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families”), and human mind (e.g. features of mental health of people, families and population). Outbreeding is a current world trend that supports the genetic diversity of the humankind, high heterozygotization across many loci, and increased speed of mutation of some loci of the genome, including diseases. The main factor, considerably affecting the frequency of the mutant genes, is migration or nomadism. Digital nomads’ generations originate from family systems carrying different predispositions to mental health fulfilled under specific conditions of the environment that may be denoted as relations between “neuronetworks, neurofamilies and neurosocium.” Digital immigrants, as a rule, have already fulfilled themselves in the family and have had some experience of existence in micro- and macrosocium. But they have to adjust to the new “digital era”, which may be connected with changes in their mental health. On the other hand, there is no doubt that both currently and previously, family-focused communicative behavior, including reproductive motivation cannot but dominate in the behavior of a healthy human. Therefore younger generation of digital nomads or digital natives will create their own nuclear families under different social, psychological, population-genetic, multicultural, political-economic, climatic, and geographical conditions. In the territory of Siberia, the processes (from the viewpoint of biopsychosocial health) are typical for the emerging young population. Thus, we can suppose that studying, understanding, and creating the environment (educational, public, and private) using tools and mechanisms understandable for digital nomads (e.g. “Genomic Electronic Card of Health”, “Passport of Health of the Family”) will result in new generations of digital nomads existing in safe and effective space.

Keywords: mental health; family; digital nomads; paradigm of health.

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FROM *MAPPA MUNDI* TO *LOREM MAPPA*: A RETROSPECTIVE OF MAP COMMUNICATION

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Abstract. Maps as a means of visual communication date as far back as humans were able to sketch locations in the dirt. This presentation will, however, begin in the Middle Ages with the iconic *mappa mundi*. It can be argued that the *mappa mundi* predates the earliest maps in its apparent dismissal of real world accuracy, the intent being to communicate a summary of medieval knowledge. We know, however, that maps have always served several purposes, figurative and literal, ceremonial and practical. Contemporary maps are no exception. Examples of map communication models dating from the 1950s will be used to illustrate that maps, regardless of media or method, have not changed in purpose. The term *lorem mappa* will be introduced as a moniker for electronic or Internet-based maps. These *lorem mappae*, whether interactive, dynamic, static, or network-based, all serve to communicate place-based information. In spite of the technological framework on which many contemporary maps are based, the *lorem mappa* and the *mappa mundi* are more similar as vehicles of communication than conventional wisdom might suggest.

Keywords: map communication; cartographic history; map visualization; Internet-based maps.

Introduction

Maps have always been a powerful means of communication. They have communicated knowledge, power and direction since the earliest humans used a stick to sketch places in the dirt. They represent human knowledge of the known world at any given time. Historically that known world was, by current standards, limited, but to those living in that limited world, it was vast. Their sketch maps represented what they knew of their environment. Very early maps such as those constructed in 4,500 BCE by the South Sea Islanders were practical, but highly schematic, representing patterns of prevailing winds and currents. During the Bronze Age, early Europeans sketched the dwellings, paths, waterways and hunting grounds constituting their environment.

Maps also represented power, either implicitly or explicitly. Implicitly, they represented power because those drawing the map had either the skill or the knowledge or, indeed both, to do so. This in and of itself is power; that ability, whether in the form of skill or knowledge, is not ubiqui-

tous. Maps could also be used to define power explicitly, communicating territorial rights, claims and acquisitions. Maps constructed for the purpose of communicating direction such as the location of particular ocean currents or hunting grounds, while seemingly utilitarian could also implicitly communicate knowledge and power. Consider the hunter who discovered the location of a particular hunting ground. He exudes power because he has valuable knowledge that he can either choose to share or not by communicating the location by sketching a map. He is, perhaps, admired and envied for his adventurous, intrepid nature at locating the hunting ground.

In addition to location information and assistance in navigating the unknown, maps have also had ceremonial and ritual applications. At no time was this perhaps more apparent than the Middle Ages. Thus, this retrospective will consider maps from the Middle Ages and the more contemporary maps of the mid-twentieth century through the present. The maps from the Middle Ages are used to represent early maps even though they are more sophisticated in terms of the permanence of the media than those of humans hundreds of thousands of years ago. Their purpose as vehicles for figurative communication has not, however, really changed since the earliest use of maps. I use medieval maps as a starting point because they are extreme in their representation of the world and examples are easily found. I end the retrospective with contemporary maps because I argue that map purpose has not changed. It has expanded, in the case of medieval maps, considerably beyond the purview of what was then the known world, but the purpose of maps is still to communicate, albeit in a greater variety of media and to a larger audience.

The *mappa mundi*

There are numerous examples of maps from the Middle Ages, known generally as *mappae mundi*, or medieval world maps. These *mappae mundi* date from about the fifth to the fifteenth centuries. While some maps from the Middle Ages were functional, such as the portolan charts used by mariners, maps of land were often more figurative. Some, although certainly not all, of these maps have been categorized as T-in-O maps because the main waterways formed what appeared to be a T in the midst of a circular O-shaped landmass. Jerusalem was typically located in the center with Paradise, or the Orient, located at the top. Europe was located on the left and the continent of Africa on the right. The Mediterranean Sea was the upright part of the T, while the Don River on the left and the Nile River on the right formed the crosspiece of the T. Surrounding the landmass was the river Oceanus.

It is, however, important to recognize that while general histories of geography and cartography have reduced medieval maps to this category, there is tremendous variation within this category and other categories of *mappae mundi* beyond the tripartite schema of the T-in-O map (Woodward D 1985). There were zonal perspectives of the world based on climate, which can be attributed to the writings of ancient Greek geographers. There was a quadripartite view that added an area inhabited by Antipodeans, or present day Australia and New Zealand, which was considered unknown due to the perception that the sun's heat was too intense for human habitation. There was also a transitional view of the world that reflected the profound change in perspective between the fourteenth and fifteenth centuries or the transitional years between the medieval and Renaissance periods. These maps, while still constructed in a circular frame, were based on the portolan charts used for maritime navigation (Woodward D 1985).

At the risk of perpetuating the uninformed nineteenth-century view of medieval maps, I will use the tripartite or T-in-O map perspective as representative of *mappae mundi*, in general. It is not that I want to portray medieval maps as simply static and a reflection of what tends to be perceived as an uninformed society. Rather I want to use them as an example of the intent to communicate the world with an acknowledged center, that is, a center acknowledged from the perspective of the map maker and his patron. This perspective, I will argue, has not changed. Even maps designed for the purpose of communicating airline distances, for example, are often centered on a particular location. Indeed, for distances to be proportionally correct from the point of interest and for all points on the

map to be at the correct direction from the point of interest, a map using an azimuthal equidistant projection must be centered on that location. While maps, then and now, were most likely created with the intent to communicate the center of the world as revolving around a particular place-based agenda, it is also likely that the map maker and patron recognized that Jerusalem or Sydney are not the center of the world, but a perspective from which to understand the world.

T-in-O maps varied in the details depending on where they were created. In the case of the Hereford *Mappa Mundi*, for example, the British Isles are visible in the northwest portion of Europe with local landmarks filling the land area. The remainder of the map was filled with drawings of Biblical references, including Moses, as well as creatures from mythology, such as Charybdis and Scylla. Known places tended to be represented by the divine, including images of Christ, God and the Saints, while unknown places were illustrated with demonic and fanciful creatures that reinforced the prevailing view that these places were considered “off the beaten path,” and should, therefore, be avoided. For the most part, these maps were not used for navigation, but rather represented a summary of deeds and public iconography (Woodward D 1987). Thus, these maps were first centered on the divine and then focused on the contributions of the local or what were perceived as local. Geometric accuracy was not the goal. Indeed, there is evidence to show that the information included was simply limited by the size of “the page.”

While geometric and geographic accuracy are now more often than not a key component of maps, the need to center them on “local contributions” has not changed. If anything, technology has made it possible to re-center the world with greater ease, the geographical and geometric accuracy following by default, as it were. I can now easily enter the coordinates of my location in Fredonia, New York, and create a geographically correct representation of the world centered on that location. Thus, the world revolves around me, so to speak, just as the world was communicated as centered on Jerusalem in the Middle Ages.

The map as a communication device

During the Middle Ages, maps were primarily created by illustrators or scribes who did not directly experience the areas they mapped. Instead, the information on maps was brought by travelers, pilgrims, explorers and soldiers, in the form of verbal descriptions that were translated, so to speak, by the illustrator into a graphic form. The illustrator or scribe was more often than not an artist rather than a cartographer. The role of the illustrator was to document geographical information, if not for the purpose of planning pilgrimages then certainly as symbols of secular and spiritual influence. Indeed, *mappae mundi* were often created as the introduction to manuscripts (Woodward D 1987). In much the same way that a table of contents serves to outline the contents of a book, so, too, did a *mappa mundi* provide an overview of what was to come in a particular manuscript. To a certain extent, we still create maps for this purpose. We want to assist the reader in visualizing the written word.

If the map communication model that became prevalent in the 1950s and 1960s is applied to the cartographic process of the Middle Ages, the illustrator is given the information verbally by the traveler probably in the form of an itinerary. It was up to the illustrator to put this itinerary in graphic form, thus creating a map. The map was most commonly included as a supplement to a manuscript. The “message” communicated to the manuscript reader was figurative in nature. Those reading the manuscript were not likely to engage in travel themselves, but use the map as a means to visualize the secular and spiritual world. Evaluation and feedback were not a specific goal in the process. For one thing, the production of a map was highly labor intensive; it was unlikely the illustrator would be available or willing to make changes to the map. For another thing, that was, again, not the purpose of the map. This was not a process of information-sharing in the sense that the illustrator shared the research and incorporated feedback to improve the accuracy of the final product. Instead, these maps were an end in and of themselves. The information was communicated and it was up to the map reader to interpret and make sense of it.

Norman Thrower, the noted geographer and cartographic scholar, defined a map as, “A representation, usually on a plane surface, of all or part of the earth or some other body showing a group

of features in terms of their relative size and position” (Thrower N 1996: 245). Such a definition can apply to a sketch map in the dirt as well as a map in a medieval manuscript and a map on the Internet. This definition does, however, suggest maps are accurate reflections of the world. We know this is improbable. A map is, instead, an abstraction of reality. We cannot truly represent the world around us. We are unable to see all that is there and, even if we could, why would we, when we could experience the world directly? Of course, the answer to that is that we cannot experience all places at all times, thus a map provides us with an abstraction, a selective reflection of another’s perception. Indeed, this selection is necessary or we would be overwhelmed by detail, or, in other words, overwhelmed by reality. For many of us, this is a satisfactory alternative to being there.

Beginning with the *mappa mundi*, or medieval map of the world, to what I will call the *lorem mappa*, or the contemporary internet map, maps have been one of many ways humans have communicated visually. Since the 1950s through the early 1990s there have been efforts to model the process of communicating through maps. Arthur Robinson (1952), among others, viewed the map as an example of graphicacy. Where literacy and articulacy represent communication through written and spoken language, respectively, graphicacy is the communication through graphic devices. Robinson and his colleagues compared the cartographic communication system to that of a typical communication system whereby there is a cartographer (encoder) between the real world (source) and the map (signal) and the map reader’s “eye-mind mechanism” (decoder) between the map (signal) and the use of the map by the map reader (recipient) (Robinson A & Petchenik B 1975; Robinson A et al, 1978). Thus, the cartographer was either given information or had information himself to be communicated. He would undertake the cartographic process, including generalization, symbolization and production (Buttenfield B 1995). Guelke (1977) concurred, but sought to stress a thorough understanding on the part of the cartographer of the phenomena to be mapped in addition to improving cartographic quality. “The goal of enhancing a map user’s understanding of reality cannot be achieved by cartographers ignorant of the phenomena they map. Before a phenomenon can be mapped effectively it must first be understood by the cartographer” (Guelke L 1977: 143).

Lech Ratajski (1977) saw the communication model of cartography as a useful starting point, but found that it did not address the change that occurs in the quality of information as it is transmitted, so to speak, from the real world to the map reader. Ratajski sought to mathematically model not just the loss of information, but also the efficiency of emission and ultimately perception. Equipped with this additional information, the cartographer is better equipped to create a map that will minimize information loss by maximizing the efficiency of emission.

Konstantin Alexeevich Salichtchev (1978) was critical of the communication interpretation of cartography because it did not take into account the “cognitive value of maps.” While he found it useful for the “perfection of map language”, he did not find it a sufficient foundation for explaining the cartographic process. As Guelke asserted and Ratajski suggested, Salichtchev stated categorically that the map reader’s interpretation of the map is as important as the components of the communication model.

More recently, that communication model of the 1950s and 1960s has come under further criticism for not taking into account the role of visualization (MacEachren A 1995: 3-11) and the inherent bias on the part of the cartographer (see for example, Wood D 1992 & Crampton J 2001). Tsou (2011) has sought to expand the traditional map communication model to reflect the proliferation of interactive web-based mapping. For him, the significant difference between traditional cartographic communication and interactive web-based mapping is the user interface, which provides the direct connection between the map user and the source of the data. Most recently, Tsou and Leitner (2013) have suggested a research framework that moves beyond the purely cartographic focus to one that considers the importance of place as the connection between time and information.

In terms of the role visualization plays in map communication, it is the unique ability maps, graphics, and images have to make spatial relationships particularly visible. MacEachren and Fraser Taylor (1994) use visualization to model a continuum rather than a separation between the map maker and the map reader, where the continuum varies depending on how the map is used. Their

Cartography Cubed (C³) model contains three dimensions ranging from private to public, highly interactive to minimally interactive and the presentation of “knowns” to the revelation of “unknowns”. All three dimensions can utilize the exploration process rather than just the product to be presented.

Arguably, those making maps have been engaged in visualization ever since the first map was sketched in the dirt with a stick. For the purposes of the Cartography Cubed model, there are, however, important differences. For contemporary maps in a new media environment, visualization refers to the added capabilities of interactive mapping software to explore data sets for spatial patterns, analyze spatial relationships, synthesize the results of an analysis, and present or communicate the new spatial knowledge (Kraak M & Ormeling F 2010).

By the 1980s and 1990s a post-modern view of the map was occurring that sought to deconstruct maps exposing their inherent bias as artifacts of power and selective knowledge. The work of J.B. Harley, Denis Wood, John Pickles, Michael Curry, and Matthew Eddy is, as suggested by Crampton (2001), a scholar of critical cartography himself, largely representative of this perspective of “maps as social constructions”. (Perhaps not coincidentally, this was the time computers began to be used more and more to make maps; the notion that anyone could make a map triggered a critical view of maps as a means of communication. The power was no longer in the hands of a few.) Merely viewing maps as a means of communication obscured the potential underlying bias of the map and the map maker. In other words, can maps be analyzed as “politicized documents”? (Crampton J 2001) This point of view does not necessarily remove the communication component of the map, but it is a more nuanced and critical view of maps. Maps should no longer be viewed as objective end products (Wood D 1992). So, in a sense, we should view contemporary maps as subtle (or perhaps not so subtle) vehicles of propaganda. Just as the Hereford *Mappa Mundi* had an overt agenda, so, too, does a contemporary map have, at least, an underlying one. That agenda is, necessarily, rooted in cultural, historical, and political interests.

The *lorem mappa*

At this point, I would like to introduce the concept of the *lorem mappa*, which I have chosen to loosely mean an Internet or electronic map in the parlance of the Middle Ages, were such things in existence then. The *lorem mappa* would include any electronic maps whether accessible on the Internet or not. Thus, a *lorem mappa* could be a map viewed in a stand-alone desktop software package, such as QGIS or CartoDB, for example. The challenge may be, then, that the variety of maps has increased dramatically, making it difficult to apply a single model to all.

There are desktop software packages that can be used to create maps privately and then shared publicly. There are online web map services that are highly interactive and allow the private creation of maps. Some map services act as navigation aids while others facilitate the visualization of tabular data and narrative descriptions. Just as traditional print maps created for presentation do, they all endeavor to communicate information, but, as the Cartography Cubed model offers, there are differences in the extent to which the map reader is also the map creator, the extent to which visualization is employed, the extent to which known and unknown information is revealed, and finally, the extent to which any of that information is shared. Regardless, all of these map services are increasingly capable of providing their users with cartographically responsible options in terms of design in the form of visual variables, data classification, symbology, and generalization, among others. From a post-modern perspective the same underlying issues regarding cultural, historical and political influences are evident. The choices available to users of these services are limited. Thus, users are forced to design their maps within the confines of limited color, projection, classification, scale, and style, among other choices. Even when operating within those confines, the resulting map takes on the values of the user, whether consciously or subconsciously.

To accommodate the proliferation of interactive web-based mapping as a communication, a variation on the original communication model has been suggested (Tsou M 2011). This model em-

phasizes what is termed “near real-time feedback”, whereby the map that is created is an amalgamation of the data provided by the database, the mapping utilities available in the web map server, the interface for the data and the utilities, and finally, the decisions made by the user. This model allows for the user to change his or her mind at every step along the way. There is no need to wait for a new map to be designed, drafted and published. The web map server and browser components facilitate the visualization. Thus, depending on the user’s decisions, the user can choose to present or explore data either privately or publicly, interacting with it based on the visualization tools.

Discussion

The challenges for making sense of maps given the increasing array of new media available to us are exciting to some in terms of the options available to us, yet daunting to others in the potential for the proliferation of self-centered or agenda-centered views of the world. Just as maps were considered as vehicles for religious dogma in the Middle Ages, so too can contemporary maps be considered as vehicles for furthering biased agendas in the guise of an electronic map. Maps, just like the written word, are often accepted without question. Just because spatial information is displayed against the backdrop of what appears to be a geographically and geometrically correct base map, does not mean that information is accurate or free from bias. Esri’s Story Maps (*story-maps.arcgis.com*), for example, are arguably modern versions of the *mappa mundi*. They are constructed around the specific interests of an individual or organization. The map maker is free to choose from a variety of base map choices and then upload geotagged images and data for display. The resulting maps may be shared widely or kept private. The images, for example, may include pictures of people without their consent, thus, potentially, invading their privacy. In addition to the potential for conveying dubious information, there is also the potential for harm by communicating an individual’s location at any given time.

Is there a model that best represents the myriad formats in which map information can be communicated? Or, has map communication become so complex in the context of new media that there are limitations to the sense that can be made of maps? Is a new research framework emerging in which maps are considered along with machine learning, computational linguistics, data mining, and so on as components of knowledge discovery in cyberspace? (See for example, Tsou M & Leitner M 2013.) It would seem to me that such a research framework does not dismiss or minimize the role of communication of maps, but rather strengthens their exploration and research capability. Such an interpretation fits neatly into MacEachren’s and Taylor’s Cartography Cube. If anything, it can be argued that maps are more important than ever in communicating place-based information and that new media provide the dynamic ability to present real world change in real-time.

Conclusion

It is easier now, more than ever before, to manipulate the world around us through new media. Our need and craving for information about the world around us has not changed, nor, fundamentally, have the role maps play. What has changed is the ubiquity of maps and the ease with which they can be created. Although there are still barriers to access, the relative ease with which maps can be created and accessed behooves us to be more critical in terms of communication effectiveness, map maker bias, potential audience, and level of interactivity.

Regardless of whether maps are presented as sketches in the dirt or on cave walls, as elaborate illustrations on animal skins or papyrus, or as pen and ink on paper or as digital displays, maps are still used to communicate. Just as a verbal message can be laden with fact or fiction and everything in between, so too can a map. The critical eye with which maps should be created and used is no different from that which should be used when considering information of any type.

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NOMADIC LIFESTYLE IN THE NETWORK SOCIETY: SOCIOLOGICAL ASPECT

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Abstract: There is a need to fix the consequences of those changes which became the result of the Third Industrial Revolution due to the rapid technological development; these changes actually act as determining factors for the onset of the Fourth Industrial Revolution. The attempt to link the explored transformations, which are in fact the features of the new type of society, usually called post-industrial, information, and network, with the typical characteristics of traditional, pre-industrial societies, is of a particular interest. As Bauman pointed out, "Throughout the solid stage of the modern era, nomadic habits remained out of favor... In the fluid stage of modernity, the settled majority is ruled by the nomadic and extra-territorial elite...", and nomadic life takes revenge over the principles of territoriality and settlement (Bauman, 2000). So, one of the transformation features is return to the nomadic way of life. Digital nomads, possessing the same characteristics as traditional nomads, should have a specific set of handheld mobile devices, as well as continuous access to the Internet. It is necessary for maintaining a comfortable nomadic lifestyle in today's network society. A specific quality of contemporary nomads is collecting, storing and processing the data, as well as sharing and filtering the information. Network becomes the subject of inquiry by various scientific disciplines, because network is a basic characteristic of modern society. The concept of network is used as a metaphor to describe the new social quality, and as a special methodological research tool. Application of the network concept is usually associated with a set of constraints dealing with different meanings of the term "network". This paper aims to compare various characteristics of traditional and network societies, and analyze different interpretations of the "network" proposed by the network society research.

Keywords: digital nomads; network; post-industrial society; traditional society.