Jori Plan* in 8-9th century Japan and *Townships* in British American colonies and later US and Canada. Those large/middle scale maps usually express various land units within each grid in spite of a land itself usually stretched continuously. Old maps are very important as primary source materials for historical geography, but researchers should consider the nature of old maps. They are commonly without accurate scale, physical situation and standard for drawing and describing. And furthermore, many old maps were made under the thought or regulation for land planning, when those are used as source materials.

Keywords: Old Maps, World Maps, City Maps, Manorial Maps, Cadastral Maps, Plats

1. Maps as Primary Source Materials of Historical Geography

Among the most widely used and indispensable primary source materials for scholars, interested in space and time when following the historical source method, are old maps. A map is by its nature a way of expressing space. If language is a mode of conveying some idea, relationship, or information, we can think of maps as the language of explaining space. Maps vary greatly—from small scale maps of the world, continents, and countries wherein the representative fraction is small, to large scale, detailed maps of regions, cities, or rural areas, whose representative fraction is larger.

What features are described on a map depend on the scale; in modern scientific maps, the most common small scale maps show lines of longitude and latitude, outline of landforms, locations of major cities, the main geographic

features of the world, continents, and countries, whereas a thematic map contains abundant data of a particular kind.

Large scale maps showing survey results, land use planning, or conditions of land use provide very useful data for analysis. Cartographic techniques and the types of features shown in maps have changed over time, but the study of maps is central to geography in general, certainly for historical geography, and cartography has become another sub-discipline of its own.

What can be called “old maps” are basically pre-modern maps with some features that appear in early modern maps, but they differ from scientific modern maps. In other words, old maps are, especially in case of small scale maps, usually made without accurate scale because of poor survey techniques and little information of distant places. Old maps have also no legend and often include limited objects of necessities for explaining space. For example, some small scale old maps of the world, continents, or countries,

although they have no accurate scale, show not only the way the world or a country was portrayed in the past but what it was actually like then. Therefore old maps often express neither accurate physical form nor precise information. Old maps in themselves vary with the times and depend on the author or the thought of the time.

For historical geography, such a map can be an object of research itself as well as a source for research on something else. Old maps commonly reflect the enormous expansion of geographic knowledge acquired during periods of exploration of little-known places, and they clearly reflect the perception of space that pertained at the time when the map was drawn.

2. Small Scale Maps

The smallest scale maps are world maps. An old world map best reflects the worldview at the time the map was produced, giving powerful expression to the ideas and spatial perceptions that come out of the cultural milieu of the era and region of its provenance. At present the oldest known world map dates from around 600 BC. It is a map of Babylonia incised on a clay tablet describing the Babylonian world as a flat disk surrounded by the sea. The Babylonian sphere of influence is shown with Babylon at the center with adjacent regions around it. Another ancient example is Ptolemy's world map. Originally it was made by Ptolemy in Alexandria in the mid-second century during the Roman Empire, a replica of this map was conveyed via the Byzantine Empire to Europe in the fifteenth century. This map describes part of a spherical world, showing Europe, western Asia, and northern Africa. The northwest part depicting the configuration of the Mediterranean region is comparatively accurate, but the area of Asia north of the Indian Ocean is considerably distorted, and everything south of the Indian Ocean is a territory marked "Terra Incognita" (unknown land), thus portraying the Indian Ocean as an inland sea. Ptolemy's map is, in other words, relatively accurate in describing known terrain, while the unknown parts of the world were rendered probably by projecting concepts from established knowledge and on that basis imagining what was out there.[1]

People coming after the days of Ptolemy did not continue and build on those achievements in medieval Europe until the fifteenth century. The *Mappa Mundi* map of Hereford made in England around 1300, for example, is a round map strongly reflecting the Christian worldview and packed with a variety of geographic information [2].

The situation was similar in the East Asian world. There is a Buddhist map of the world thought to have been made in Japan in 1364 (the Horyuji world map in Horyuji temple, Japan) that expresses the Buddhist worldview. This map shows an egg-shaped world with a broader northern part, with India lying as an appendage in the southern part, East Asia in the eastern part, and the sacred Mount Sumeru in the center of the northern part, as well as other features important in Buddhism [3].

In case of a Buddhist world map, wood printed later by

priest Hotan in 1710, it shows another stage. This is still in the tradition of the Buddhist worldview and the external form as an inverted triangle of the world with much broader northern part, but at the same time new information of Europe is introduced into the north-west part and even Africa is drawn at the south of Europe, although both shapes are incorrect [4].

As more and more adventurers set out to explore the world, the production of maps rose apace. The Catalan Atlas of 1375 (now in the National Library of France) is brilliant evidence of the progress being made in making world maps that incorporated the new geographic and nautical information acquired by the voyagers [5]. At about the same time in East Asia, world maps divested of a religious worldview were beginning to be produced. One example is an extant world map (Ryukoku University Museum, Japan) produced in East Asia on the basis of a fourteenth-century Chinese world map. In addition to showing information on Japan and Korea and nearby areas, this world map extends as far as Europe and Africa [6]. World maps made in Western Europe, like the Catalan Atlas, provide geographic data going all the way to the southeastern part of China. One map that shows with special clarity how greatly knowledge about the world was changing is the Cantino World Map of 1502, known to have been smuggled from Portugal to the Italian city of Modena. Showing Portuguese discoveries, this map gives a detailed and accurate picture of Africa, thus enabling explorers coming after Vasco da Gama's successful voyage to India to chart their course around Africa [7].

The world map that best reflects the knowledge being gained from exploration is a Chinese version of a world map originally produced in Europe. This Chinese map was made by the Jesuit scholar and missionary Matteo Ricci in 1602 and was engraved and printed in Beijing, one of a few is stored at Kyoto University Library. It is symbolic of the huge strides then being made in sharing and combining geographic information from and about both the eastern and western hemispheres. Eurasia, Africa, and North and South America are, on the whole, described fairly accurately, but the map has omissions and glaring mistakes. Australia is missing, and a number of imaginary islands are placed around the north polar area; in the southern section *Terra Australis Incognita* is turned into an enormous continent called *Magallanica*. In the eighteenth century when the region around Australia—then called *New Holland*—was still one of the frontiers of exploration, Captain James Cook, heading for the South Pacific, was commissioned by the British navy to confirm whether or not this *Magallanica* really existed [8]. When the voyage around Australia was completed by Bass and Flinders, it was clear that this was a large separate continent [9]. And then the Bering Straits, Greenland, and the northern regions of North America had been charted.

The information was also conveyed to Japan, lying at the eastern edge of East Asia. A world map compiled by Aaron Arrowsmith printed in 1799 and a North Pacific map with Bering Strait and Aleutian archipelago by La Pe'rouse printed in 1797, both of which arrived at Edo (present Tokyo).

A Japanese official, astronomer and librarian, Kageyasu Takahashi was ordered to compile a new world map by those two European maps and exploration results by Rinzo Mamiya who discovered Mamiya Strait, and some other maps. Takahashi published a copperplate printing named 'Newly Revised World Map' in 1810, as shown Figure 1. This world map was made by the stereographic projection with a meridian of El Hierro Island in Canary Islands as the beginning of longitude, although Arrowsmith's world map was made by the Mercator projection with Greenwich meridian. This map shows, for example, Tasmania as an island, but the northern part of North

Amerika has still huge blank and Greenland has a great east-west gap, both according to Arrowsmith's world map. In spite of such deficiencies, Takahashi's world map was a result, unifying European and East Asian knowledges, and including new information on one of the last little-known regions of the world [10].

In the process of exploration and refining cartography, several methods of projection were devised. Most notably in Western Europe, flat images of the world has been replaced by the round world and world maps had been becoming modern scientific maps with that step. The world map should be no longer an old map.

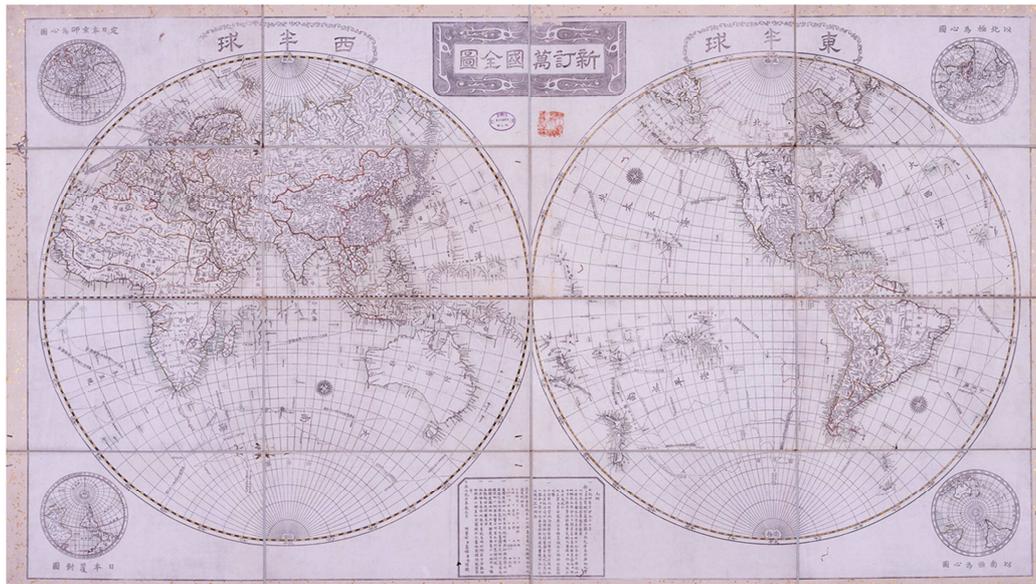


Figure 1. Newly Revised World Map by Kageyasu Takahashi in 1816 (Kyoto University Museum).

3. Large Scale Maps

A great many large scale old maps showing local conditions are known. Those were usually made to describe areas in fine detail. The most famous examples adopted a grid pattern land management system are old maps of the Roman Empire around the turn of the century and Japan in and after the eighth century AD. Orange cadastral maps, so called, of Roman Empire in the second century BC displayed at the city museum in Orange, France. They are restored to three clusters of fragments consisted of 416 pieces etched in marble, which delineate the square units called *centuria*, around 50.4 hectares in area [11]. Ancient manorial maps, so called in Japan, in the Shosoin Treasures are stored at Todaiji temple in Nara, Japan. Twenty maps of the Treasures are original eighth-century ones drawn on hemp cloth showing the *jori* grid pattern of the land management. A basic unit of the grid is around 1.2 hectares in area.

Figure 2 shows a typical example of those maps drawn in 766, showing a region behind sand dunes with some vegetation along Japan Sea. Whole area of the map is covered with the *jori* grid pattern, in each of which a grid number with small place name, land owner, land area and land use are described. Those descriptions are completely

expressed according to the land management system of Japan in the eighth century. Even the shape of the lagoon, at the right in the center of the map, is regulated by the land management system. The lagoon is more than 9 hectares in area, but the west shore is drawn as straight line along the grid pattern more than 550 meters long [12].

The tradition of making this kind of very detailed map continued in Japan long after that, but there was a long hiatus in Western Europe when such large scale maps were no longer made. They had reappeared by the end of the sixteenth century, as we can infer from the line in Shakespeare's *Henry IV* (written by the end of sixteenth century) referring to a map establishing borders between territories—"Come, here's the map. Shall we divide our rights." From the sixteenth century onward under the English Tudors and in the whole Anglophone world, maps were made in such profusion that we might call it the age of cartography [13].

The Gallery of Maps in the Vatican appeared at that time. The Gallery contains 40 fresco panels that are two topographical maps of the Italian peninsula and surrounding areas, four maps of major cities, Genoa, Venice, Ancona and Rome, 31 maps of Italy's local regions including some enlarged drawings of fort cities and ports, and seven island maps around the peninsula. The creation of the panels took a

few years but they were all completed by 1581 [14]. Those maps, especially city maps, in the Vatican look like quite accurate, although those are very pictorial maps.

Almost all old maps differ quite a bit from modern maps. Because the scale of these maps, the way the features are described, and the basis for determining the features and the purpose of the maps are not always clearly or consistently established. Nevertheless the progress toward modern scientific maps was a process in which all those elements gradually grew more precise, more consistent, more accurate, and more well-defined.

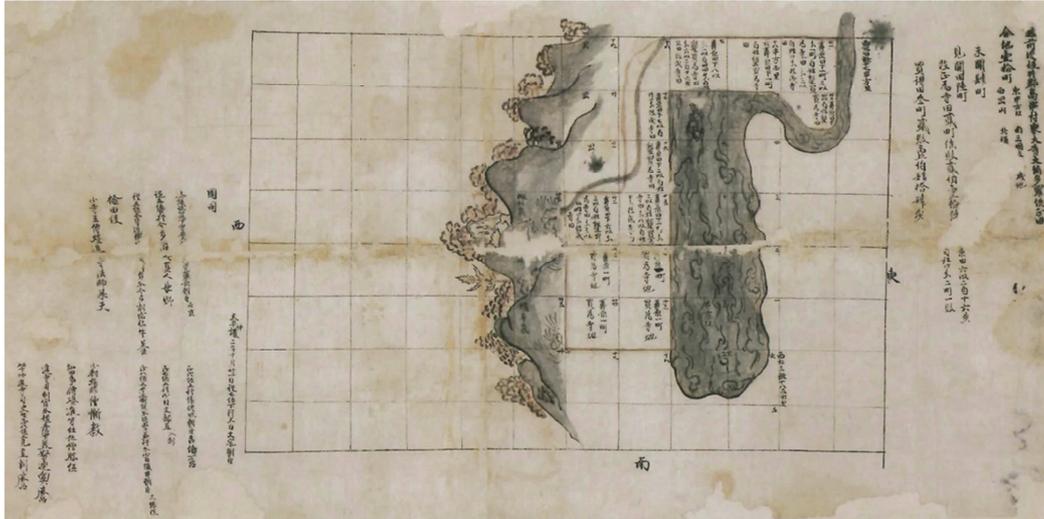


Figure 2. A local map in japan in 766 (Shosoin Treasures, Nara, Japan).

The large/middle scale old maps that have been most commonly used as research materials are city maps. One must look out for different sorts of bias in old city maps, but they are extremely valuable sources. There are innumerable examples, but one of the most impressive is the way Erwin A. Gutkind (1886–1968), architect and urban historian, applied them in his wide-ranging, six-volume work on urban development and renewal in cities in Europe [15]. He used old city maps as sources to lay out the period, configuration, and structure of each city. In the process of his usage, we could know that he did not identify any objects on the maps with real ones. The way of his research might avoid misapplication of old maps. His inference was reasonably correct.

Production of maps was especially prolific in England since the end of sixteenth century and was spurred on by Britain's growing colonial empire, which stretched even to North America. A huge number of maps were made of American places. Plans or plats, and bird's-eye view maps made for the planning and development of cities in North America from the seventeenth century onward have become productive sources for research on the history of urban planning and urban development. In the sense that their scale and feature representation are clear and specific, almost all of them are already similar to modern maps. John W. Reps, in his work on the cities of North America, has been particularly influential in advancing research based on the use of these

Generally speaking, large scale old maps, namely detailed old maps, from the medieval period into the early modern period are manorial maps, city maps and village (or rural area) maps. They differ depending on the place but the older the period the more variation there tends to be in scale as well as in delineation and choice of features. Thus there is ample room for strong bias in any given map from those times. If maps are a language to express space, then the journey toward the standardization of scale, feature representation, and so forth in modern maps is the process of universalizing that language.

'old maps' [16].

In North America the plats showing land planning, as well as city maps, were types of land management plans or land use plans. They were made primarily as land distribution charts for the purpose of selling or allocating land with the number of township, 36 square miles in area, and the number of section, one square mile. This system based one mile square grid pattern began as Seven Ranges along Ohio River in 1785, and completed around 1800 with some prior examples and revisions. Then the township system with principal meridian and base line covered from the Midwest to the West Coast. Plats or plans have various scales from the township unit to the extent of a state, yet they also had some character of cadastral maps in that they showed the number assigned to each allotment and showed the results of land distribution. They reflect strongly the land system at the place and the time. The plats itself merely land management plans at the time when they were made [17]. American land system with townships and sections should gradually become the element of landscape, and actually we can see the expanse of the grid pattern of quarters, 160 acres in area, according to Homestead Act in 1862 and so on, in the United States from the air.

When European colonists went to North America and Australia, they moved in large numbers, never taking the presence of indigenous peoples, their rights, and their own ways of using the land into account in their planning. To the

Europeans, the land was *tabula rasa*, a blank slate to be parceled out, sectioned off, and used in any way they wished. Numerous historical geography studies have made use of the large scale maps made for these purposes or medium scale maps redacted from them. There has been some controversy and indications around the township land survey system in United States, and its diffusion and transformation to other British colonies [18].

Manorial maps, cadastral maps, and other large scale maps are extremely useful in historical geography, but for the researcher interested in real conditions at the time the map was made. As we have noted, North American plats remain nothing more than plans; how the land surface was actually sectioned off and used in the end is another matter entirely. There tends to be bias of some sort in manorial and other classic pre-modern maps, which differentiates them from modern maps. Compared with manorial maps, the cadastral type of maps, showing divisions, plots, ownership, and land rights give a good account of the realities of the time, but one must always remember that they were depicted from the land system in force at that point in time [19].

As in the famous work of August Meitzen (1822-1910), cadastral maps of the eighteenth and nineteenth centuries, made as a record of land division and land use to work out land taxes, are often used to help paint a picture of conditions that prevailed before the map was made. Meitzen believed that cadastral maps would give clear and detailed evidence of the conditions of villages and cultivated fields originated from West German, East German, Celt, Romanian, Finn and Slav in times past [20]. The cadastral map became important source material to German historical geography and

settlement geography, although Meitzen's belief itself has been obliged to change, because of new evidences for the transformation of the settlements and fields.

In case of Japan, modern cadastral system started in 1872. Before then, great many large scale maps on cities, towns, villages and rural area were made in early modern times. But they were usually made by various and inaccurate scales, and have very few legends depending on the order of feudal lords or the necessity among communities. A typical example of modern cadastral map is shown in Figure 3, which was an administrative village area in 1873. The legends at left of bottom show lands for housing, paddies, dry fields, bushes, grasses, rivers/ditches and roads. The description in each grid means a small place name, and those in each rectangular paddy in the grid are the lot number and the class of paddy.

This cadastral map shows three natural villages and small rectangular paddies in the grid road and ditch patterns originating from the *jori* grid pattern land management system of the eighth century. The *Jori* grid patterns shown as Figure 2 in the eighth century were, first of all, land management system, therefore there were actually few grid patterns and many irregular shapes of paddies in that time. But they became real landscapes, because of long control of land management based on the *jori* grid pattern. Such processes are dominant at many places in center/west of Japan and are it is supposed that real landscapes of the *Jori* grid patterns had appeared around the twelfth century as shown in Figure 3. The settlement pattern also transformed from the dispersed type to the nuclear village during the same period [21]. Both patterns of settlement and shapes of fields had transformed in Japan as well as in Europe.

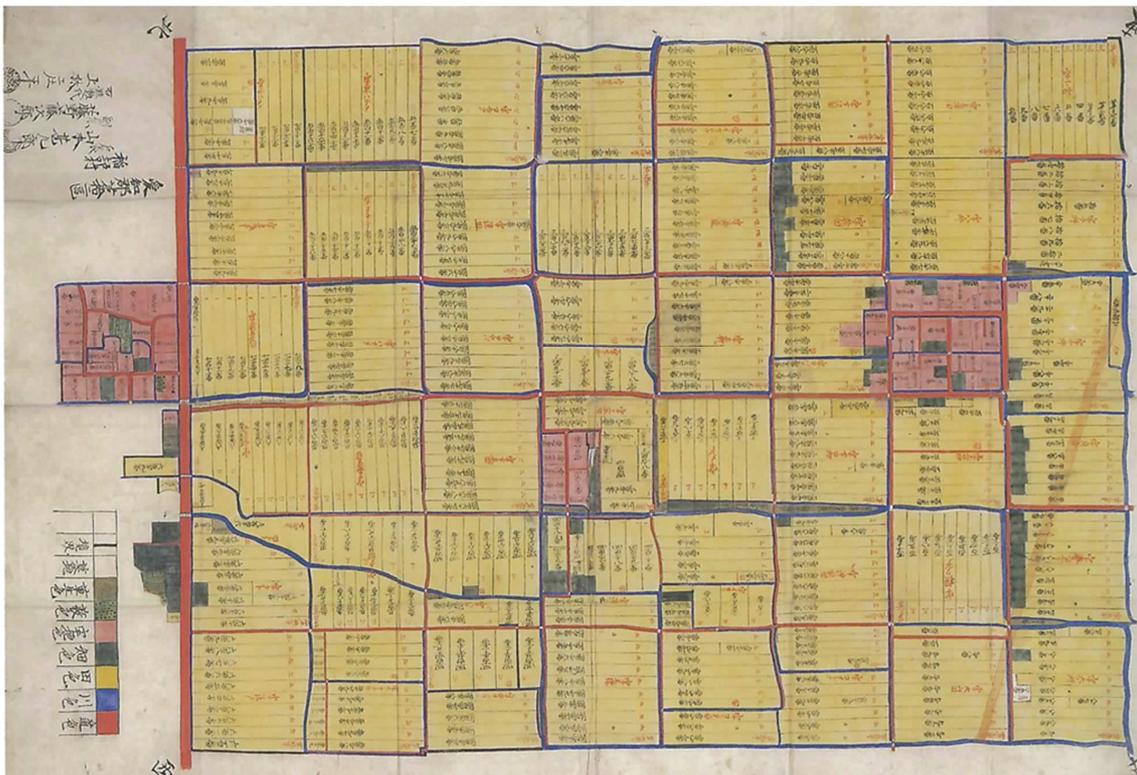


Figure 3. A cadastral map in Japan in 1873 (Hikone, Japan).

4. Effect and Limit of old Maps as Primary Source Materials for Historical Geography

Small scale old maps mean mainly world maps, although they have no accurate scale. They have usually no standard like modern scientific maps for selecting objects to describe. Besides that they are inevitably not accurate maps because of few information of the world. Some of them might draw religious ideas of the world. Those are effective to know the structure of ideas and the thought of the world at that time. From another point of view, they commonly reflect the enormous expansion of geographical knowledge acquired during periods of exploration of little-known places, and they clearly reflect the perception of space that pertained at the time when the map was drawn. They are suitable for historical geography to know, follow and analyze the situation and changes of geographical thought and information on the world.

Large scale old maps contain usually detail descriptions more than small scale maps. But there are various types of expression as the maps like manorial maps made in the medieval period, city maps and village (or rural area) maps in the early modern period, cadastral maps and so on. They differ depending on the place but the older the period the more variation there tends to be in scale as well as in delineation and choice of features. But even large scale maps, old maps have usually no legend and often include limited objects of necessities for explaining or insisting. Thus there is ample room for strong bias in any given map from those times. In spite of those characters large scale old maps are very important source materials for historical geographical analyses if researches stood on those characters.

Another point on large scale old maps, they reflect strongly the land system at the place and the time, like *centuria* in Roman Empire or the *jori* plan in ancient Japan. Many manorial maps as typical medieval maps are usually much pictorial and often draw/stress only the objects connected with the manor itself like boundaries and manor houses. The description and objects themselves on manorial maps are usually factors of landscapes with strong bias, and many other factors existed but neglected on the maps.

In case of the plats of the United States, they are kinds of modern maps based on modern survey, but they express merely land management plans at the time when they were made. Each description in the grid is completely expressed according to the land management system as well as Orange Cadastral of Roman Empire or ancient Manorial maps of Japan. Many of the expressions on those maps might reflect strongly the land system but be indefinite substance at that time when such maps were made. But those large scale old maps are precious examples to know the past within the limit and the characters of expressions.

Typical large scale old maps are cadastral maps which depict generally every lot or allotment for housing and farming in the

area. Besides such detail expression, they have, as early modern maps, usually the standard to depict and the legend for them, and relatively accurate scales as maps. Meitzen's exploitation made inferences about the previous conditions of villages and fields. Such application of the retrogressive method [22] using cadastral maps as old maps was epoch-making, but it has an inherent problem of demonstrability: the researcher chooses and makes assumptions about the earlier pre-map period, and does so in line with his/her own interests, unburdened by the usual procedures of finding and presenting hard evidence on which to base conclusions.

Naturally cadastral maps were dictated by the land system prevailing at the time, but even with that limitation they are valuable as sources for spatial analysis of conditions at the time they were made. Yet, in order to reconstruct an even older past, it is indispensable either to rely on old maps and similar historical materials from that period [23] or refer to supporting archaeological or other materials to back up assumptions about the time.

In the case of works by Gutkind and Reps, they used old city maps, plans or plats and bird's-eye view maps for analyzing the city planning and structure at the time when they were made. Those maps, especially plats, reflect strongly the land system at the place and the time, and they sometimes depict merely land management planning at the time when they were made. But both works employed effective methods and were worthwhile within the limitation of old maps as source materials.

Clearly I wish to stress the centrality of large scale old maps as prime sources for historical geography, but there are other useful sources as well. Once the year and character of structural remnants from the past, estimated from aerial photos, can typically be confirmed by archaeological methods and historical documents then aerial photos can be used to study such remnants in a much wider area. Old maps might be partly the same to those aerial photos, but old maps draw usually limited objects without scientific standard that aerial photos does. Since large scale old maps reflect strongly the land system, they differ also from aerial photos shooting by optical process.

When any researcher using large scale old maps like cadastral maps not only to estimate conditions at a time previous to the year when the map was made, but also to know/analyze the same year to the maps, it is necessary to know the nature of old maps. That is why two research directions are alive, one as an object of research itself, another as a source for research on something else. Both have been closely connected with each other, and also each research direction needs inevitably another. We should consult with results of both research directions.

5. Conclusion

The map is a way of expressing space as a sort of language. Maps vary greatly—from small scale maps of the world, continents, and countries wherein the representative fraction

is small, to large scale, detailed maps of regions, cities, or rural areas, whose representative fraction is larger.

The old maps are basically made at various parts of the world in the pre-modern times, they differ from scientific modern maps. In other words, old maps are, especially in case of small scale maps like world maps, usually made without accurate scale because of poor survey techniques and little information of distant places. An old world map best reflects the worldview at the time the map was produced, giving powerful expression to the ideas and spatial perceptions that come out of the cultural milieu of the era and region of its provenance. The old maps have usually no standard like modern scientific maps for selecting objects to describe. Besides that they are inevitably not accurate maps because of few information of the world.

Even though they are effective for historical geography to know, follow and analyze the situation of geographical thought and information on the world, and change, diffusion and impact of them from time to time.

Large/medium scale old maps have usually no legend and often include limited objects of necessities for explaining or insisting. Many of them express merely land management plans at the time when they were made. Each description in the grid is completely expressed according to the land management system like Orange Cadastral of Roman Empire or ancient Manorial Maps of Japan. Tradition of those map-making was continued at some region like Japan, but once interrupted other places like Europe, and revived in England and the Vatican at the end of sixteenth century. There is still ample room for strong bias in any given map from those times.

In spite of those characters large/medium scale old maps are very important source materials for historical geographical analyses if researches stood on the understanding and limit of those characters. Among many famous works using old maps, some of them were achieved within the limit of expression but some others were not.

Many of the expressions on those maps might reflect strongly the land system but be indefinite substance at that time when such maps were made. But those large/medium scale old maps are precious examples to know the past within the limit and the characters of expressions. The centrality of large scale old maps as prime sources for historical geography have been cadastral maps. Since many large/medium scale old maps reflect strongly the land system, they differ also from aerial photos simply taken by camera technique.

When any researcher using large scale old maps like cadastral maps to know/analyze the area of the same year to the maps, it is necessary to know the nature of old maps not only the picture and description of the maps but also land management system of that time.

References

- [1] P. Whitfield (1994) *The Image of the World: 20 centuries of world maps*, pp. 8-11, The British Library J. Fujii, M. Sugiyama and A. Kinda, (eds., 2007) *Portrait of the Earth*, pp. 29-53, Kyoto University Press.
- [2] J. Black (2003) *Visions of the World: A history of maps*, pp. 31-37, Mitchell Beazley (London).
- [3] Whitfield op. cit., [1], pp. 20-21 Fujii, Sugiyama and Kinda, op. cit. [1], pp. 54-83.
- [4] N. Muroga (1983) *Essays on Old Maps*, pp. - Tokai University Press (Kanagawa).
- [5] J. B. Harley and D. Woodward (eds., 1987-1998) *The History of Cartography, 2 Vols.* (4 books), University of Chicago Press Whitfield op. cit., [1], pp. 22-23 Black, op. cit. [2] pp. 34-37 Fujii, Sugiyama and Kinda, op. cit. [3].
- [6] Fujii, Sugiyama and Kinda, op. cit. [1], pp. 54-69.
- [7] Whitfield op. cit., [5] Harley and Woodward, op. cit. [5].
- [8] A. Hunakoshi (1970) On the international map on the Earth by Matteo Ricchi, *Journal of Oriental Studies* 41 (Kyoto University) A. Kinda and K. Uesugi (2012) *History of Cartography in Japan*, Yoshikawa Kobunkan (Tokyo).
- [9] T. Perry (1982) *The Discovery of Australia; The charts and Maps of the navigators and explorers*, Melbourne University Press R. Crancy (1995) *The Mapping of Terra Australis*, pp. 104-119, Universal Press (New South Wales).
- [10] A. Hunakoshi (1986) *A Study of Kangxi Map coming to isolated Japan*, Hosei University Press (Tokyo) A. Kinda (2008) *Looks at Lands*, pp. 114-143, Shibunkaku Shuppan (Kyoto).
- [11] A. Kinda (ed., 2010) *A Landscape History of Japan*, pp. 115-135, Kyoto University Press A. Kinda (2018), *Land Planning of Ancient State*, pp. 94-103, Yoshikawa Kobunkan (Tokyo).
- [12] M. E. Bellet (1991) *Orange Antique; Monuments et musie*, Imprimerie nationale A. Kinda (1998) *Ancient Manorial Maps and Landscape*, pp. 334-342, The Tokyo University Press.
- [13] P. D. A. Harvey (1993) *Maps in Tudor England*, pp. 7-25, The Public Record Office and The British Library.
- [14] A. Paolucci (2011) *The Gallery of Maps*, Edizioni Musei Vaticani (Vatican).
- [15] E. A. Gutkind (1964) *International History of City Development, 6 Vols.*, Free Press of Glencoe (New York).
- [16] J. W. Reps (1965) *The Making of Urban America, A history of city planning in the United States*, Princeton University Press J. W. Reps (1979) *Cities of the American West, A history of frontier urban planning*, Princeton University Press.
- [17] W. D. Pattison (1975) *Beginnings of the American Rectangular Land Survey System, 1784-1800*, The University of Chicago Press E. T. Price (1995) *Dividing the Land; Early American beginnings of our private property mosaic*, The University of Chicago Press A. Kinda (2001) The concept of 'townships' in Britain and the British colonies in the seventeenth and eighteenth centuries, *Journal of Historical Geography*, 27-2.
- [18] C. A. White (no date) *A History of the Rectangular Survey System*, US Government Printing Office N. J. W. Thrower (1966) *Original Survey and Land Subdivision; A comparative study of the form and effect of contrasting cadastral surveys*, Rand McNally & Company (Chicago) Kinda, op. cit., [17] A. Kinda (2015) *Township: Diffusion and transformation*, pp. 95-117, 135-207, Nakanishiya Shuppan (Kyoto).

- [19] e.g. A. Kinda (2017) *Towns and Villages on Old Maps*, Keibunsha (Tokyo) Kinda, op. cit., [8] and [11(2010)].
- [20] A. Meitzen (1895) *Siedlung und Agrarwesen der Westgermanen und Ostgermanen, der Kelten, Römer, Finnen und Slawen*, Berlin.
- [21] A. Kinda (1985) *A Study on Historical Geography of the Jori Plan and Settlements*, pp. 397-443, Taimeido (Tokyo) Kinda, op. cit., [11], pp. 131-133.
- [22] A. R. H. Baker (1968) A note on the retrospective and retrogressive approaches in historical geography, *Erdkunde*, 22 A. Kinda (2002) *Quest for Ancient Landscape History*, pp. 1-42, Yoshikawa Kobunkan (Tokyo).
- [23] A. R. H. Baker and R. A. Butlin (eds., 1973) *Studies in Field Systems in the British Isles*, Cambridge University Press Kinda, op. cit., [12].