Where is the map?

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Introduction

We find them everywhere. Visual representations that depict and denote spatial features and structures. Are they mapping the landscape, what happens there, or our conceptualizations thereof? That begs the question as to what the word "map" means. Is it the geometric image modelling the world, is it everything we use for geocommunication, or can it denote an even larger semantic area? Can this larger semantic area be mapped? What kind of a map would be the result of this mapping process? These are the questions discussed in this chapter. Several examples will show various senses of the word "map" and how they are used. The purposes served by maps will be analyzed in order to structure the area of tools and systems, physical as well as conceptual, used to depict and understand our environment.

Scratched on the walls of caves we find depictions of rivers and other landscape forms seen from a bird's eye view perspective, created by humans and possibly also by other hominidae. Between the stable land forms we see animals in a different perspective. Is the use of perspective clumsy and dysfunctional, or is it rather a complex use of perspective, to differentiate between the static land forms and the moving animals? Rock art, like all other art, is open to interpretation. Do we see a hunting scene? A super-natural scene? Is it depicting something that did happen, something that happens regularly, something that should happen, or is it about something quite different, such as a metaphysical understanding of the relationships between human, animal, and landscape? Is it all of the above?

We find humans and other animals depicted in rock art all over the world. In some periods (or whatever it is that creates stability and changes in forms of expression), humans have arms and legs, in other periods they are but lines

Figure 1: Rock art from Álttá/Alattio/Alta, Norway (Photo: Nina Tveter/NTNU)

on a boat form, sometimes both modes of depiction are used.[1] Some are men and women, others have no clear sex markers that can be understood by today's experts.[2] The environment is there, in the form of rivers and paths, huts and fireplaces. As a background? As a meaningful part of a communicative device? Often we do not know. The traces remain there on the rocks, in the form of recognizable pictures. There are parts of the world in which rock art is a living tradition,[3] accompanied by other cultural expressions such as stories. In other cases, the cultural context and the original stories might be lost in time.

Birch bark maps from North America (Woodward/Lewis 1998: 79-86); three dimensional maps, or geographical sculptures, from Greenland and the Pacific (ibid: 168-9; 481-4); drums with depictions of spiritual and physical objects and landscapes in the Nordic Arctic, used by Sami Noaides in shamanism (Manker 1950; Keski-Säntti et al. 2003); humans everywhere, across time and space, in cultures writing and non-writing alike, depict their environment. As documented by Harley et al. (1987–)[4], where many further examples can be found, many if not all human cultures create and use maps. Maps make

1 This development is clearly recognizable in Norwegian rock carvings.

2 This is claimed by some researchers to be the situation in rock paintings in Dâureb (Brandberg) in Namibia (see Lenssen-Erz 1998).

3 And indeed, is it possible to make a clear distinction between rock art and graffiti?

4 Volume 6 was published in 2015 but volume 5 is still forthcoming.

up a fundamental aspect of human culture, but should we count all these examples of depictions of environments as being maps?

There is something about these examples, true as they are as individual cases, that might be misleading. They make up a limited number of cases taken from large geographical areas over thousands of years. We might assume they are the tip of an iceberg of common practices of mapping happening anytime everywhere. But we cannot know. There is a risk of creating subconscious extensions of our own experience, of thinking anachronistically about the past.

The concept "map"

How is the word "map" defined by organizations of cartographic professionals? How is it used in the literature on the history of cartography? "Map" is often defined as a document depicting a landscape through a system of reference. Bagrow (1951: 13) simply stated: "The famous French cartographer J. L. Lagrange wrote in 1770: 'A geographical map is a plane figure representing the surface of the earth, or a part of it'; and this definition is perfectly adequate".[5] The International Cartographic Association (ICA) defines a map in the following way:

> A **map** is a symbolised representation of geographical reality, representing selected features or characteristics, resulting from the creative effort of its author's execution of choices, and is designed for use when spatial relationships are of primary relevance.[6]

While this definition does not state explicitly that maps are documents, the following definition of "cartography" on the same webpage goes far in assuming it: "**Cartography** is the discipline dealing with the art, science and technology of making and using maps."[7]

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5 "Der berühmte Kartograph J. L. Lagrange (1770) sagte: 'Eine geographische Karte ist nichts anders als eine ebene Figur, die die Erdoberfläche oder einen Teil derselben darstellt', und diese Begriffsbestimmung ist vollkommend ausreichend."

6 This is the current definition, taken from the 2003–2011 strategic plan, see https://icaci.org/mission/ (last accessed August 4, 2020), original emphasis. The previous definition, from 1995, was identical apart from the word "image" instead of "representation" in the first clause, and two small grammatical alterations.

7 Ibid., original emphasis.

The multivolume historical cartography book project initiated in the 1980s, however, used what at the time were recent developments in geography to redefine maps in a less document-oriented direction. The definition in the first volume is: "Maps are graphic representations that facilitate a spatial understanding of things, concepts, conditions, processes, or events in the human world." (Harley/Woodward 1987: xvi)

Table 1: Key aspects of the three definitions of "map"

Definition	**Representation method**	**Target of representation**
Bagrow	plane figure	a landscape
ICA	symbolized	geographical reality
Harley et al.	graphic	things, concepts, conditions, processes, or events in the human world

Table 1 shows two important aspects of these three definitions and how they have many aspects in common, even if they are also different. The representational methods are quite similar but also include important nuances. At first sight Bagrow's definition seems to be a subset of ICA's, which again is a subset of Harley et al.'s. But there is actually no claim in the ICA definition that a map should be a figure or indeed graphic at all. A textual document or a song could be a map, according to this definition, as long as the expressions represent geographical reality. This is not the case for Harley et al., as they claim that the representational method should be graphic. Thus, it is clear that some rock art and some aspects of the other examples we saw above are maps according to all these definitions. Harley et al. would include most if not all of them, whereas Bagrow and ICA would not cover the representations of spiritual landscapes and the humans engaged in hunting (or whatever activity they are performing).

However, and beyond the definition printed in the first volume, Harley et al. actually go much further than any of the three definitions in their actual use of the concept of map and cartography. This is clearly pointed out in volume 2.3, where maps as parts of material culture are seen as less important than maps as cognitive systems and social constructions, made clear with concepts such as "performance cartography", which we will come back to below.

If we look at the use of the words "map" and "cartography" in scholarly and scientific publications, it becomes clear that maps as something also beyond graphical representations is the norm rather than an exception. We find it in literary studies, where for instance Bulson (2007) discusses literary cartography in a text about texts – it has little if anything to do with maps in the sense of documents with graphic representations but a lot to do with the spatial aspects of narrative.[8] The concept of cognitive maps extends the concept of the map from an external material document to something in the mind of humans and other animals, whereas the conceptual map is a map, external or internal, of objects and processes where geography or even spatiality is not necessarily privileged. Thus, the concepts in modern language are used for both document and non-documents, visual as well as textual representations, and for the representation of anything, whether it is a real landscape, a fictional landscape, or something else. Looking into the etymology of the words commonly used in European languages, focusing on forms of "map" and "chart"[9] we see that these are dated back to the 15th century only (Eide 2012: 29-30). There is a word used in medieval Latin usually connected to maps, *mappa mundi*, but this was also used to refer to textual documents (Schneider 2006: 26).

Is this merely playing with words? Is there no material basis for the concept of "map"? Must we choose between reductionist pragmatic prescriptive definitions, such as the one used in Eide (2015), or should we let the term loose entirely? I will defer the discussion about words here and instead focus on the essential aspects behind the words, on actual spatiality and actual mapping practices, as a basis for many of the discussions to follow in this book. Then I will come back to the word "map" towards the end to suggest how to cope with the problem of defining it.

Actual spatial thinking and land use practices based on physical landscapes can be grouped into four basic aspects:

8 As exemplified by the way the concept of the chronotope (Bakhtin 1981) has been and is understood in literary studies, the link between space and time, between landscape and event, is fundamental and intimate. Thus, the view of literary mapping as an only partially geographical endeavour, where the map as a graphical object is not really seen as an ideal or, in many cases, even a useful tool.

9 As this chapter is written in English and the discussion is about the English word "map", the focus here is on English and closely related languages. An extension to other languages, especially non-Indo-European, would be highly interesting but is beyond the scope of this chapter.

- **Landscape:** The physical landscape itself.
- **Landscape knowledge:** The animal (and human) internal representation or knowledge of the landscape.
- **Wayfinding tools:** The tools we use to find our way through the landscape.
- **Spatial media products:** Our communication about the landscape and the media products[10] we use in this communication.[11]

We have seen that at least the last three are commonly referred to with the word "map". Even the landscape itself, or at least the organization of space, can be seen as a map, as is commonly seen in architecture where the layout of a church, a Sami tent or a turf hut represents aspects of the spiritual world (Mathisen 1997: 124-125, 129); the layout of city parts can be seen as a map of historical periods such as modernism, or of ideological systems. In the following, I will focus our discussion about maps, and about the lack of maps, on these four aspects, denoted by the short forms used above. These short forms are not general terms, but rather short term references to the four aspects, which are intended to be easier to remember than numerical codes.

No maps

Wood/Fels/Krygier (2010) claim that there were no maps before 1500. Not meant to be taken literally, their argument is based on the fundamental change in the mapping situation in Europe at that time. When a map was made over an administrative area in the 14th century, for instance, when a monastery made a map of its areas, this mapping work would be done by one single monastery rather than developing into something that most or all of the monasteries in the area did. After approximately 1500, this changed. Over the next 200 years, all major and eventually also minor political powers in Europe initiated systematic mapping of the areas they control. This happened

10 "Media product" is here used as in intermediality studies, in order to denote mediated things used in communication, and can include everything from a book or a data file to a waving hand to order something or a humming sound intended to calm a child (Elleström 2010).

11 Spatiality is here meant to refer to the spatial reference system used by maps (MacEachren 2004), not to the general spatiality of two-dimensional objects – the latter is present for written and printed texts too. Thus, a printed textual landscape description is here seen as a non-spatial media product. See Eide (2015) for a more detailed discussion about the spatiality of text and map documents.

around the same time in Japan, but centuries earlier in China. These were spatial media products used to describe the landscape based on a certain landscape knowledge.

Smail (1999) describes extensive work on analyzing protocols from Notaricus Publicus in Marseille in late medieval to early modern times. In the many extant volumes he studied, which document a large number of legal land transactions, there is not one single map. All places were described in words only. The landscape knowledge is expressed through non-spatial media products.

In the seven protocols documenting the Danish crown's gathering of information in preparation for the border negotiations establishing major parts of the borders between today's Norway, Sweden and Finland in 1751,[12] no maps were included or even mentioned in the interviews with farmers or reindeer herders of Norwegian, Finnish and Sami background.[13] We also see an absence of maps in other documents with strong geographical aspects from that time. While the borders between parts of traditional farms became property borders in Norway as a consequence of the change from land leasing to free peasantry in the 17th century, with a resulting increase in land transactions (Holmsen 1966: 144-148), maps were not common in the documentation of these borders. There was an official call for maps in legal cases concerning ownership of land from 1719, but this was very rarely implemented in local courts, and only partially in higher courts (Kiil 1969: 84).[14] Again, we see that the expressions are mostly non-spatial. It is also interesting to see how all these examples involve finding places in relation to other places, even if they are not about navigation in the more direct sense of planning for actual travel from one place to another.

Many late 20th and early 21st century people are at first surprised by the limited use of maps we see in these examples when they are exposed to such source material. In order to understand why this is so, that is, to understand why the lack of map use looks so strange to many modern people even if it is common across many quite different historical and cultural periods, we will move back to the anachronistic thinking suggested above through an analogy with fiction:

12 The protocols are printed in Schnitler (1929; 1962; 1985).

13 At least one map was submitted by a priest, and Captain Peter Schnitler, who led the work, made some maps himself as parts of the protocol material.

14 See Brody and Vermeylen, this volume, on the use of maps in court cases.

> [T]he 'principle of minimal departure … states that we reconstrue the world of a fiction and of a counterfactual as being the closest possible to the reality we know. This means that we will project upon the world of the statement everything we know about the real world, and that we will make only those adjustments which we cannot avoid (Ryan 1980: 406).

While this concept comes from the study of fictional works, it can also be helpful in understanding how historical evidence is interpreted. For people living in a culture dominated by maps not only for navigation, but also for making sense of the spaces we live in and relate to, it is natural to assume that similar map-based methods are used, and similar map-based sense-making happens, in all cultures, even in different places and in different historical periods. Neither maps nor texts are incontestable true statements about reality (Eide/Schubert 2021). Depictions and descriptions of landscapes have different levels of realism, both in terms of author/cartographer intention and of the relationship between documents and what, in many cartographic traditions, including administrative maps in Europe, China, Japan, and other parts of Asia, are seen as testable facts. Even in quite different traditions, such as the one exemplified by the *Lienzo de Zacatepec*, which will be discussed later, the existence of political units shown on the map were presumably testable facts at the time of the creation of the map.

In an attempt to understand the history of cartography as a history of the actual use of maps as spatial media products, the application of the principle of minimal departure may be of some use. There are examples of the creation and use of graphical representations of space from most, if not all, historical and many pre-historical periods, but there are also numerous examples of extensive documentation of spatial information without the use of spatial media products. Is what we see a wide-spread use of maps for a multitude of purposes, of which only a few examples have survived until today, or is the limited amount of extant documents due to the fact that only a very few were made in the first place? Did people in many places and times simply not use maps much, if at all? Are the examples of spatial media products that we find in the documentation exceptions or are they rather examples of a widespread, mostly lost, practice of mapping?

Or are these claims too unspecific to make any sense? At one level these questions cannot be answered. As in all historical research we can know what we have but we cannot know how much has been lost. We may assume that many more spatial media products must have existed: ephemeral figures in

sand or snow, as well as more stable physical objects in wood, bark, parchment, stone, paper and other writeable surfaces which have disappeared over the centuries and millennia.[15] What remains clear is that most humans in most if not all cultures can quickly learn how to understand, use and create maps in the form of spatial media products when motivated to do so (Landau/Lakusta 2009), and that some have done so in a significant number of documented situations.

What remains unknown is how systematic, how widespread, this was in terms of actual activities, how much it was part of individual and societal normality. How often was the potential competence for map making put to practical use? The reality addressed by such questions depends on practicalities as well as on needs. How easy and practical was it to create, use, duplicate and transport objects carrying graphical representations? What was the cost of doing so, compared to the benefits? One usually does not need maps for navigation when living and moving in only a small area for the whole of one's life. However, even when maps are not needed for navigation they might still be useful, for instance for conceptualizing space.

The double enablers of need and ability apply to single individuals and small communities, as well as at a larger society level. The change in Europe around 1500 is related to the needs of the early modern state (Wood/Fels/Krygier 2010) but also to the increased possibilities for mass production of maps, first through woodcut printing, then through metal engravings. The development in Japan is concurrent with that in Europe, whereas in China it happened centuries earlier, which can again be explained by both the development of society-level spatial administrative management and by the availability of printing.

The purpose of maps as spatial media products

Imperial systems and national states give different impressions depending on their spatial coherence. Most modern states consist of one continuous land area, if broken by water only. The map shows *us* relative to *them*: here is the land of the Norwegians, there of the Swedes, there of the Finns, and there of the Russians. When one has no land, one has no place on the map. Or

15 See Vermeylen, this volume, for the use of contemporary bark paintings as a form of mapping in native title claims.

one can carve one's own place independently from the governmental maps, as the Sami artist Hans Ragnar Mathisen has done since the 1970s under the artist's name Keviselie.[16] Maps are used to express dominance and control, but also for counter-stories and to represent alternative visions of the world. Activist mapping is sometimes part of processes of striving for recognition by governments, with minority place names and landscape understanding becoming parts of official maps and stories. Land rights issues are intimately connected to mapping and map use (Tobias 2000), as will be discussed in detail later in this book.[17]

In the context of maps, knowing where one is is closely related to finding the way to somewhere else. Even if maps are made and used for many other purposes, wayfinding is there as a possibility.[18] The question "Where am I?" means "What is the location on this map representing the place in the landscape at which I am standing?" This implies also the meaning of being "off the map", which means being in a place outside the area represented by the map, and being "lost." Being lost can be seen as the realization that one does not know which location on the map represents the place in the landscape where one is. Once one has gotten it right and one "knows where one is", one can find another place on the map where one wants to be and, given that the bearings are right, one can use the map to find the way there. The map is a generalized semiotic system with coherent reference functions to landscape types for the different symbols on the map; one can use the map to find the way through a previously unknown territory.

Thus, in addition to wayfinding as one of the four aspects of spatial thinking, governmental control also has to be taken into consideration as a key element in the creation and use of maps. The same can be said of various alternative strategies, from stealing secret maps to counter-mapping. Control and navigation are indeed closely related, significant differences notwithstanding. In a Global Positioning System (GPS) based digital mapping system, the problems of being lost or off the map do not usually occur. The dot on the map, based on satellite information, indicates the location ("I am here") and the map does not in principle have any border that can leave the map user "off the

16 Many of his maps can be found and bought at his webpage: http://www.keviselie-hansragnarmathisen.net/33514843 (last accessed February 14, 2020).

17 See e.g. Brody, Goldman, Vermeylen, this volume.

18 "Wayfinding" is here used without a clear distinction from "navigation." For a precise discussion of these and other concepts see Wood (1993) and Ingold (2000).

map". Exceptions do occur, often enough to make many people expect them and talk about them. Sometimes GPS signals are blocked by cliffs or houses, sometimes the addresses do not work, sometimes the map is just wrong. GPS based systems also rely on satellites, which are controlled by specific countries and strongly interconnected with military-industrial complexes. In addition to requiring the larger infrastructure to be working and available, the use of GPS also relies on the device one uses. It must have power and function correctly. However, this is the case for paper map navigation too – sometimes a map might dissolve due to rain or an unplanned fall into a river, sometimes the compass is broken.

A landscape is categorically different from landscape knowledge. The map is never the territory, and the relationship between claims on the map and the realities of the landscape people find themselves in can go in many directions.[19] Sometimes the map says something quite different from what one experiences on the ground.

> The DPR Korea is located in the middle of east of Asian Continent. It shares borders with China and Russia in the north with Rivers Amnok and Tuman in between. And it lies opposite Japan in the east with the East Sea of Korea in between. It lies in latitude 43°00'36"-33°06'43" and in longitude 124°10'47"-131°52'40". The Korean peninsula has an area of 223,370 sq.km. The northern half covers an area of 123,138 sq.km and the southern half 100,2321 sq.km.[20]

The implicit claim that there is no South Korea is supported by the map on the web page. The situation seen from the south is:

> In 1948, the two Koreas established their respective governments. Defined as two different countries under international law, they joined the United Nations simultaneously in September 1991. The Constitution of Republic of Korea, however, regards North Korea as part of the Republic of Korea.[21]

The same website shows maps where the whole of Korea is marked as one unit, with the border (or demarcation line) indicated as a thin red line. Thus, the maps and texts from both sides claim that Korea is one unit, showing

19 See Sullivan, Goldman, Vermeylen, this volume.

20 Official webpage of the DPR of Korea, see http://www.korea-dpr.com/location.html (last accessed February 14, 2020).

21 About Korea: http://www.korea.net/AboutKorea/Society/South-Korea-Summary (last accessed February 14, 2020).

awareness of the division, but not officially accepting it. Even when the text acknowledges the internationally recognized facts, such as the South Korean text giving the size of South Korea rather than that of the whole of Korea, the map sends different signals. Numerous other examples can be found from around the world, of maps that carefully (and sometimes less carefully) negotiate the relationship between international law, state level claims and the situation on the ground. The use of maps for governmental control was and still is a mixture of describing and creating spatial and political reality.

One of the most well-known extant Mixtec maps from what is now Mexico, *Lienzo de Zacatepec*,[22] shows the history and the boundaries of the Mixtec town of Zacatepec, with adjacent communities shown outside the area controlled by the town (Woodward/Lewis 1998: 202-3). Thus, the map shows not only the political situation and the physical space controlled by Zacatepec at a certain time in the 16th century, but also the history behind the then existing situation, with the genealogy of the rules shown as footpaths on the map, indicating time on the static map image. Another well-known example of the direct link between political power and maps is the painting of Queen Elizabeth I standing on a map.[23]

The rulers shown on maps do not have to be political leaders in a modern sense. The organization of the map can also be based on empires and powers different from the worldly ones. On several medieval maps the world is the body of Christ,[24] and Jerusalem, being seen as the centre of the earth, was commonly depicted in the middle of the map. The T-O map[25] from *Isidore von Sevillas Etymologiae* (early 7th century) identifies the three continents, Asia, Evropa and Africa, with the three sons of Noah: Sem, Iafeth, and Cham.[26]

When we look at extant decorated Sami ritual drums, traditionally used by Noaides in shamanistic rituals, there is a comparable mix of spiritual and

22 Instituto Nacional de Antropología e Historia (INAH), Mexico, see https://www.codices.inah.gob.mx/pc/contenido.php?id=59 (last accessed February 14, 2020).

23 Marcus Gheeraerts, the Younger: *Queen Elizabeth I ('The Ditchley portrait')*. National Portrait Gallery, London, NPG 2561, see https://www.npg.org.uk/collections/search/portrait/mw02079/ (last accessed February 14, 2020).

24 One example is the 13th century Ebstorf Map, see https://commons.wikimedia.org/wiki/File:Ebstorfer-stich2.jpg (last accessed February 14, 2020).

25 Named after the form of the map, a T inside an O.

26 Reproduction of this map based on a 15th century printed version, see https://commons.wikimedia.org/wiki/File:T_and_O_map_Guntherus_Ziner_1472.jpg (last accessed February 14, 2020).

physical elements. The drums can include symbols representing deities of various sorts, but also physical locations, and can be used, for instance, in preparation for hunting. Indeed, according to Mathisen (1997), there are three representations of the Sami spiritual world: the "inner map" carried in the mind of people, the drum, and the layout of the dwelling mentioned above. These are three aspects of a moveable sacred space (Rydving 2010: 117-8). The map carried in the mind, used in the ritual, and reconstructed every time a tent is put up, also becomes a performance, in line with what Woodward and Lewis (1998: 4-5) described from several places around the world, including Australia, Meso-America, Colombia and Melanesia. It was suggested above that the landscape was not used as a map. And there is still a categorical difference between map and landscape. But when the maps grow, from a document in one's hand, via the document on the ground one gathers around and the map a queen stands on, into the layout of the tent one lives in, the distinction between landscape and map also starts to blur. The map gains aspects which belong to processes in addition to still being a document – performance cartography takes place. The processual view of maps will be a basis for the discussion about route directions in the next section and will be central in the final attempt to define "map" in the last section of this chapter.

Topology and topography: between spaces and lines

Maps of train systems, metros, bus and tram lines, and other public transport networks, make up a fundamental part of the daily life of many people, even if such maps are a fairly recent invention, with a history going back to Harry Beck's London Underground Tube map from 1933.[27] The structure of a network has its mathematical basis in graph theory, formalized by Leonhard Euler in the 18th century. Its use in the humanities and social sciences, of which we find some examples in the 19th century, became central in the 20th century (Eide 2020), and is also important at technological and societal levels through, for instance, computer networks and social networks.

Wayfinding is often a social, dialogical practice. In their studies of how people give each other route descriptions, Barbara Tversky and colleagues

27 See https://tfl.gov.uk/corporate/about-tfl/culture-and-heritage/art-and-design/harry-becks-tube-map (last accessed May 19, 2020).

have documented both textual and visual expressions over a series of experiments. The visual representations created by the participants in the experiments tend to be weak on what topographical maps are expected to convey precisely: correctly represented relative distances and geometrical relationships and forms. Roads and paths tend to be represented as straight lines even if curved, turns tend to be represented as close to 90° even if quite different from that in reality, and distances tend not to be relative.[28] These results are also consistent with how expressions are made and can be represented in different historical and cultural settings, as many of the maps in Harley et al. (1987–) show. It has been shown, and is consistent with this research, that the types of representations we find in the public transport networks mentioned above, which are called topological maps, as opposed to topographical maps, which are the scaled ones with representative distances, convey verbal route descriptions quite well (Eide 2015: 108-111).

When we look at the history of cartography, not least with a global perspective, and also when we look outside of cultures where writing was common, the division into topographical maps, topological maps, and written and oral texts is useful to understand how spatial information was mediated and, as is commonly claimed, also conceptualized.[29] This has been and still is extensively studied in the context of Mediterranean antiquity (Purves 2010; Palladino 2016). In this context, the network as representing a travel route, or as stars reflecting what one sees around oneself from a specific starting point (Evans/Jasnow 2014), is known as the hodological perspective, and is central to understanding antiquity as a period where the role of maps was quite different from what we see in many modern societies. The temporal dimension of the spatial, which comes not just from travel but also from the mixed spatial/temporal nature of many expressions about distance and/or travel time, is pinpointed by Herodotus, who expressed his mistrust in maps (Hdt. 5.49-50).[30] When he lays out a series of places visited they are differentiated in time as much as in space, making the spatial reference system less natural for the understanding of such relationships than what one often sees in modern

28 A number of publications show these results; see e.g. Tversky/Lee (1999) and Tversky (2019).

29 See Vermeylen, this volume.

30 The text of Herodotus' *Histories* is available from the Perseus archive, see http://data.perseus.org/citations/urn:cts:greekLit:tlg0016.tlg001.perseus-grc1:1.1.0 (last accessed May 19, 2020).

spatial thinking.[31] Not only due to Herodotus' critical remarks about maps, which can be read in various ways, but more based on what made sense as a scholarly method, the Hestia project, based on Herodotus' *Histories*, included lines expressing relationships as an important part of their map visualizations (Barker et al. 2016).

A graph is a non-spatial construction in the sense that it is mathematically defined as a set of nodes with edges connecting them. In a network visualization, the distance between nodes has no meaning and the physical appearance is often automatically created based on parameters for visual clarity. Concepts such as closeness do not refer to the length of single edges. Directions are also not relevant; the network can be turned around or turned upside down without changing as a graph structure. Therefore, topological maps as we know them from metro networks are not just graphs. They tend to have some orientation, usually with north on the top, even if it is not precise. A London underground map with Stratford on the left and Heathrow on the right would look peculiar to most users.

Many networks have a spatial meaning. The transport networks are prototypical, but networks of letter exchange also have nodes linked to places. Exactly how these links are understood might vary: the dwelling places of sender and receiver, the actual location the letter was sent from and addressed to, are two possible and often different choices. Other structures forming graph structures, such as kinship diagrams, taking into consideration that trees are graphs of a special type, can also be put on maps if some meaningful spatial aspects can be identified. The places where ancestors were born or dwelt can help us in making sense of or understanding other aspects connected to kinship structures. The result will not be the kind of ancestral map we saw in the Zacatepec example above, but it is related.[32]

A network can be visualized and interacted with as a network, with nodes having arbitrary locations. The same network can be put on a map, which fixes the location of each locatable node. Interactive studies of these different forms of visual representations are a research strategy with a significant potential, that computers in general, as well as specific tools for working with maps and networks, have made much easier over the last decades. Indeed, since 2010–2012 there has been a boost in the use of network-based methods

31 This is discussed in more detail in Eide (2016).

32 The question of kinship as related to spatial organization is also discussed by Dieckmann, Sullivan and Skaanes, this volume.

across the digital humanities, also in various forms of spatial analysis, where network visualizations can be more or less connected to other spatial forms such as geographical maps. We see this, for instance, in historical disciplines as well as in the study of fiction (Eide 2020).

So what is a map, really?

Leaving the attempt to define the "map" concept aside, visual representations of landscapes expressed with different levels of concreteness have been discussed through examples spanning from Greek Antiquity to the current political situation on the Korean peninsula. In some cases we can and even must use terms that we do not define explicitly or precisely. Sometimes, encircling the concepts behind the term, as we did above, is all we can and should do. However, in closing this chapter a different strategy for getting closer to a definition of "map" will be attempted.

The relationship between a map and what is mapped is a special case of the relationship between a model and the system or object being modelled, that is, the target of the model (Eide 2015). Models cannot be defined by their material form; one must take the use of models in practice into consideration (Mahr 2009). What is a model for a new type of car for a car designer is a toy for her daughter. This understanding also highlights the need to take the person or group of persons doing the modelling into consideration, in what is called a pragmatic view of modelling (Gelfert 2016: 113). Many maps are explicitly created as representations of an external reality, and mapping practices in many cases are rule-based and scholarly reproducible. Measurements and projection methodologies are publicly accessible and the consequences of many of the methodological choices are available. However, the process can never be objective in a strict sense; there are always purposes behind the selection of features that the person or group of persons behind the map pursue, such as a governmental agency or a private company. This basic aspect of mapping is relevant to governmental and commercial actors at all levels: from the governments of large countries to indigenous political organizations, from Google to the Sami artist Hans Ragnar Mathisen mentioned above. It is a basic feature of mapping as a cultural production rather than being connected to who is behind the map, but the consequences vary from map to map. The level of truthfulness of maps can and must be discussed. The choices are always based on an agenda, which at best is open to public insight

and critique, but in other cases is partly or fully one of propaganda.[33] This pragmatism fits well into an understanding of modelling as semiotic (Knuuttila 2010), especially where models are seen as icons (Kralemann/Lattmann 2013). Modelling in digital humanities is a practice-based methodology combining epistemological and ontological processes. The pragmatic and semiotic aspects of modelling are united in an understanding of modelling as an interplay between semiotic meaning making and the mediated ontological nature of models (Ciula/Eide 2017; Ciula/Marras 2018).

Models are media products insofar as they have a material form and express meaning in a communicative setting. Indeed, we find similar challenges in defining media products, where a functional definition also turns out to be necessary:

> Since being a media product should be understood as a function rather than an essential property, virtually any material existence can be used as one, including not only solid objects but all kinds of physical phenomena that can be perceived by the human senses (Elleström 2019: 11).

This leads to the suggestion that model, media product, and map can be understood in analogue ways, focusing more on the function than on essential ontological aspects.[34] A descriptive definition can never be all-encompassing. What is rather suggested is more in line with the wheel model of "text" in Sahle (2013), where different aspects of the concept must be understood, when studied empirically, as co-existing aspects of the phenomenon.

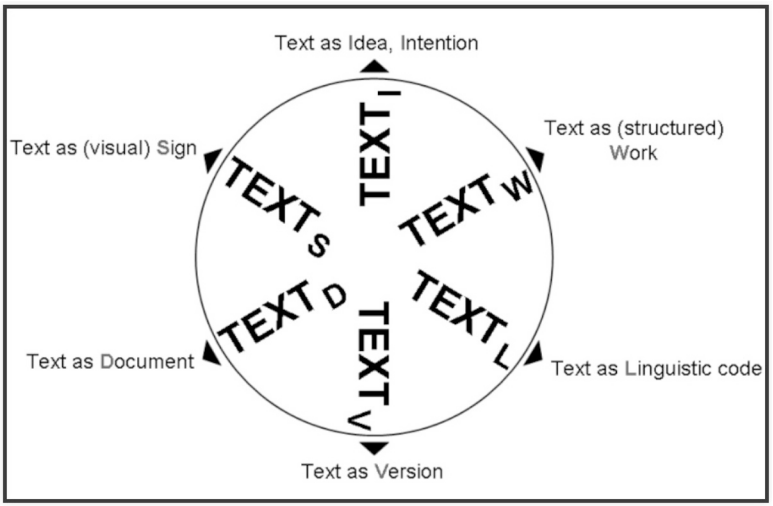
In the extended definition of "map" we find in Woodward and Lewis (1998), a map is what we use to understand a wide area of phenomena, expressing all sorts of landscape knowledge. In the narrower definition in Bagrow (1951), a map is a specific kind of a document, a spatial media product. The actual use of the word "map" must be understood in the span between the narrow and the wide sense of the word, without either of them completely taking over.[35] This, as we have seen, is not new and might very well be a key to understand

33 Discussions of such questions are found in, for instance, Monmonier (1996) and Wood et al. (2010).

34 See the Introduction to this volume, which stresses the importance of the *purpose* of the map.

35 This is also reflected in the various chapters in this volume. Some of the authors rather use a narrow definition of map, while others suggest embracing different sorts of landscape knowledge.

Figure 2: An English translation of Sahle's text wheel, showing how a definition of text covering the wide history of the concept must operate with a number of different understandings simultaneously.



the meaning of all these representations of spatial thinking, concrete as well as metaphorical, across time and space. While it may be useful in many cases to limit the use of the word "map" to scaled spatial media products such as topographical maps, one must also remember that not only networks and conceptual maps, but also textual structures and cognitive processes are often referred to as maps, not only in general language use but also in science and research.

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