Medium, Messenger, Transmission

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I have not yet provided an example of a phenomenon that can unproblematically be identified as a medium or demonstrated how the messenger and transmission perspective I have developed actually brings to light new aspects of this phenomenon. There are two additional requirements that would – ideally – be satisfied by such a test case: It should be a medium that cuts across different times, that is not rooted in only one respectable tradition, but rather that provides a context in which the changes associated with the development of information technologies and digitalization can also be reflected and studied. Furthermore, this medium should embody its mediumness in such an exemplary way that it is endowed with a certain metaphorical potential and its mediality condenses or is condensed into a dispositif.1

I have chosen to focus on maps and cartography. It is no accident that ‘maps’ and ‘cartography’ have been named here at once, for a theoretical dispute has arisen concerning the ‘epistemological nature’ of maps that is quite revealing for my own purpose. The perspective of the messenger and the trace will hopefully provide a new view of maps, which is distinct precisely because it introduces a new position in this cartographic dispute. It should come as no surprise that I want to conceive of this new position as a ‘third’ or a mediated position.

Maps are ‘foundational texts’ of our civilization.2 Maps drastically visualize what ‘world pictures’ or ‘worldviews’ literally mean and how fast they change.3 They have so deeply penetrated everyday life that their mostly unobtrusive presence is hardly noticed. Whether as weather chart, city map, subway plan, or road atlas, it is nearly impossible to imagine movement through space without the intervention of maps. These examples suggest what is initially meant here by the word ‘map’: pages4 or surfaces that contain graphic markings of relations between places in the form of a spatial, two-dimensional representation. These places can be real or fictional, they can refer to every possible form of bodies, territories, empirical facts or purely epistemic entities. There is hardly anything that cannot be represented cartographically in the form of spatial relations. The tremendous diversity of the maps that have survived from different times, cultures, practices, and orders of knowledge is also virtually incalculable.
I will thus focus on a fairly selective view: I am only interested here in the elementary forms of familiar maps that claim to represent a more or less substantial spatial territory in such a way that people are able to orient their actions within this territory. These maps are employed to refer to a given ‘reality’ beyond the map, in which the user of the map is practically embedded. I will not address fictional or thematic maps, as their representational form is always already dependent on the model of geographical maps.5

I will now discuss the theoretical dispute concerning cartography, which serves as a starting point.

The Narratives of ‘Transparent’ and ‘Opaque’ Maps
This dispute focuses on a difference in the interpretation of maps, which I will call – following Christian Jacob – the difference between ‘transparent’ and ‘opaque’ maps.6

(i) From a naturalistic-oriented perspective the map is considered ‘transparent’, as it is committed to the general principle of exact representation. Its narrative is thus reconstructed as follows: Like the cinema screen on which a film is projected, the map is a technical and symbolic artefact that disappears ‘behind’ the information it transmits. The content of this information is an illustration of the actual conditions of an external territory, which is as precise as possible. The goal of mapping is to produce a correct and undistorted relational model of a terrain, which enables the producer of the map to transmit information about a territory to the user. The map is thus a medium that represents and mediates knowledge. What matters most is the content of the map or what the map represents.

There is a clear progression in the precision of maps, as they are dependent on the evolution of measuring techniques and forms of graphic representation, and as they become more precise they also approach ever closer to reality. At the same time there is an important historical break in this progressive narrative, the so-called ‘cartographic reformation’7 in the seventeenth and eighteenth centuries, when map producers abandoned the elaborate and fantastic projections created in their studios and exchanged them for fieldwork in a landscape whose topology was exactly quantifiable.8 The production of maps was considered no longer an ‘art’, but rather a ‘science’. The map became an incarnation of the purity and neutrality required of exact scientific representation. It evolved into a metaphor, which was the force behind the knowledge claims of science: to know something was to be able to substitute it with a symbolic representation that approximated it exactly.9
(2) This approach can be distinguished from the instrumentalist-constructivist perspective, which is committed to the narrative of the ‘opaque’ map. To return once more to the film analogy, which Jacob himself introduces to explain the difference between ‘transparent’ and ‘opaque’. Film can be discussed in terms of the optical, chemical, technical, social, and cultural conditions that make film projections and the institution of the cinema possible. This is the standpoint of the ‘opaque’ map, as the map itself becomes an object. From this perspective maps do not simply depict a territory, but rather they create it. Mapping techniques obey their own technical, semiotic, and social conditions and conventions, which are in no way congruent with the rules of mathematics and logic. Politics and power are then also part of the conditions of cartographic activity. The key question thus becomes not what a map represents but rather how it does this. And this ‘how’ is bound to and shaped by the interests that determine the production as well as the use of maps. Maps are no longer considered a neutral means of representing knowledge, but rather they are seen as instruments and tools that can only be understood in the context of their production and use. This instrumental approach is graduated: It ranges from the description of maps as means of communication and text to the notion of maps as ideological and political instruments of power. In the opaque view maps are considered social constructs; they are anchored in practices that are informed by the worldview of an epoch. In other words, maps are witnesses of time. This post-representational or representation-critical approach to maps is methodologically legitimated as a form of deconstruction, as it applies the deconstruction of textuality, introduced by Foucault’s socialization and historicization of epistemes and developed by Derrida, to maps.

This is the basic constellation of approaches to cartography, which can also refer to different philosophical traditions and schools: For example, the supporters of the ‘transparent’ map naturalize the artificial, and they are therefore part of the tradition of British empiricism; the proponents of the ‘opaque’ map, on the other hand, culturalize the natural, and they are therefore inspired by continental philosophy and its critique of discourse. As this sketch suggests, both sides seem to offer opposed and irreconcilably divergent views of mapping. And this divergence is deep-seated, as it exceeds the limited field of cartography and stems from the epistemological alternative between a ‘realistic’, naturalistically-oriented interpretation of human cognition and knowledge and a ‘constructivist’, culturalistically-oriented interpretation. But is the disjunctivity of both positions the only possible view? Would it not be possible to understand both perspectives
not as exclusive but rather as inclusive and thus interrelated approaches to the map?

This is precisely what my suggestion implies. It is based on the assumption that a connection between the ‘transparent’ and the ‘opaque’ interpretations can be brought to light if the map is understood in the context of the media-theoretical distinction between the ‘messenger’ and the ‘trace’. While the ‘representationalists’ refer to maps as if they function as ‘messengers’ of the territories they represent and the knowledge of the map producers, the ‘anti-representationalists’ regard maps as ‘traces’ of the conditions that determined their production and use. ‘Transparency’ and ‘opacity’ thus prove to be the names of two co-existing ways of reading maps, yet they still ‘speak’ in two different ways, namely in their visible (explicit, manifest) as well as in their hidden (implicit, latent) dimensions. To refer to what maps explicitly show means using them for practical orientation in order to operate on a terrain with their help. The fact that the materiality and autonomy of the map ‘make themselves invisible’ in order to represent something external to the map itself thus corresponds to our ‘natural’ way of using heteronomous media, which require self-neutralization and self-withdrawal to function smoothly. To refer to the implicit dimension of maps, on the other hand, means focusing on this self-concealing mediality and employing the map as an instrument to uncover the contexts of its production, representation, and use, which are crystallized in the map but are more or less buried; the map thus functions as a cartographic dispositif.

Nevertheless, the separation of these two dimensions, which are constitutive for the (modern) map and which are to be understood according to the model of ‘message transmission’ and ‘reading traces’, does not tell the whole story concerning the narratives of ‘transparent’ and ‘opaque’ maps. Actually, the degree to which both of these dimensions reciprocally depend on one another is more intense than the distinction between these two approaches to maps. You will recall the media-theoretical formulation that in the course of using media the message of the medium is visible but the medium itself is invisible. It can also be assumed that in the course of using media the medium itself appears ‘only’ as a trace of its message. In fact, by critiquing the notion of the map as text the narrative of the ‘opaque’ map reveals not only the distortions, rhetorics, and myths of maps, but also their hidden contents, which are due to the inherent logic of mapping practices as well as their social-political embeddedness and instrumentalization. However, these traces of the unsaid and unseen can only be analyzed as something not-said and not-seen because they are implicitly shown through what is said and seen. This means that the map can be regarded as a trace in the
narrative of opacity only because and insofar as it functions as a messenger in the narrative of transparency.

Let me explain more precisely what it means to understand the message of a map as the function of a trace.

It is first necessary to register a remarkable shift in the positions of both ‘competing’ approaches. Supporters of the narrative of the ‘transparent’ map are usually believed to be the ones who remain blind with respect to the practices of producing and using maps insofar as they only treat the map as a representation of knowledge and thus they only pay attention to its representational content. The proponents of the narrative of the ‘opaque’ map, on the other hand, are understood as the ones who situate maps in terms of their relations of production and use. However, from the perspective of the medium as messenger the transparency of the map appears to be a condition precisely of its practical use, while conversely the notion of the map as a trace presupposes an examination of what it implies, in the sense of Husserl’s ‘epoché’, and thus ignores its practical use as a medium of orientation within a territory. It is almost trivial: The map can only become an object of critical analysis when it is not at the same time deployed to facilitate movements in disorienting spaces; in other words, the map does not appear as a trace until it is no longer used for practical purposes. However, this break with the map’s original terms of use still refers to them ex negativo. It must be possible to assume how a map is supposed to be used, even if it is not being used.

The narrative of the ‘transparent’ map is therefore surprisingly informed by a practical approach with respect to the map as a medium, and the narrative of the ‘opaque’ map is informed by a theoretical approach. So what is this ‘practical approach’?

On the Everyday Use of Maps
When someone looks for directions to an address on a city map, determines where to transfer on a subway plan, or uses a road atlas to make a detour around a traffic jam: in all of these situations an uncertainty has been eliminated with the help of a map. The map provides new information, which facilitates goal-directed mobility and practical actions in a territory. The legend of the map very rarely plays a role in the everyday use of maps. The reading of maps is a form of routinized literality and technical competence that becomes familiar through practice. This familiarity is rooted in the acceptance of a correspondence between the map and the territory. Practical experience instructs people as to whether they have read a map ‘correctly’: When someone notices while hiking in the mountains that the
shorter route shows considerable height differences and the destination will thus be reached faster by taking the longer but flatter route, this person has learned that the ‘right’ reading of a map means accounting for the routes and contour lines.

In an initially unproblematic way it can be said that reading maps means acquiring knowledge about something other than the nature of maps: The message of the map is thus based on reference. Maps are only useful for orientation when a ‘correspondence’ can be expected between the existing territory and its cartographic representation. This correspondence can take many forms – from a three-dimensional infinitely diverse surface to a convenient little two-dimensional schematic. All that matters here is the fact of referentiality, which vividly shows that maps age. In an ironic twist, not unlike buying milk, it is necessary to pay attention to the date. The fact that maps can be read incorrectly, as well as the fact that they can actually be ‘false’ and territories thus have a ‘veto power’ with respect to maps, shows that the narrative of ‘transparency’ is woven into the everyday use of maps. And it is this use alone that provides the criteria for evaluating maps: The purpose of the map is the criterion of the quality of its representation.

In this elementary form the map actually functions as an ambassador who mediates between the territory and the user or between the knowledge of the map producer and the user’s lack of knowledge. And the medium of the map does this better the more it is able to visualize something beyond itself in a transparent, objective, and neutral way. Like all media, therefore, maps are heteronomous. In light of this heteronomy, the idea of the ‘transparent’ map proves to be not an ideologeme but rather a thoroughly practical requirement. It refers to the ‘natural’ position, which is distinctive of an operational approach to maps. ‘Transparency’ and ‘representationality’ are characteristics of the use of maps. A map in itself is not a medium, but rather a thing with visual marks on it that is easy to handle or hang on a wall. The map does not become a medium until it is situated in practices that at the same time assume its representational transparency, such as when someone uses the map to orient himself. In the words of Rob Kitchin: ‘The map emerges through contingent, relational, context-embedded practices.’

To look more closely at this practice, which first constitutes the map as a medium, it is helpful to consider Michel de Certeau’s distinction between ‘places’ and ‘spaces’. For de Certeau ‘places’ are fixed points that can be determined through relations of coexistence. ‘Spaces’, on the other hand, emerge through the movements of subjects and their goal-oriented activities. ‘Spaces’ thus result from ‘places’, as historical subjects have done something with and at these places. By actually walking on the street
marked on the map, a person transforms – according to de Certeau – a place into a space. The meaning of this difference can also be expressed by means of other terms, such as the concepts of absolute or relative, objective or subjective, geometrical or anthropogenic, mathematical or existential, etc.

These two kinds of spatiality reveal the function of the map as a medium: ‘Transparent’ maps depict places so that they can be transformed by users into spaces. In other words, the messenger function of the map is to facilitate – in cooperation with a user – the transformation of objective places into subjective spaces. The transmissions performed by the map as a medium thus activate a metamorphosis: The representation of places on the map is transformed into the presence of walkable spaces for the user. The map mediates this gestalt-switch, whose significance as a cultural technique of civilizing spatial integration cannot be overestimated. To begin to understand the function of maps it is necessary to explain how this transformation of representation into presence is possible.

Indexicality

The clearest indicator that maps are bound to an external territory is their indexicalizability. Whenever someone wants to use a map for guidance he must first know how to locate himself, such as the red arrow on the subway plan stretched across the wall of the station that says ‘you are here’, the worn and no longer readable position on an enlarged extract from a city plan posted for tourist information, or the pointer on a trail map that indicates the hiker’s location.

Indexicalizability is an essential element of every operational approach to maps. It is the connecting link in the transformation of places into spaces. Like the pronoun ‘I’, the indexical ‘here’, and the deictic pointer finger, something is being referred to whose meaning changes with each articulation: If a person looks at a map of the territory on which he is currently standing, walking, or driving, he is present in two ways. While reading the map the ‘I am here’ becomes ‘I am there’. This is a remarkable deictic gesture, which points from the body to the map and thus at the same time to the self. Through this indexical identification of his own position the map user becomes part of the map. He identifies a position on the map that not only represents an external territory, but also presents the map user. This transformation is what matters here. While maps transform an objectively described place into a subjectively experienced space, their indexicalizability reveals that the reverse is also a necessary condition of the operative use of maps: The map user must transform his individual location in the world into a generalizable position on the map. By ‘locating’
himself on the map in the third person perspective, the map user assumes the role of an external observer. Determining one's own position with the help of a map is often a tedious business, which demands a constant balance between what is seen and what is marked on the map. The institution of proper names – of streets – also plays a key role.

If indexicalizability as a condition of the operative use of maps requires that there be a correspondence between the map and the territory, then it is necessary to explain how this ‘message’ of the map is to be understood.

**The Cartographic Paradox**

There is no question that any interpretation of cartography has to respect one principle: ‘The map is not the territory.’ The transparency of the map, which reveals something that is not ‘of the nature of maps’, cannot be achieved because the map actually creates a double of an unfamiliar external reality and it is therefore doubly unfamiliar. There are countless anecdotes about the anachronism and also the absurdity of a map that reproduces the landscape on a scale of 1:1 and therefore completely covers it.²⁴

A three-dimensional world, which constitutes the living environment, and a two-dimensional map, which is part of the living environment of this world, are each of a different ontological nature and weight. All of the potential contained in the cultural technique of mapping is based precisely on the difference between a territory and its map. How can this difference be defined?

Maps are flat. This is something they share with paintings and photographs, yet there is a notable difference between them: Maps are not perspective representations. While the flatness of a central perspective image appears to transform optically into a window, through which the eye can see a three-dimensional space, the map has precisely no depth dimension – in the case of normal topographic maps at least. The map is regarded as the view of a surface and it is precisely for this reason that it provides an overview. Its ordering principle is the visual graphic marking of adjacent neighbourhoods with the help of lines, points, shading, colours, etc. Maps give an ‘aerial view’. The world appears primarily in horizontal outline for people who walk upright. Yet maps reverse this point of view and show the territory vertically in that it is seen from above – even from way, way above depending on the size of the mapped section.

This standpoint of the Apollonian eye,²⁵ with which the world is observed ‘from outside’ in a way that was impossible before the invention of airplanes, rockets, and satellites, has a profound significance not only
for our worldview, but also for our role as epistemological subjects. I will return to this later.

I want to focus here on the representational-technical aspects of this Apollonian perspective: Maps show territorial surfaces from a perspective that is usually impossible for human eyes. But their representational claim is based precisely on the art of adopting this 'unnatural' perspective. This view from above also applies to globes, spherical models featuring representations of the earth's surface, and it is no coincidence that the production of globes and the design of maps went hand-in-hand in the epoch of the 'cartographic reformation'.

If they both represent surfaces as seen from the perspective of a 'divine eye', what distinguishes the two-dimensional map from the three-dimensional globe? This is a key turning point in my reflections on maps. Three-dimensionality cannot be transmitted onto two-dimensionality without distortion. Can the peel of an orange be spread out flat on a table? Because the map represents the surface of the earth without its curvature, two-dimensional maps cannot depict surfaces, angles, contours, distances, and directions at the same time without distortion. This constitutes the 'cartographic paradox'. To understand this paradox it is necessary to be familiar with several other aspects of the inherent logic of the map as medium: In addition to a font, which is part of its 'language', maps must have (i) a scale, (ii) a grid-like coordinate system for positioning places, and (iii) a method of projection.

(i) The scale indicates the proportions between distances on the earth's surface and the distances represented on the map, therefore 1:100, 1:1000, etc. It ensures not only the manageability and clarity of the map, but also the undeniable difference and structural similarity between a territory and its cartographic representation.

(ii) In the Western tradition latitude and longitude (meridians) have been established as the coordinate system for positioning places on the earth's surface. They are oriented towards the equator and the prime meridian, which stands perpendicular to it. The equator (from the Latin 'aequāre', to equalize) is based on the ideal spherical shape of the earth. It is a geometric form created by a plane that goes through the centre of the sphere and stands perpendicular to the rotational axis of the earth. The equator vertically intersects circles of longitude, which lead through the poles. The equator also marks the point of zero degrees latitude, while the prime meridian was designated the point of zero degrees longitude purely out of convention.

These mathematical-geographical relationships will not be enlarged upon here. It is sufficient to note that the arrangement of the earth's surface
according to coordinates of latitude and longitude is a mathematical **construct** (whose relationship, by the way, is etymologically due to seafaring on the Mediterranean, whose length runs from east to west and whose width stretches from north to south).²⁸

The mathematical poles are also not identical to the magnetic poles, to which compass needles point. Longitudinal and latitudinal lines provide the earth with a ‘network’ that treats all places equally; regardless of whether they are located on the summits of mountains or in the depths of the ocean, they only distinguishable in terms of their mathematically exact position. It is almost redundant to add that the mathematically exact configuration of this ‘network’ is a feature of the *representation* of the earth as a globe, but not an attribute of the earth itself. So how can this mathematical arrangement of the earth’s surface, which is only geometrically correct on a three-dimensional globe, be transmitted onto a two-dimensional map? This is only possible through methods of projection.

(iii) For a curved surface to be represented on a flat plane it must be projected onto it. All maps claiming to be ‘transparent’ must embody a method of projection, but there is always a plurality of them.²⁹ Projecting the surface of a sphere onto a flat plane means changing it – and this is a topological law. The price of the projection, therefore, is that a map cannot preserve both the areas and angles of a globe at the same time. When the surface of a globe is stretched out onto a map, in other words, the map cannot retain both the proportions and the right angles at the points where the longitudinal and latitudinal lines intersect. The kind of distortion that is then preferred depends solely on the pragmatic purpose of a map.

I will now turn to an example: the conformal world map designed by Gerhard Mercator (1512–1594) in 1569. Mercator’s map is the prime example used to deconstruct the idea of the ‘transparent’ map, as it is obviously ‘Eurocentric’: The distortion increases from the equator to the poles so that northern regions are represented as disproportionately large in relation to equatorial regions. Greenland (2.2 million km²) appears to be the same size as Africa (30.3 million km²) on this map.

So what was Mercator’s method of projection?

It is helpful to imagine projecting the surface of a sphere onto a cylinder. The cylinder is ‘wrapped’ around the globe like a coat, but only touches it at the equator. A light inside the globe casts shadows of the continents onto the surface of the cylinder.³⁰ If this cylinder is then cut open at a random place and rolled out, it will look approximately like Mercator’s world map. In order to retain the angles between the longitudinal and latitudinal lines, Mercator had to stretch the map vertically and thus increase the distance
between latitudinal lines. An image is also helpful here: Imagine that the globe is a balloon stuck inside the cylinder, which (again) only touches the surface of the cylinder at the equator. If the balloon is inflated so that it touches the entire surface of the cylinder – and not only the equator – then the polar regions of the balloon will have to let in more air, as the surface of the balloon has to stretch further at these places in order to come into contact with the cylinder. Because the distance between latitudinal lines increases towards the poles, the surface area will be greatly enlarged in these regions. The price of preserving the angles is thus the distortion of the areas.

I will now return to the accusation that this map is Eurocentric.

Arno Peters developed a map in 1974 that was intended to do justice to the ‘countries of the third world’ by using an equal-area projection so that every square meter on the earth was represented as true to scale on the map.31 This resulted in an ideologically heated debate.32 Of course Peters’s projection was also distorted, but in a different way: this time it was not the surface areas, but rather the lengths and angles that were ‘falsified’.

I will not delve any deeper here into the artistry or diversity of cartographic projections, none of which are able to escape the cartographic paradox that maps are only able to depict something by distorting it. The ideological critique of Mercator’s world map nevertheless reveals a constellation that was already encountered in the narratives of the ‘transparent’ and ‘opaque’ map. Every critique of distortions must _nolens volens_ invoke the narrative of the representationality of maps, as this narrative establishes the criterion necessary to diagnose something as a distortion. Peters’s map claims to represent the land masses in the equatorial region ‘more correctly’ than the Mercator projection. Such a claim explicitly presupposes that there is a correspondence between the map and the territory and that this correspondence is the organizing principle of mapping. And the presupposition that maps are supposed to represent an external territory as faithfully as possible overlooks their pragmatic purpose and practical use, which provide the only means of evaluating whether a map is ‘good’ or ‘bad’. Maps are not simply visual representations of something, but rather they are a means of exploring and operating with what is represented. The performance and limits of the Mercator projection can only be determined in the context of its production and use.

**Mercator Projection and Navigation**

According to the cartographic paradox a certain structure can only be transmitted onto the map ‘faithfully’ when other structures are thereby
replicated ‘unfaithfully’. And the topology and topography do not determine which structures retain their proportions and which ones are distorted, but rather the purpose that the map ‘serves’. *Representationality and relativity are not mutually exclusive but rather inclusive.*

Peters’s correction of the Mercator projection is ‘naïve’ because in overlooking the cartographic paradox it also ignores the pragmatic situation of maps. While the Peters projection absolutely makes sense as a means of revealing the ‘unconscious’ and ‘discreet’ enlargement of temperate land masses at the expense of equatorial regions on traditional maps, and it is rightly deployed by aid organizations for precisely this function, the meaning of the Mercator map is entirely different. It is less epistemic and therefore decidedly practical. This map served less as a projection of a worldview (which it also naturally is) than as a means of navigation. It first became a medium through its interaction with sailors who needed to orient themselves at sea. Its conformal quality made it possible to find the simplest and safest route to a target destination through so-called loxodromes or straight courses in a constant direction on the sea. Loxodromes are mathematical constructs, like latitudinal and longitudinal lines. They look like helixes on a circular cylinder, as they approach the poles in spiralling coils. What is special about the conformal Mercator map is that these coils appear to be straight on the map, and this enables a ship to proceed on a constant course with a compass. It is only necessary – and actually with the help of the map, which is thus an act of graphic measurement – to take an initial bearing of the course from the home port to the destination port and then to maintain this bearing at sea without constantly adjusting one’s direction.

This movement along a cartographically determined line applies not only to nautical but also to aerial navigation. The Mercator projection underlies nearly all nautical and aeronautical charts to this day. This map enables the calculation of spaces without markings or traces, like the sea and the air, which then become ‘navigable’ and ‘traversable’.

Therefore, if a map is viewed as a mediating third between a user and a territory then its mediality evolves solely in the field of activity of a triadic relation between people, maps, and territories. The map links data documenting the structures of a territory to the intentions of the map user (‘I am here and want to go there’). Every interpretation that considers maps to be either illustrations or constructions thus falls short.

I will now return once more to the relationship between representation and relativity in order to address the ‘inherent logic’ of maps, which is at the same time constantly rooted in their terms of use. The next section focuses
on the abstractions and generalizations that are necessarily connected to cartographic representations.

**Generalization, Schematization, Stylization**

Unlike pictures and photographs maps are not ‘consistent’ but rather ‘disjointed’ symbolic systems and they can thus be *highly selective* (measured against the territory they represent): They equalize things that are different, they omit some things and highlight others. For example, it is impossible to use an aerial photograph as a city map due to the vast range of details. Consider a contemporary electronic practice: It is only when the zoomed-in photographic details from ‘Google Earth’ are superimposed over the corresponding maps from ‘Google Maps’, and thus the aerial photograph of a city is furnished with a schematic inscription of streets, that a visual representation emerges that actually makes it possible to identify and determine places, distances, and directions. What distinguishes an aerial photograph of a place from a map are processes of generalization, schematization, and stylization.

Maps can be considered a modality of representation that is sui generis. They emerged semiotically from the intersection of language and image. Graphic variables like two-dimensionality, size, brightness, pattern, colours, forms, etc. become conventional signs. With the help of these signs, the individual details of a territory are assigned different kinds of objects that then appear on the map as individual streets, rivers, places, mountains, etc. The map intertwines the graphic-visual with the linguistic-syntactical. Maps visually represent relations that in principle can also be translated into linguistic expressions, such as relations of position like ‘A is east of B’ or relations of quantity like ‘A is larger than B’. Maps thus contain an element of testimony, and what they show can be completely false. Please keep in mind that the territory does not predetermine the criterion of correctness and falsity, but rather the method of projection as well as the purpose and use of the map. To return to the example of representations of distances: Maps signify planimetric distances, horizontal distances in which height differences are levelled. Planimetric distances are always less than real distances, and even less than linear distances, as all of the terrain coordinates are projected onto a horizontal surface and thus – necessarily – distorted.

To return to the issue of generalization: Maps would not be possible without processes of abstraction like selection, simplification, elimination, equalization, straightening, and typesetting. A meandering river becomes a curve; a winding road becomes a line; constantly crisscrossing streets, trains, and rivers become parallel; a constantly changing coastal zone
becomes a stroke; and villages of different sizes and populations become equal points.

Subway cartograms depend on neglecting the real geometry of a city. They depict constellations of places in a way that ensures precisely that the user is able to transform these places into subjective spaces through his own movement: Subway lines are always straight on subway plans and the distance between stations is expanded in the city centre and compressed on the periphery.36 Readability is more important than topological precision.37

The topic of cartographic generalization is virtually inexhaustible, and what has been presented here constitutes nothing more than a fragment. I will now turn to a phenomenon that is related to cartographic generalization but is not limited to it; moreover, it is a phenomenon that continues one of the central media-theoretical propositions of this study: Maps – fundamentally – make the invisible visible.

The Visualization of the Invisible
Maps require these practices of abstraction due to their selectivity: Maps can only exist because it is possible to ignore the excessive abundance of what is seen. If mapping is also rooted in the art of abstraction then it can only develop as a strategy of visualization in connection with the ability to concretize, visualize, and embody something that is abstract and thus not simply perceptible. To understand the culture-endowing function and epistemic power of maps it is therefore necessary to conceive of this embodying and concretizing potential as the ability to visualize the nonsensory and to transfer it to the register of perceptibility. There are different kinds of invisibility that thereby come into play.

(i) On the first level, it is necessary to undo an oversimplification. Up until now I have referred to the representation of a ‘territory’ on a map, yet strictly speaking is it not a territory but rather knowledge about this territory that is visualized as a map. The map does not depict things, but rather ‘epistemic things’, to use Jörg Rheinberger’s concept.38 And these knowledge-things must be quantifiable: They must be able to be described as the result of measurement methods (in the field) and they must be regarded as bodies of measurable data that can be inscribed. However, measurement methods are cultural techniques that work with different scales and constantly change with the evolution of knowledge cultures, especially mathematics and technology.

(ii) The concept of visualizing something invisible applies even more to the plotting of purely mathematical constructs, like latitudinal and longitudinal lines, and this is the second level. By appearing on maps these
lines not only enable the identifiability of (previously surveyed) places, but above all they also introduce self-positioning. Making these mathematical constructs and epistemic things perceptible opens up the possibility of concretely situating the user in the map. This indexical place is a ‘known place’: The user does not simply see where he has positioned himself within the map, but rather he must deduce this position.

(iii) Maps make not only mathematical constructs and the determination of indexical positions perceptible, but also political bodies that are almost never encountered in the phenomenal world, and this is the third level. In the history of nations, the unified image of the map has quite often suggested a sense of national unity that did not exist politically or administratively. David Guggerli and Daniel Speich show what this means using the example of the first topographic map of Switzerland. Exhibited in 1883, the cartographic representation of the entire confederation, which was first founded as a federal state in 1848, became an identification model with which the public began to transform itself into one nation of Swiss people – an idea that had previously been largely a utopian dream. Nevertheless, this national map also sparked conflicts concerning the borders of cantons. Before then ‘clear borders’ had meant nothing more than a lack of border disputes, but as a result of this map people had to wrestle with the exact locations of political borders. It is no accident that the creation of topographic maps became an official and thus national task in the nineteenth and twentieth centuries. Topographic maps or so-called ‘general maps’ always depict – like most maps – a constellation of political power. This power largely consists of the ‘power of naming’, and the example of Switzerland is also instructive here. Because the places depicted on maps are always furnished with proper names, but these places mostly bear different names in the practical life of the population, the erasure of this difference in support of a single name makes it ‘quasi-official’, and it thus becomes a ‘political issue’. The map is granted ‘the character of a decree’.

The political function of maps is a well-explored field and does not require any further discussion here. Yet the ‘power of naming’ clearly shows how maps visualize the invisible: namely, what is visualized on the map is at the same time created and constituted by this act of visualization. Because maps refer to something independent of and prior to the map itself, in a gesture of naturalistic transparency, they have the power to shape this independent and prior thing according to the model of the map. And ‘model’ here does not mean an after-image, but rather a ‘prototype’. It is through the map that a worldview emerges.
(iv) To explain what this means I will now turn to the fourth and perhaps most significant level. Maps depict something that in principle and not only with respect to some abstractions cannot be seen by anyone in this form. And it is precisely because maps present something that is not accessible to people, who are embedded in the living environment, that a non-human standpoint beyond the living environment must be adopted in the construction of the map. Maps thus represent a ‘view from nowhere’ or an Apollonian perspective. With maps something enters into our world thanks to our ability to imagine stepping out of it.

Before the moon landing and the development of satellite images, the only way of representing the earth as a planet was in the form of a globe. Planimetric maps inherited this unique function of representing the world from the perspective of an external observer, who is (or seems to be) not part of the world. Because people do not perceive things in sequence, like the experience of listening, but rather in juxtaposition, like the experience of seeing, they are able to compare objects and visualize their proportionality through their proximity to one another. The visualization of simultaneous spatial relations introduces a disposition of perception that is most conducive to the cognitive understanding of the perceived, as observing something simultaneous from a distance offers a perspective that is optimal for cognition and objectivity. Maps that treat this distance even more radically as the position of the ‘Apollonian eye’, which underlies their principle of construction and representation, constitute a nucleus of crystallization that honours the eye as an organ of perception.

Maps thus present the world in a form that is not actually accessible to the human eye, but for that reason they come even closer to the modern scientific and philosophical position of the human as subject of cognition. In other words, maps present the world as seen with an ‘intellectual eye’. Yet this ‘intellectual eye’ depends on the potential of visualization, which is due to the materiality of the map as medium. The form of invisibility that matters here is therefore the position of the modern subject, which is the organizing perspective of planimetric-topographic mapping. The arrangement of a simultaneous overview, which the map communicates, requires a standpoint ‘high above’. Unlike the real map user, who positions himself indexically on the map and can then also see his position like an external observer, the Apollonian point of view of the subject of cognition exists not on the map as a perceptible event, but rather – like the central perspective image – as its ‘inner organizing principle’. The invisible form that the map implicitly visualizes is the methodological function of the modern subject to be able to adopt the perspective of an external, neutral
observer. Or, to express this in Kantian terms, what the map visualizes is the epistemological fact that the subject is not part of the world, but rather constitutes the transcendental condition of its visibility and cognizability.

This connection between the map’s visualization of the invisible and the constitution of the modern idea of the subject is only plausible so long as it is clear that the standpoint of the ‘Apollonian eye’ is an epistemological abstraction that belongs to the realm of the imaginary, that cannot be based on real experience, and that only develops into an illustrative function within the symbolic world of the map.

But what happens when the imaginary ‘Apollonian eye’ transforms into a satellite camera and the perspective from ‘nowhere’ is located as a position in space? The final step in my reflections on maps will thus question how mapping changes as a result of digitalization.

**Digital Maps**

It is remarkable that with the triumph of the computer the principle of location seemed to become obsolete and space and spatiality seemed to become almost superfluous. Yet in recent years there has been a noticeable expansion of precisely those practices in which the computer is deployed as an instrument of mapping and localized ‘georeferencing’ information.\(^\text{47}\)

I want to look more closely at such phenomena of digitalized mapping, which are associated with buzzwords like ‘virtual globe’ and ‘digital earth’.\(^\text{48}\)

Programs like Google Earth and Google Map\(^\text{49}\) not only enable the pleasure of exploring the earth’s surface from the perspective of a bird in flight, but also pave the way for the creation of thousands of individual maps, as users are able to feed local information into these programs with global datasets that contain everything localizable and digitalizable.

Google Earth is a software program that consists of an animated model of the earth’s surface. This model was created by digitally combining hundreds of thousands of satellite and aerial photographs taken from different points of view. Using this program it is possible to ‘navigate’ around the world, or more vividly: to fly over the earth’s surface and thereby visit random places. The detail resolution usually amounts to 15 m, but in urban centres it can also be up to 15 cm; cars and people are then already recognizable. Moreover, Google Earth is frequently coupled with three-dimensional terrain and city models. In any case, users are able to zoom in and out of places, always in gliding flight, and the reloading of the image does not disrupt the continual view of the landscape.

People have seen sections of the earth’s surface from a bird’s perspective before in the form of photographs or through airplane windows; what is new
about Google Earth, however, is its interactivity or the possibility that the user can determine which places he wants to view and explore as a ‘virtual visitor’. From its origin, Google Earth is a game for virtual hobby pilots. This feature leads to unexpected and sometimes even bizarre discoveries, like the swastika formation of a US Marine barracks in Coronado, California that was ‘uncovered’ and brought to the world’s attention through Google Earth: The swastika-like arrangement of the building could only be seen from above, and it had never attracted attention before because the building was located in a no-fly zone. The degree to which the virtual pilot perspective of Google Earth had become a publicly recognized common property capable of raising political issues was signalled by the decision of the US Marines to conceal the building from aerial photographs (using plants and solar panels). Google Earth had (until then) made the invisible visible.

What was introduced as a game turned out to be – to say it in jargon – a ‘georeferencing information machine’. For this purpose it is only necessary for Google Earth to be connected to locally specified datasets. The Danish biologist Erik Born equipped walruses on Greenland's arctic coast with sensors in order to track their movements through the Arctic Ocean. He was then able to use Google Earth to identify the location and migration of every walrus on his screen. The biologist was also able to superimpose his walrus migration map onto a map created by his geographer colleague, which visualized data concerning the thickness of arctic ice and the direction of arctic currents. The image that then emerged enabled the biologist to obtain new findings about the influence of the melting of the ice on the behaviour of the animal world and thus to discover new causal relationships in times of climate change. Observations of the virtual world of visualized data thus introduce new insights to the real world.

Or, to go from science to the everyday: So-called ‘mash ups’ are individually created maps that result from combining local data with global services like Google Earth or Google Maps; these maps are then uploaded onto the Internet, where they reproduce explosively. Maps then emerge of everything indexicalizable: the geographical distribution of approximately 12,000 ant species, all of the airliners flying over the USA, the distribution of comics on buildings in Brussels, speed traps in Cologne, or free wireless hotspots in Berlin. People also like to point to the example of emergency relief efforts during catastrophic situations, as viewing destroyed areas from above allows people not only to diagnose the severity of the catastrophe but also to determine which routes are still intact and can be used for supporting measures.
The virtual globe is thus filled with traces of local events and individual preferences.

There is no question that the digitalization of mapping has far-reaching consequences for the creation, distribution, and use of maps and that it fundamentally alters the face of cartography. There appears to be some truth to the speculation that we will witness a revolution in the cultural technique of mapping whose potential for radical change is even greater than that of the ‘cartographic reformation’ in the early modern period. But I want to look once again at what is new about the use of maps ‘via the Internet’, which can be subdivided into three dimensions that are nevertheless always integrated in digitalized mapping: operating, exploring, and presenting.

(i) **Operating**: Generalizing maps record the places and structures of a region supra-individually: the subway network of Berlin, the city plan of London, the hiking map of the Ötztal Alps. In order to use a map the individual must be able to locate himself and indexically inscribe himself onto the map; the individual is then able to acquire new knowledge from the map, which is essential for orienting his movements in space. The work of locating is now automated by GPS and satellite technology, and the individualized maps that these technologies produce depict a territory in a way that is fundamentally based on the standpoint of the user. The conversion of objective spatial relations into subjective and tangible spatiality is now – for the most part – automated by the computer.

(ii) **Exploring**: The possibility of exploring random places on the earth from the perspective of a bird in flight is fascinating, and this activity also offers an unprecedented degree of freedom and playfulness. More importantly, the empirical observation of the world itself becomes virtual, which creates new ‘possibilities of observation’. Through the hybridization of different geographically indexicalized datasets (resulting from surveys), new knowledge can be acquired about relations on the ‘real earth itself’. Patterns become discernible that can only be seen on the screen in the form of computer-generated visualizations. Visualization thus evolves into a scientific instrument of perception that plays a fundamental role in empirical observations, experiments, and theory.

(iii) **Presenting**: Information can be represented in different ways: linguistically, visually, or through a mixture of both modalities, as in writing, diagrams, and maps. Because ‘mash ups’ combine global and local data and thus specify and make visible local information in countless ways (properties for sale, company headquarters, clusters of retired people, Italian restaurants, residences of sex offenders, etc.), the map lends itself as a substitute for purely linguistic representations of information. Commercial
directories are no longer written, but rather they are available in the form of digitalized maps that clearly show where companies can be found – near the user's place of residence, for example.

It is not necessary to provide an overly incisive conclusion to see that what digitalization contributes to our approach to maps lies in its visualization, with which the map develops into a ubiquitous format of information acquisition and mediation. The often diagnosed ‘topographical turn’\(^\text{57}\) thus finds its counterpart in the fact that the significance of maps has not declined but rather grown. Yet an interesting shift in the function of the use of maps becomes apparent with digitalization. I would like to formulate this shift in the form of a hypothesis that can prepare the way for a more comprehensive investigation, which cannot be carried out here: \textit{While the creation and use of overview maps was developed during the ‘cartographic reformation’ as a cultural technique for practical operations in complex territories, ‘cartographic digitalization’ transforms mapping into a cultural technique for movement in landscapes of knowledge.} These ‘landscapes’, however, are no longer accessible at all except through media.

\textbf{The Messenger Model Considered in Light of the Map: In Lieu of a Conclusion}

Up to now I have been focusing on what my basic media-theoretical assumptions reveal about maps. I would now like to reverse this perspective and explore what maps, as a text case, reveal about media theory.

One of the main goals of this study is to avoid the creative-oriented (generative) image of media, which conventionalizes media as more or less autonomous agents of cultural dynamics. The basis of these reflections is the presupposition that the figure of the messenger – in conjunction with the involuntary errand of the trace – constitutes a prototype of what it means to function as a medium. What distinguishes this ‘function’ is that it is not self-organized. The ‘heteronomy’ that makes media into instances of being-directed-by-others is a basic idea, if not the basic principle of this media theory. But this raises some unavoidable questions:

\begin{itemize}
  \item If media transmit and mediate something that they themselves have not created, how is it nevertheless possible to trace the creativity that is still ‘somehow’ immanent in this approach to media? How can the culture-endowing power of media be explained if they are so strongly thematized as foils of transmission and not of creation and transformation? There can be no reasonable doubt that media possess an inherent logic through which they also (pre)form what they transmit and mediate. Is the shaping power of media fundamentally neglected – and does
it therefore remain inexplicable – if the messenger is made into the ur-scenario of a media theory? Is there a danger of throwing out the ‘media-theoretical baby’ with the ‘generative bathwater’?

I wanted to avoid both the marginalization and hypostatization of the medial, but doesn’t the rejection of a generative approach marginalize media once again, as the assumption that they are directed by others seems to reduce media in relative importance to merely a secondary phenomenon? How is the claim that media have an irrefutable function in communication, perception, thought, and experience consistent with their reduction to ‘mere’ relations of transmission?

In summary, how can media have a culture-endowing power if their creative power is denied?

My assumption is that these media-theoretical reflections on maps suggest an answer to these questions in two ways:

(i) *Media as Mediator and Third: Distributed Activity* – Media occupy the position of a middle, a mediator, and a third in a triadic relationship between two heterogeneous fields. Describing media as the ‘middle’ spatially connotes and (misleadingly) suggests that this constellation should be understood as a – more or less static – structural relationship. Yet the map reveals that mediality is less structural than pragmatic: The map *is* not a medium, but rather it *becomes* a medium when and only as long as someone actively orients himself in a territory with the help of the map. The map thus occupies the position of a mediator only when it is being used. *Media only exist in the processuality of their implementation.*

The idea that the meaning of something only emerges through its use may seem banal. Moreover, this use-oriented explanation would seem to lump media together with signs, which this is something I have tried to avoid from the beginning. However, the point of establishing use as the foundation of the map’s function as a medium lies elsewhere. When the map is employed as a medium, this does not simply mean that the map is read and interpreted as a form of symbolic representation, but rather it means that something outside of the map is altered through the act of orienting oneself with the map. It thus depends not on an interpretation, but rather on a *transformation* that turns an ocean without markings into a straight traversable ‘sea lane’ or an unfamiliar city into a walkable space. This transformation is caused not by the medium per se, but rather by the operative unity of user, map, and territory. *This functioning ‘unity’ alone has agency and the attributes of an actor.*

When media are denied any original creative power, therefore, it does not mean that this ability is then granted instead to those who employ
media. Being subjected to a complex, confusing, and unfamiliar space without a map is adventure, and it leaves people thoroughly powerless. Something like ‘agency’ only emerges in the practical tripartite connection in which the medium is situated as middle and mediator. The mediatized ability to act must therefore be understood as a ‘distributed’ potential whose productivity always depends on the collaboration of human and non-human components. This type of distributed activity is not prevented but rather made possible by the heteronomy of media or their ability to incorporate attributes of both of the worlds between which they mediate.

(2) Media Make the Imperceptible Perceptible: Transparency and Opacity and the Possibility of a Media-Critical Epistemology. – What could be easier than to suppose that maps reproduce something prior and already extant and they are considered practical failures if they do not reproduce it more or less exactly? Where, if not with maps, does ‘imaging’ prove to be an essential dimension of our symbolic processes? Nevertheless, even though media are fundamentally based on something prior (remember that ‘topographic maps’ were chosen as the starting point, which disregards fictional maps) they still make perceptible something that is invisible to the eye – in many possible ways.

Making something that eludes the senses perceptible is a creative transformation that obviously depends on the presupposition that the medium is transparent, as it must represent the expanse of the ocean or the branching of subway lines ‘in reality’, like an incorruptible messenger. But maps depict neither the sea and the land nor subway lines and stations, but rather the spatial and positional relationships between them – relationships that can only be seen in the diagram of the map. The map is undoubtedly not the territory, but more importantly it also does not depict it. Maps can at best reveal something about a territory, yet they always do this from an Apollonian or non-human perspective that is not part of the territory itself. Maps incorporate something into our life world that can only be seen from a standpoint outside of this world – something that is therefore not accessible to the senses – and it is precisely for this reason that they possess an explosive potential through which new orientation knowledge can be generated.

Cartographic visualization is therefore always also a process of construction. The representational and generative dimensions of media are not exclusive, but rather inclusive.

The ‘cartographic paradox’ shows that cartographic representations are inherently distorted and that this distortion is not a disruption but rather a condition of possibility of representation. Like the relationship between
'representation' and 'generation', it could also be said that transparency and opacity are two distinguishable dimensions of maps that nevertheless require and include one another. They are related to each other like the messenger aspect and the trace aspect of media.

The difference between transparency and opacity must not be bypassed or even annulled. It is distinctive, it is eminently practical, and it is also the source of a media-critical epistemology: To use maps for everyday orientation and self-localization one 'must remain blind' to the inherent distortions in cartographic projection methods.

To critically analyze map projections and their social instrumentalizations, on the other hand, one must render the user’s approach inoperative. Like a Husserlian 'epoché', a theoretical approach requires dispensing with the practical use of maps.

Thematizing the medium as messenger also reflects my practical approach to media – how analyzing the medium as a trace of its social-historical contextualization and instrumentalization can be the starting point of a media-critical approach. A critical epistemology of media is inevitably tied to the duplicity of the transparent and opaque dimensions or of the messenger and the trace – a doubling that corresponds to all media in one way or another. This relationship is epistemologically generalizable: ‘realism’ and ‘constructivism’ (or ‘instrumentalism’) appear to be not competing and exclusive but rather interdependent and reciprocally inclusive epistemological positions.