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Abstract

It is common practice to consider global space a coherent entity that naturally contains social practices and provides the stage for actors of global politics. Yet, such a view ignores the social process of establishing a global space as a framework for other social practices. This paper suggests that an analysis of cartographic practices is key to understand the historical formation of spaces. Drawing on Bruno Latour, I show how the globe has been assembled through cartographic practices in Europe from 1450-1650. I trace how the emerging discipline of cosmography transformed knowledge of the world, and how the Spanish attempts to map the world during the 16th century put in place a system to cartographically establish a new reality of global space. Finally, the paper focuses on how the world was published by Dutch map makers which disseminated this novel global reality and, in effect, made it mobile. This leads to the conclusion that the global map preceded, and assembled, the globe as a unified abstract space enabling the expansion of European political and economic practices.

> You compress the immense structure of land and sea into a narrow space, and have made the earth portable, which a great many people assert to be immovable[1]

Introduction

Such were the words of a satisfied customer in possession of Abraham Ortelius' Theatrum Orbis Terrarum, first published in 1570, and generally held to be the first atlas of the world. The accomplishment of Ortelius links up well with the purpose of this paper, which is to show how the global map preceded, and assembled, the globe as a social space; or in other words, how the globe has been constructed as a unified single space through cartographic means. This argument counters a general trend of taking global space for granted as a natural space that both frames social relations and also provides a surface - or a stage - on which social actors perform. In this view, space is something we can travel across (see Massey 2005: 4-8) or something that provides an obstacle to movement which can be overcome through technological feats. However, most importantly, for my argument, is the understanding that the globe is a natural object which provides the frame, and therefore the limit, for social practice. Conceptualised in this fashion, the globe provides a natural unity to a global humanity - or a social totality - which does not have to be questioned or investigated, and therefore it provides a natural reference for politics.

In most claims to a postmodern globalisation looking to the future, and most often in historical sociological accounts of how we came to be living in the world of nation states, the globe is taken to be a natural outer sphere demarcating humanity, homo sapiens, in general. Yet, contrary to this, I wish to argue that we need to grasp the historical process of how global space has been integrated as a single unified space within which European empires and a burgeoning capitalism could expand. To focus solely on the political and economic practices with an expanding dynamic in order to understand globalisation historically, ignores what enabled these practices in the first place. The main purpose of this paper, therefore, is to point to the effect of cartographic practices in producing space in a specific way which allowed other practices to unfold. In effect, I argue that to regard global space as a natural frame simply waiting to be conquered and united by European empires and capitalism ignores how it was a prerequisite for global social practices to establish knowledge

of space, a reality of space, for these other practises to be feasible. It was thus not capitalism in itself which unified the globe but cartography.

The argument is based on two components. First, a specific understanding of the relationship between cartography and the concept of space, which is derived from the French sociologist Bruno Latour (primarily 1987; 1999). Based on his writings I argue that in order for a phenomenon to be real, it has to be fabricated as an autonomous thing. As a knowledge technology, scientific cartography[2] serves to unite a myriad of sites, places, features of the landscape such as mountains, coastlines, etc into a coherent phenomenon: geographical space. By implication, cartography is not considered an issue of a representation performing a certain image of something that already exists. Instead it is considered as something that assembles, fabricates and put together a phenomenon in a circulating process between humans and nonhumans. As a phenomenon, space does not occur in the sudden encounter between space as 'a thing in itself' and categories of human understanding. Through the study of cartography, therefore, we can trace the agency and processes involved in establishing a spatial reality, and, in effect, change in the theory and practice of cartography will transform the reality of space. Hence, space is fabricated but should nevertheless be treated as 'relatively autonomous' in order to capture how space is not only a product of social practices but also a constraint and condition of social practice (for further elaboration, see Strandsbjerg 2008a; Strandsbjerg 2008b). Second, the argument is supported by a historical exposition of the practices of global mapping in early modern Europe. This illustrates the dynamics and practices involved in unifying the globe and the implications these had for contemporary political practice.

This historical material has also been investigated in writings such as Denis Cosgrove's *Apollo's Eye* (2003) and Jerry Brotton's *Trading Territories* (1997), and while I draw on the material and arguments provided by these accounts, the implication and conclusion differs. Brotton emphasises the trading impulses fuelling cartographic practices, and how cartography served specific pecuniary interests, Cosgrove's constructivist approach investigates "the historical implications for the West of conceiving and representing the earth as a unitary, regular body of spherical form" (2003: 7). Instead of seeing cartographic practices as derived from, say forces of capitalism, I seek to maintain a relative autonomy of cartography in order to highlight the effect that novel spatial fabrications had for political practice. On the wider implications of the argument, this paper shows how the emphasis on

the cartographic unification of the globe provides an analytical grasp of global space which avoid the predominant divide between a subjectivist and objectivist understanding of space. Space is something real and physical but at the same time it is something fabricated. This means that space can be established as a seemingly static unitary framework without necessarily being so. While analysing such a historical formation it is important to stress the conditions of such a spatial framework. It was only through the ability to make different places mobile and combinable in the shape of spatial data that it was possible to construct such a single space. This is to say, that it was due to the cartographic ability to make places mobile that it was possible to construe a static unified global space.

In order make this argument, the paper begins with the increasing global rivalry between Portugal and Castile that rendered the globe a political space during the European Renaissance. Subsequently, it is emphasised how a historical transformation of cartography in Renaissance Europe served to alter the reality of space, and hereby providing novel conditions for European expansion. I discuss the epistemic transformation of spatial knowledge encapsulated in the growing discipline of Cosmography that enabled the reality of the world to be established as a global space. Narrowing the focus, I then turn to the specific agency of assembling the globe, here exemplified by the imperial Spanish map projects *Padron Real* and *Relaciones Geográficas*, and the techniques employed to master space for the sake of establishing an empire. This includes a discussion of the power of representing the world according to the principles of scientific cartography and I focus on the epistemic encounter between different map cultures as well as questions of authorship of the world. Finally, I discuss how the global representation was completed by publishers such as Abraham Ortelius and his atlas *Theatrum Orbis Terrarum* which typifies the novel world that became a global standard.

Global Unity

It is common to perceive of a global space as the natural framework of a human totality. Eric Wolf, for example, illustrates the problematic trend nicely through his central assertion that the world of humankind is a manifold totality and those analyses that split this totality into bits, without proper re-assembling, "falsify reality" (1990: 3). He emphasises that humankind has always lived in one world and points to global production systems, such as the Dutch in

the Bengal, and states that: “Europe learned to copy Indian textiles and Chinese porcelain, to drink native American chocolate, to smoke native American tobacco, to use Arabic numerals” (Wolf 1990: 3-4). Drawing on Karl Marx, Wolf asks whether we can envisage a common dynamic of the connections and yet maintain “a sense of its distinctive unfolding in time and space as it involves and engulfs now this population, now that other” (1990: 19)? His answer to this question is, of course, positive. He argues that to understand this world, “we must begin with geography. A map of the Old World reveals certain physical constants” (Wolf 1990: 25) such as mountains running east-west across the Eurasian landmass. The problem with this approach is the prevalence of ‘physical constants’ and the main assertion of the totality of humankind and the singularity of the world as a fact, rather than as something that itself has to be explained historically. This is to say that space is taken outside ‘the social’ and appears as a constant background whose shape and size has some causal effect on the formation and modality of social relations. One might want to argue that ‘well, of course, but really, we know that the world is like we represent it today’, but this, I would suggest, is genuinely problematic. We have to ask what it tells us about social life that the world is round and limited and thereby can be said to delimit all that exists on it. This notion of natural space, as a stage on which life occurs, neglects the social processes which have been involved in producing this stage itself. If space is a social relation, then a notion of social totality can no longer rest on a notion of natural spatial unity as an ontological fact.

Turning the Globe Political: the Treaty of Tordesillas

Walter Mignolo has argued that during the fifteenth century the notion of Europe came to be understood as a geographically located Christian republic, and universality was thus increasingly understood as a spatially bound phenomenon (1995: 326). This signalled a process of spatial delimitation which challenged medieval notions of universality. With the defeat of Constantinople, and what remained of the Roman Empire, it was no longer clear where ‘the universal empire’ was. Spain, under the Habsburg monarchs Charles V and his son Philip II, pursued ambitions of a global world empire until Philip’s death at the end of the sixteenth century. The Ottomans also pursued imperial dreams. In 1466, Mehmed the Conqueror received a letter from a Greek scholar telling him that: “No one doubts that you are the emperor of the Romans. Whoever holds by right the center of the Empire is emperor and the center of the Empire is Constantinople” (quoted in Brotton 1997: 92). Not only did the

Ottoman conquest introduce a challenge to the relationship between empire and a universal Christianity, it also affected trade patterns in and around the Mediterranean. In effect, the Ottomans came to control, or mediate, much of the lucrative trade with Asia and this provided an incentive for the West European rulers to seek alternative trade routes.

As a consequence, both Spanish and Portuguese rulers were in competition with each other seeking to establish and control westward trade routes along the west coast of Africa and the Atlantic islands. In the 1450s, Portugal claimed a monopoly on the Guinea trade on the grounds of being the first to have discovered these places and having received Papal bulls granting this right (Parry 2000: 134). A subsequent war of succession between Spain and Portugal was resolved with a treaty which mirrored the way in which space was divided resulting in a politicization of the globe. The Treaty of Alcaçovas in 1479 contains a general demarcation line dividing the contested areas in Atlantic and East Africa into a Spanish and a Portuguese sphere. Portugal maintained its dominance at sea and Spain refrained from interfering in the Guinea trade. The division produced by this Treaty had implications that led to the Treaty of Tordesillas between Portugal and Spain from 1494 which settled an abstract boundary dividing the world into a Spanish and a Portuguese sphere where they could respectively claim possession.

The event that triggered the Treaty of Tordesillas was Columbus' expedition to Americas. Returning from the first voyage, Columbus' fleet was forced to seek shelter in a Portuguese port in the Azores as a consequence of adverse weather conditions. Being suspicious of Columbus' voyage, the Portuguese authorities laid claim to his discoveries under the Treaty of Alcaçovas (Parry 2000: 151). In response, Spain sought Papal support and received it. Four bulls were issued by the Pope, and the third – *Inter Caetera* – drew a boundary line that laid the foundation of the Treaty of Tordesillas ratified the subsequent year (Parry 2000: 150-152). In this Treaty it was agreed:

> that a boundary or straight line be determined and drawn north and south, from pole to pole, on the said ocean sea, from the Arctic to the Antarctic pole. This boundary or line shall be drawn straight, as aforesaid, at a distance of three hundred and seventy leagues west of the Cape Verde Islands, being calculated by degrees […]. And all lands, both islands and mainlands, found and discovered already, or to be found and discovered hereafter, by the said King of Portugal and by his vessels on this side of the said line and bound determined as above, toward the east, in either north or south latitude, on the eastern side of the said bound provided the said bound is not crossed, shall belong to, and remain in the possession of, and pertain forever to, the said King of Portugal and his successors. And all other lands, both islands and mainlands, found or to be found hereafter, discovered or to be

> discovered hereafter, which have been discovered or shall be discovered by the said King and Queen of Castile, Aragon, etc., and by their vessels, on the western side of the said bound, determined as above, after having passed the said bound toward the west, in either its north or south latitude, shall belong to, and remain in the possession of, and pertain forever to, the said King and Queen of Castile, Leon, […], and to their successors.[3]

This text is significant for a number of reasons. First, it renders the whole world a space for Spanish and Portuguese expansive trade and conquest – even those places that are as yet unknown. Second, it divides this world according to an abstract line of longitude that does not take into account what already exists in those places that might fall under the auspices of the Spanish or Portuguese crowns. Thus, being based on an abstract knowledge of space, depicting the world as an empty globe where all places can be located according to the grid of latitude and longitude, the Treaty also pre-empts future controversies over spatial possession as authority over new land will simply be a matter of location within the matrix. In this respect it was already decided that Brazil would belong to the crown of Portugal even prior to its 'discovery' in 1500, and it was thus the Treaty based on a cartographic reality of the world that came to decide 'the reality on the ground' and not the other way around. Therefore, in the years to come, legitimate claims to possession became inseparable from determining the location of longitudes and latitudes and deciding the location of coastlines and islands.

The Tordesillas Treaty stands as maybe the first genuine example of how a political boundary originates in a map or rather, in a carto-scientific representation of space which, in consequence, plays a performative role in shaping the world. Politics no longer primarily corresponds with socio-political relations, or 'the reality on the ground', but corresponds instead with a reality derived through cartographic means. To exemplify, in 1515 a group of Portuguese were imprisoned for having violated Spanish rights by landing on the Cape St. Augustin of Brazil, but controversy arose as it was not actually known where this cape was located in relation to the demarcation line. Although the boundary was known, it constantly had to be assessed when confronted with events that turned locations into contested sites. Though, as long as things remained within the framework of Tordesillas, the solution had been rendered a technical one rather than a political one. In response to this particular problem, a 'junta' (of scientists and experts) was assembled to determine whether the Cape St. Augustin was on the Spanish or the Portuguese side of the demarcation line (Lamb 1974: 53). It should thus be clear how the cartographic conventions of the map decided and preceded territorial divisions in practice.

Turning the Globe Political: the Treaty of Saragossa

Despite the simple principle being cemented by the Treaty of Tordesillas it did not last long in its original form. As the boundary was drawn from 'pole to pole' on a two dimensional map it did not take into account that the earth is round. What happened if Spain sailed west and continued? The primary motive for exploration was trade – especially in spices, and the most valuable locus was the island group of the Moluccas in contemporary Indonesia. The Portuguese reached these islands in 1515 by sailing east, which was only six years before a Spanish fleet encountered them (Destombes 1955: 66). When Magellan's expedition reached the Moluccas in 1521 by sailing west, it disrupted the settlement of the Tordesillas Treaty because both countries could now claim the right to the island under the settlement of this Treaty. It therefore became necessary to decide where the demarcation line would run on 'the other side of the earth', and thus make clear whether the islands were within the Spanish or the Portuguese sphere. To reach an agreement, negotiations commenced between representatives of the two governments during the 1520s.

These negotiations introduced the globe as a tool for international politics. Two delegations were launched from the respective sides, and they presented a large collection of maps and globes in order to support their claim to the disputed islands. Prolific cartographers such as Diego Ribeiro, who had been greatly involved in planning Magellan's journey (Brotton 1997: 133), and the Reinel brothers on the Portuguese side featured among the delegates. One of the key disputes was the size of the earth as the length of the Pacific would decide whether the islands would fall on one side or the other. Despite their collective expertise, it was not possible for the cartographers to decide 'scientifically' where the demarcation line should run. In the end, the fact that the westward journey to the Moluccas was untenable for the Castilian crown as the journey was too long and arduous to be profitable probably played a significant role for the outcome of the negotiations (Brotton 1997; Parry 2000). Eventually, an agreement was reached and the Treaty of Saragossa was ratified in 1529. In this, Charles V gave up his claim to the islands in return for compensation that amounted to 350.000 gold ducats. The Spanish throne also negotiated a clause that allowed the settlement to be renegotiated if new geographical evidence should occur that would support the Spanish claim (Brotton 1997: 136). The agreement was tied up in a map, which had to be recognised by both sides, and "[t]his chart shall also designate the spot in

which the said vassals of the said Emperor and King of Castile shall situate and locate Molucca, which during the time of this contract shall be regarded as situated in such place" (quoted by Brotton 1997: 137 from Davenport 1967).

The fact that globes were introduced to represent spatial knowledge on which to base the negotiations underlines how the entire globe was becoming a reference for politics between European states and, further, how geographical knowledge was becoming of prime significance to politics. The determination of longitude was no longer only a matter of navigation but rather a matter of solving political disputes over land. Interestingly, Portuguese naval charts started to show scales of latitude from circa 1500, but scales of longitude did not appear until the dispute arose over the Moluccas 20 years later (Destombes 1955: 76). The conclusion which can be drawn from this is that with the treaties of Tordesillas and Saragossa, the globe was becoming political, and politics commenced referring to a cartographically derived global space. The question that now poses itself is whether, and how, this new carto-global politics emerging during the negotiations between the two Iberian powers became universalised – or made global in itself.

Transforming Knowledge of Global Space

Ptolemy's *Geography* was introduced in Florence in around 1400 and its translation into Latin was completed within a decade (Skelton 1965: 35). This marks the symbolic beginnings of what Mignolo calls a cartographic revolution in Europe (Mignolo 1995: 219-258). What is remarkable about this new cartography is that according to its own principles it becomes a universal tool producing universal knowledge separated from social symbolic significance. In practice, of course, this cartography was spatially particular, claiming to produce universal knowledge about space, but according to its own principles it was universal and was not constrained by anything but the rules of geometry and the problems of assembling and coordinating data. Where the Christian *mappaemundi* has obvious links with a particular culture, the modern map has less visible links or origins, precisely because it is emptied of explicitly symbolic value content. Most non-geometric modes of map-making are centred on the symbolic 'capital' within the world that is represented. In contrast, scientific cartography has no pre-defined centre.[4] Thus, the science-cartographic revolution in Europe, in a sense, emancipated space from the Christian biblical doctrines and made possible the geometrical

projection with no pre-defined centre. In subsequent sections, I will discuss Mignolo's suggestion that the cartographic revolution in Europe entailed a geometric rationalisation of space which, in effect, detached space from ethnic or social substance. It is thus important to emphasise that scientific cartography not only claimed to be a universal science of space it was also applicable everywhere because of its geometrical rationale. This does not, however, mean that it was value-free or should be viewed independently from the social practices in which it was embedded, and should not be seen as a linear visualisation.

The Cosmographic Globe

Where the globe was put to another use, and achieved a novel significance for politics, it was also produced in a different way. The image of the globe was not an invention of the Renaissance, but the 'practical use' to which it was put represented a significant transformation. In preceding periods, the globe had been adopted to signal universality, and as a symbol of power. In the first century BC, the globe was adopted by Rome to signify empire and, with the addition of a cross, was later adopted by Frankish and German emperors (Cosgrove 2003: 11). By the twelfth century the study of an ordered creation was put on the curriculum at the new universities being founded in Europe, and the global map (the *mappaemundi*) conveyed a synthesis of Aristotelian natural philosophy, biblical authority and a growing portion of spatial data brought back to Europe by crusaders and other travellers (Cosgrove 2003: 69-71). However, as argued above, there was still no agreed global geopolitical space in the opening years of the sixteenth century and this lack, according to Cosgrove, "was a consequence of the mode of its representation" (2003: 85).

However, during the Renaissance the study of geography arose to a pertinent role with cosmography laying claim to be the most fundamental science in the sixteenth century (Cosgrove 2003: 118). How significant geography was considered in relation to general learning is illustrated well by this rather immodest opening by the Florentine scholar Francesco Berlinghieri in his translation of Ptolemy's Geography:

> How many [disciplines] are affected by the delay of this great work, which takes into full view the whole earth. It feeds not only military art but also philosophy, scripture, history, and poetry. The sweet life of agriculture, medicine, and art that animates the love of nature in the human breast. In sum, no greater need have our faculties than knowledge of the earth (quoted in Cosgrove 2003: 108).

The scheme which was put forward by the Ptolemaic geography was one that played into a notion of a singular world divided into political particulars. It not only involved the use of geometrical perspective that came to inform the representation of space, it also involved a distinctive approach between cosmography, which was concerned with the entire known world on the one hand, and chorography which was concerned with particular places (Mignolo 1995: 281). Within the same epistemic framework, then, we get two levels of analysis: the globe as the entirety on the one hand and, on the other hand, the concern with the mapping of particular places.[5] The word 'cosmos' comes from Greek and signifies order so Cosmography was about bringing order to the world. In its task, cosmography was future oriented as it aimed to complete an unfinished image of the globe (Lestringant 1994: 3) in contrast to medieval cartography which was more concerned with the historical past. The drawing of the world during the Renaissance represented thus a preoccupation with establishing a (new) spatial reality.

Martin Waldseemüller's *Cosmographiae Introductio* from 1507, for example, made a break away from the tri-continental world image of medieval geography by adding a fourth continent to the old world (Cosgrove 2003: 97). He named it after Amerigo Vespucci who was thus given the honour of having discovered the 'new world'. Later, Waldseemüller realised his mistake, but by then it was too late and the name America had been established for good (Thrower 1999: 71). Waldseemüller's world maps became hugely popular and influential as they represented the new perspective on universality now that the *oikumene* was being enlarged and coincided with the terrestrial sphere (Lestringant 1994: 24). Consequently, cosmographical studies established the mapped globe within a greater celestial scheme as the universal sphere for human activity. In the words of Lestringant, the "hypotheses of cosmography supposed a full, global world with no other limits than the celestial orb that, projected onto it, formed its poles, regions and zones" (1994: 12). Defining the framework in terms of the globe, the image was gradually improved and 'completed' with the data collected by navigators and travellers which was combined with the classic textual inheritance.

Establishing Space

Under the cosmographic scheme, the global image had to be constantly updated as new data rendered old representations untenable. In establishing the new reality of space, experience became the predominant authority as cosmography brought together the practical experience

of the sailor, or the navigator, with theoretical knowledge of geometry (Lestringant 1994: 104-5). However, as Cosgrove argues, a tension remained between the authority of the classical texts on the one hand, and the constant flow of new data based on experience on the other:

> Sixteenth-century cosmographers found themselves stretched epistemologically between the fixity of an Aristotelian cosmos and the rapidly differentiating terrestrial surface, forced to negotiate and regulate disparate and disconnected strands of text, commentary, and eyewitness accounts that moved across information networks controlled by powerful political and commercial interests (Cosgrove 2003: 100).

The cosmographers gathered and reconciled a large amount of disparate geographical descriptions within an overall theoretical framework and, at the same time, navigated between various political and intellectual interests. The establishment of a new reality of space had, to a large extent, become a practical exercise in which the cosmographers' studies – echoing Lestringant's description of André Thevet's 'atelier' – became centres of accumulation albeit, primitive ones.

A 'centre of accumulation' is a term introduced by Bruno Latour to describe the place where scientific knowledge production 'starts' and takes place. These centres can become centres of accumulation if all connections conspire towards the same goal: "a cycle of accumulation that allows a point to become a *centre* by acting at a distance on many other points" (Latour 1987: 222). In *Science in Action*, Latour uses Lapérouse's scientific expedition in the late eighteenth century as an example of how the significance of 'the expedition' is not primarily to discover new lands, but to bring them 'back home' in terms of knowledge that will allow a return to the place in question (Latour 1987: 217). The centre performs the role of a 'hub' in which disparate traits of knowledge are assembled and ordered into a whole and from where a new expedition can be launched. Assembling knowledge in this way is all about the possibility of *coming back*. This enables people who have the accumulated knowledge to be able to send expeditions out to places, of which they have no personal experience, and be reasonably confident of the expeditions arriving at these places and returning home. Furthermore, this spatial knowledge would emancipate 'the expedition' from dependence on local guides on whom they would otherwise have to rely in order to get to their destination.

Moreover, the key issue concerning the ability to come back is that 'action at distance' becomes feasible. This means that those in the centre are able to plan, and act at a

distance, on locations where they have not necessarily been and from where people are not necessarily able to reach the centre. And 'acting at distance', Latour argues, requires that somehow places are brought back to the centre. This is done by a) making them mobile; b) keeping them stable; c) making them combinable (Latour 1987: 223). Hence, places, lakes, hills, and other geographical features have to be rendered mobile in order to constitute a whole. And this is, according to Latour, what cartography does. Captured by scientific cartography other worlds were rendered mobile, taken 'home', combined with other worlds, and hence an accumulation of spatial knowledge was able to take place. This was done by the sixteenth century European cosmographers and, even though it was done in a less sophisticated and controlled manner than by the eighteenth century scientific enterprises, their studios can be considered 'centres of calculation' in which knowledge is accumulated.

The French cosmographer, André Thevet, is credited with making the most ambitious attempt to unify expanding oceanic knowledge into a single image of the terraqueous globe of his time (Cosgrove 2003: 99). The centre of calculation was Paris where he was working as the royal cosmographer to the last Valois king, Henri III of France. His work was based on a literal reading of Ptolemy, which he combined with a large amount of chorographic accounts in order to produce a complete picture of the world. Working under the auspices of the French king, he tied his scientific enterprise to the state, and his aim was, to quote Lestringant, to "transform the intellectual and symbolic possession of the world into a military conquest of it" (Lestringant 1994: 16). Nevertheless, as his cosmography was based on an unsystematic *bricolage* of sporadic knowledge and various ancient sources neither he, nor the state, controlled the input of knowledge and the end product was therefore less systematic than later projects, yet, still the traces of the standardised processes of knowledge production are visible. These examples illustrate how the belief that space and time exist independently as a frame of reference *inside* which events occur "makes it impossible to understand how different spaces and different times may be produced *inside the networks* built to mobilise, cumulate and recombine the world" (Latour 1987: 228). In other words, the events we discuss do not take place inside space, on the contrary, space is generated inside the observatory, or the atelier, of the cosmographer. As we shall see in the subsequent section, both the Spanish and Portuguese leaders engaged in more controlled attempts to produce a fully global image of space following the years after the Treaty of Tordesillas; an exercise

described by Cosgrove as ‘oceanic globalism’ which “altered both Europe’s imperial vision and its constructions of humanity” (Cosgrove 2003: 80).

Assembling the Globe

It is a common belief that Columbus’ voyage proved that the world was a globe. He did not. What he did was to find a continent that was (maybe) unknown in his world. [6] The empirical proof that the world was indeed a global sphere was not provided until the circumnavigation of Magellan’s fleet during the years 1519-1522, and even prior to that, only few disputed that the world was spherical.[7] The disputes that Columbus faced prior to his first voyage concerned the size rather than the shape of the earth. Curiously, he was in fact wrong by underestimating the size of the earth by ca. 20% in the face of critical arguments bearing on a more accurate calculation of the size. It was, thus, Columbus’ good fortune that he – unknowingly – encountered a new continent to cut his journey short.

Columbus’ geographical ideas regarding issues such as the expected length of the voyage and the location of the Asian countries are reflected on the oldest surviving European globe completed by Martin Behaim and his team in 1492 (see figure 1). Both drew on similar geographical sources (Harley et al. 1990: 53) and Behaim was familiar with the latest Portuguese travels along the African coast. He thus presented current knowledge, and it is clear that Columbus did not set out to navigate a blank or unknown space. On the contrary, if Harley is correct in his argument about converging knowledge between Behaim and Columbus, the latter would have had a fairly clear idea of when he would encounter Japan (Harley et al. 1990: 53).

Figure 1. Behaim's 1492 globe. Reproduced from BNF (1999).

This globe was commissioned in 1490 and, although being completed simultaneously with Columbus' voyage, there was a clear global image in place prior to the globalisation of navigation, trade and conquest. Even though, it was not immediately recognised that an unknown continent had been found, the encounter with the Amer-Indians in itself shattered the established division of the world into three parts with their respective races. However, it was not only Christian cosmological conventions that were challenged; the recently (re-) discovered authority of Ptolemy would also have to be amended in order to make space for a continent that no template had previously allowed for. Direct experience and observation thus became the sources of assembling a new knowledge of the world. The requirement to keep up-to-date with continuous expanding geographical horizons in the Americas was a central challenge. As has been discussed, the ability to return was key, and in order to do that, both the Spanish and Portuguese governments established centralised agencies to produce master maps of their respective overseas empires. This was a matter of filling in the unknowns and correcting the content of the abstract global image. Not surprisingly, mapping initially focused on coastline mappings, thus drawing the contours of the discoveries. Subsequently, more orchestrated efforts would be made to 'fill-in' the contours by establishing topographical knowledge of the claimed territories.

The *Padron Real* (Drawing the Framework)

Both the Spanish and the Portuguese authorities established institutions to keep track of the new spatial knowledge very soon after the settlement of Tordesillas. As the globe had been politicized it was urgent for both sides to obtain as accurate an image as possible. In response they both established 'master maps' which assembled all the disparate pieces of information that had been obtained, primarily, from returning captains. The *Padreo Real* and the *Padron Real* were, respectively, the master charts of the Casa de Mina in Lisbon and the Casa de Contratación in Seville. Through these, the two crowns sought "to keep knowledge of new discoveries within the control of the state and to ensure the standardization of knowledge, so that errors and inconsistencies among charts could be eliminated and they could be revised and updated as new discoveries were made" (Turnbull 1996: 7). Hence, it was an attempt by the state to create a centralised knowledge framework which would allow pilots, by their own means, to return to any location which had been discovered, and to ensure that this framework was regularly updated.

The *Padron Real* consisted of "a large world map and of a book of charts of considerable size covering specific routes" (Lamb 1974: 57). It was managed by the Casa de Contratación (House of Trade), which was established in 1503 to control Spanish overseas trade and colonisation. In effect it worked as a department of government responsible for, amongst other things, commerce, a school of navigation, and a hydrographic bureau (Haring 1964: 32). The latter was established in 1508 and the person giving name to America, Amerigo Vespucci, was the first 'pilot major' responsible for the *Padron Real*. Partly to remedy the problem of poor duplicate maps being sold in the Spanish ports, Amerigo Vespucci was instructed to create an official master map to minimize errors (Haring 1964: 306). David Turnbull quotes Vespucci's instruction at length:

> We command that a Padron General be made and, so that it should be more accurate, we command our officials of the Casa de la Contratación that they assemble all our pilots, the most skilled captains at the time, and that the said Amerigo Vespucci, our pilot major being present, a padron of all the lands and islands of the Indies hither to discovered and belonging to our kingdoms and seignories be drawn up and made…when they find new lands or islands or shoals or new harbours or anything that should be recorded in the said padron real on their return to Castile they to report to you the said pilot major of the Casa de la Contratación so that all shall be registered in the proper place in the padron real, in order that navigators be better advised and cautious (quoted in Turnbull 1996: 11).

In that respect the *Padron* worked as a mediator between the pilots and the spatial locations they were exploring. On return from the Indies, the pilots were obliged – under threat of heavy punishment – to submit their log to the Casa, where at least once a year, the *Padron* was updated and in turn new charts were distributed to navigators sailing to the New World.

The *Padron Real*, however, was not entirely successful. According to Clarence Haring, there is no evidence that the Casa held effective monopoly on issuing charts (1964: 307). An additional theoretical problem facing the people working for the Casa was that the *Padron* was based on old *portolan* style map prescriptions (Turnbull 1996: 9). These were not based on the grid system of latitude and longitude. It was, therefore, a complex task to reconcile fragmented pieces of knowledge into the general framework and slowly the status of the *Padron* would erode until, by the 1560s, it "slipped into disuse" (Turnbull 1996: 14). Nevertheless, while being unable to establish a sustainable centre of calculation that would bring the entire globe together in a single map located in Seville, the *Padron* represented one of the most significant attempts to this end. As well as being a good example of the dynamics involved in the European mapping of the globe, it also combined with a political outlook to render the world a stage for European political practice. There are no known copies of Padron Real maps but through pilots of the Casa, such as Diego Ribeiro and his maps, we can get an idea of the extent of the map (see figure 2). According to Parry, Ribeiro's map is the source available to the Padron and his 1529 map of the world represents a landmark in the representation of European knowledge of the world (2000: 105-106).[8]

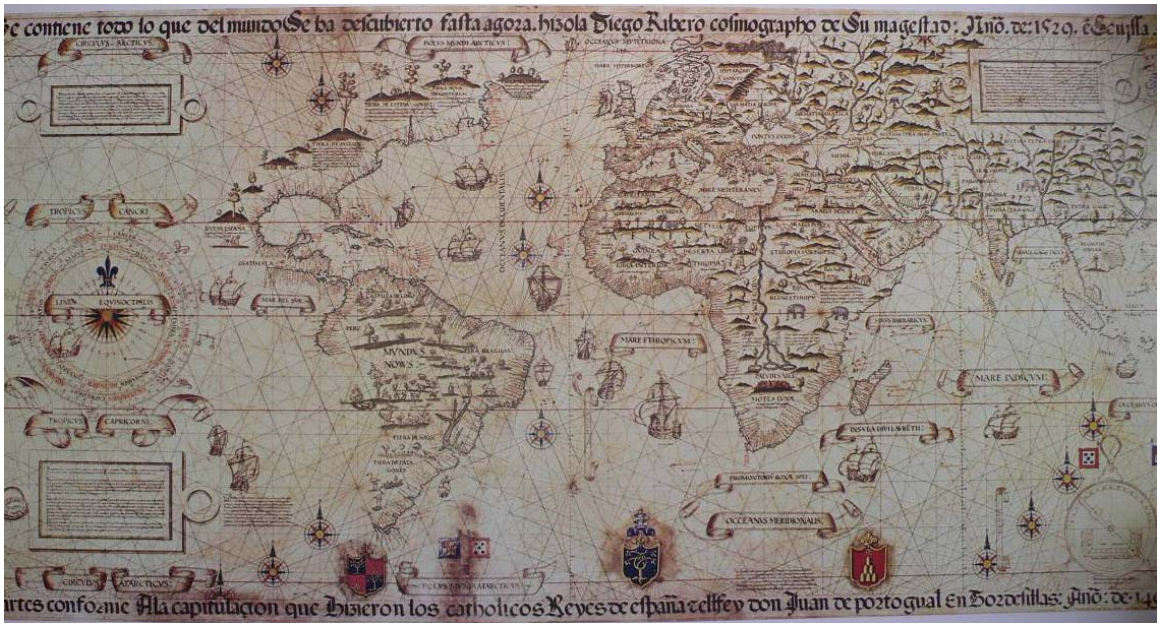

Figure 2. World map by Diego Ribeiro 1529. No copies of the Padron Real have survived but this Ribeiro map is considered to be based on the Padron. It specifically mentions the Treaty of Tordesillas and is published in the year of the Saragossa Treaty and it could have been used in that context. Reproduced from private facsimile.

The Ribeiro map represents a massive expansion of the *portolan* style map which had previously been used by Mediterranean pilots to navigate a limited area, namely, the coasts around the Mediterranean. The *portolans*, presumably, worked well as a specific mode of producing knowledge about a limited area, but, as mentioned they were not adequate as a framework for coordinating the cartographic global space because they did not use latitude and longitude as the ordering principle. Nevertheless, the centre of calculation that was set up in Seville on the orders of the Spanish crown did produce a unified space which they were able to maintain and update, and thus produce an expanding space that was navigable and to which it was possible to return. Even though the project was not entirely successful, it still represented an unprecedented ability at the time to equip navigators with uniform maps and, in turn, enable planning and coordination of large fleets over long distances and long time spans.

Having thus filled in the global image by drawing the contours of continents and landmasses it became important to fill in this framework in order to take more permanent control, organise and exploit the new space. It took around 50 years from Columbus sighting land in the Indies until America, as a continent, was mapped into the European knowledge of the world. Sebastian Münster published the first detailed map depicting the Americas as extending from the North to the South Poles in 1540 (Mignolo 1995: 267-8). In what was to

become the New Spanish Provinces, the viceroyalty New Spain (Mexico), which was conquered around 1519-1521 by forces lead by Hernán Cortés, and Peru, conquered just over 10 years later by Pizarro's forces (Parry 1990: 83-7), this order of affairs follow suit. The historian J. H. Elliot suggests that the resources of the new Spanish territories can not be said to have begun until after 1550 (Elliott 2000: 29), and it was in the 1550s that the Spanish crown launched a great attempt to map their new possessions by questionnaire, as will be discussed in the following section.

The *Relaciones Geográficas* (Filling in the Contours)

Up until the mid-sixteenth century, global mapping done by Europeans had been mostly concerned with the mapping of coastlines as the immediate need that was driving cartographic innovations came from navigation and the desire to produce a navigable global space. In addition, the treaties between the Iberian powers generated a preoccupation with longitude even though this was notoriously difficult to determine until the eighteenth century. This was because longitudinal location would determine whether an area would fall under Spain's or Portugal's jurisdiction. However, as Castile faced a challenge of governing the new possessions after the conquest of New Spain and Peru, the need for spatial knowledge increased. Governing European possessions meant governing a space within the reach of the monarch – Isabel and Ferdinand, for example, had travelled throughout their realm during their time in power in order to maintain a presence there. The new possessions, however, were beyond the physical reach of the monarch's body (Mundy 1996: 8). Amongst other things, this increased the problem of loyalty, and the Crown feared that the new elite, gaining their riches and prestige in the Indies, would not remain loyal to the crown. Parry argues that the king abstained from appointing Cortéz to any position of civil government within the new possessions as he had become too famous and too powerful (Parry 1990: 88). Instead, Castile sought to enforce government by non-noble officers loyal to the throne.

The task of government required the throne to obtain spatial knowledge, which could be used to act independently of indigenous knowledge, and to provide the basis for a more efficient government of 'New Spain' from Old Spain. As such, it was thus necessary to make the colonies present at the centre of the empire. From 1569, more concerted efforts were made, under instructions from the Council of the Indies, to bring descriptions of the Indies returned to Spain. The Council was responsible for overseeing the government of the

transatlantic empire and it did so “in superbly bureaucratic style, various instructions and questionnaires poured from the Council’s desks to find their way to the remotest New World jurisdictions” (Edwards 1969: 17). In an early project to map the American possessions, the appointed cosmographer Santa Cruz planned first to establish a geometric projection of the ‘New World’ based on the grid system of latitude and longitude (Mundy 1996: 12). Hence, they began by defining the framework. Secondly, a survey was commissioned by King Philip to add content to the framework, and thirdly, local officials were required to provide geographical details and maps of their localities.

The project was incomplete when Cruz died in 1567 (Mundy 1996: 17). A López de Velasco was subsequently appointed *cosmógrato-cronista mayor* and he came to coordinate what is known as the *Relaciones Geográficas* in 1577 (Cline 1964: 346). Based on a large number of questionnaires containing 50 questions, local officials and governors were to describe the geography, history, mythology, and so forth of the areas which they governed. In addition they were asked to make very detailed measurements of lunar eclipses in order to determine the longitude of the location. Velasco’s predecessor, Santa Cruz, had been greatly occupied by the riddle posed by longitude. He inventively described ways of measuring longitude by simultaneous observations of lunar eclipses in different locations and subsequently determining their relational distance in time – and thus longitude. Based on this, the *Relaciones Geográfica* questionnaires included a very detailed instruction to the respondents of how and when to monitor a lunar eclipse (Mundy 1996: 18). In addition they asked for maps, or drawings, of the areas in order to provide some kind of topographical mapping. If this ambitious project had been successful, colonial officials would have supplied “López de Velasco with accurate topographical and coastal maps, as well as precise lunar observations […which would have provided…] ample information to make both geographic and chorographic maps of this crown jewel of Spain’s colonial empire, thus making this part of the New World visible to its absent king” (Mundy 1996: 22). This would have provided the state with a strong tool of governance, which they so needed. In the instruction to the governors of the *Relaciones Geográfica*, King Philip II wrote “so that the Council can attend to their good government, it has seemed a proper thing to decree that a general description be made of the whole condition of our Indies, islands, and their provinces, the most accurate and certain possible” (Cline 1964: 363).

Yet, the *Relaciones* did not represent a success despite the grand plan. Whereas the Padron Real had suffered from an insufficient spatial framework at home, in the 'centre of calculation', the *Relaciones* was based on a strictly Euclidian framework organised around the grid work of longitude and latitude and able to contain disparate spatial data on the condition that they were produced in the right way, i.e. in a fashion that made them compatible with the framework. However, the respondents of the questionnaires did not render the world mobile in such a sense. The almost two hundred replies were all very different – incompatible both with each other and with the rational framework prepared 'back home' by Velasco. Velasco had written the instructions on the lunar eclipse observations in a fashion so that a lay person would be able to return 'scientific spatial data' required by the 'experts' back home for ordering the territories according to latitude and longitude. Yet, very few observations were returned and although some were fairly accurate, such as the observations made for Mexico City, which located it within 35 kilometres of its current coordinates, the project did not succeed in establishing a precise network of positions by celestial observation (Edwards 1969: 22-27). Equally disappointing, from the point of view of Velasco, were the topographical maps which the respondents had been requested to produce. The majority of these had been painted by Native Americans who were drawing heavily on their own map-making traditions with their associated iconography (Mundy 1996). The result appeared as an intricate hybrid of new cartographic conventions and the indigenous traditions which were largely incommensurable with the Ptolemaic episteme of map-making into which the maps were supposed to be combined.

Epistemic Incommensurables

The epistemic power relation of the map is the one that decides how a spatial reality is established through cartographic representation. This relation becomes visible in the transition or the encounter, as in the two Spanish attempts discussed previously, to assemble a uniform representation of global space with the *Padron Real* and the *Relaciones Geográfica*. Both projects contained traces of scientific map-making, but neither project was entirely successful. In the case of the *Padron*, the framework receiving spatial data was based on a tradition preceding that of geometric cartography, the portolan, which was based on practical navigation rather than the mathematically informed principles which were required to accommodate the increasing world of the Europeans. On the other hand, the *Relaciones*

represented a significant encounter between two cultures whose modes of establishing spatial reality were radically different. The discussion of the difference between different sets of epistemic rules can be seen as part of a wider concern with language, identity and cultural difference which have occupied Postcolonial Studies in recent years. This work has highlighted how certain knowledge structures have produced an inherently unequal world based on particular standards of European knowledge production (see, for example Said 1995).

Several postcolonial scholars have emphasised the centrality of space and the conceptual appropriation of space in the processes by which Europeans expanded their world to incorporate an increasing proportion of the globe. Walter Mignolo, for example, stresses that "[o]ne of the particularities in colonization processes is that people from quite different cultures come face to face and fight to preserve or appropriate territories, both as possessions and conceptualizations of space" (1995). The essential tension arises as a consequence of Europeans entering a world unknown to them and their need, then, to establish knowledge about it based on their own particular principles often dramatically different from the principles of those who inhabit the area. Simply put: "[t]he *terra incognitae* of the white intruders were the *terra cognitae* of the natives" (Lewis 1998: 2).

In his discussion of the *Padron* and the *Relaciones*, Raymond Craib concludes how "maps were fundamental to creating the object to be possessed" (2000: 17). With this, he emphasises how cartography served the need of the Spanish state to produce the colonies as intelligible units in order to rule them. This implies that the mapping of, for example, New Spain was not a process of uncovering a pre-existing reality, but rather, of creating one. This is the theme in Edmundo O'Gorman's classic *The Invention of America*, in which he traces how America "developed from a complex, living process of exploration and interpretation which ended by endowing the newly-found lands with a proper and peculiar meaning of their own, the meaning of being the "fourth part" of the world" rather than a sudden discovery by the man Columbus (1961: 124). In explaining the 'invention' of a new continent, O'Gorman stresses the significance of Amerigo Vespucci's letter, *Mundus novus*, in which he introduces the idea that the newly found lands were indeed part of a new world. This letter is published in the work that brings America to life, namely the map of Martin Waldseemüller published in *Cosmographiae Introductio* 1507, where the continent, for the first time, is described as a separate continent and named in honour of Vespucci (O'Gorman 1961: 117-124).

Postcolonial scholarship has emphasised how the naming and establishment of America as an entity in European knowledge has oppressed and marginalised the indigenous population. In her celebrated study of the *Relaciones*, Barbara Mundy describes how European naming gradually deprived most of the indigenous people of the means to represent their communities. This was because they could no longer recognize place names as there was 'a yawning gulf' between alphabetic and logographic writing in the images (Mundy 1996: 164-169). Hereby it is highlighted how the power of naming favours one and dispossesses the other side in a cultural encounter like the one taking place in the Spanish attempt to establish a single global image for the purpose of taking the new lands into possession.

Although the hybrid responses to the *Relaciones* survey were incommensurable with the grid framework of European spatial knowledge, they proved that the immediate encounter between the two cultures was not antagonistic. Most of the maps contained a mix of the Ptolemaic style of the Spaniards and the cartographic mode of the natives building on a social projection, where societal hierarchies and relations provide the ordering principle of the map (Mundy 1996: xiv-xvi). In this respect, the Native Americans played a significant part in producing the imperial reality. This was not an even-handed process, however, but one in which the epistemic rules were set by the Spanish. Even though indigenous cartography came to significantly influence the responses to the *Relaciones*, it eventually had to give way to the European style of mapping in order to represent and secure property and to represent a territorial space of belonging (Craib 2000: 23-27). Thus, while the indigenous population retained some power of authorship, they had to succumb to the epistemic power of Ptolemaic cartography.

As such, the epistemic encounters of the *Padron* and the *Relaciones* are instructive of the challenges facing the Crown of Castile in expanding their activities towards a global scope, and also of the consequences of the encounter in the sense that the indigenous populations gradually had to adopt the epistemic mode of cartography set by the Spanish. Nevertheless, as shown, European cartography relied on local spatial knowledge up until the point where it became possible to deploy, from the centres of calculation in Europe, surveyors who would carry out their own surveys of the colonies governed, and thus achieve independence from native knowledge.[9] While this was part of the *Relaciones* project, it was never completed and it was not until the eighteenth century that general surveys were launched in the colonies.

The Power of the European World Map

What distinguished the scientific map from most other map traditions was that it did not, in principle, have an immanent centre built into its epistemic prescriptions. This does not mean that it was value-free or neutral but that it was in principle possible for others to adapt and utilise this 'mapping-mode'. Historically, most cultures have located themselves at the centre of the map. The medieval *mappaemundi* were centred on Jerusalem occupying a prime position in the cosmological imagination at the time. Chinese cartography, which utilised a grid system as the basis of cartographic representations contemporaneously with Ptolemy in Europe (second century AD), remained Sinocentric (Thrower 1999: 30-32), Aztec maps likewise centred on Tenochtitlan. Of course, most European world maps put Europe at the centre in the map, but this was not written into the instructions of 'how to make a map'. Mignolo describes this when he distinguishes between cartography based on 'a geometric rationalisation', as opposed to 'an ethnic rationalisation', where the former is not based on an ethno-symbolically defined centre of the world (1995: 257-258). He illustrates the point with a tale about the Jesuit missionary Matteo Ricci, who in the 1580s, was paid a visit by Chinese Mandarins who were astonished to see a world map decorating Ricci's walls. Mignolo presumes that this was the Ortelius world map from 1570 which, to the surprise of the Mandarins, showed China as only occupying a limited part of the world and being pushed all the way to the eastern edge of the map. In order to accommodate the world view of the Chinese officials, Ricci changed the layout of the map so that Europe and America were pushed to the sides and China was placed in the centre (1995: 219-220). This did not, of course, change the size of China on the map but it re-centred China in the middle of the map and thus satisfied the Chinese notion of 'Middle Kingdom.' Although being a somewhat profane example, it illustrates an ability of the geometric map to accommodate various 'symbolic centres', which would not have been possible with contemporary Chinese maps because such a cutting exercise would have undermined the meaning of the map.[10]

The power of this episteme, then, rests in the fact that it is possible to accommodate a variety of centres within the same mode of cartography. And herein lies the opaque power of the map, because submission to the geometric discourse remains a requirement, but at the same time it allows for multiple centres to exist, or in other words, it is possible for different groups to claim authorship and write themselves into the centre of the

map. It is the distinction between socio-symbolic content ('ethnic rationalisation' in Mignolo's terms) and mathematical projection of space that makes this possible and, if we return to the argument concerning Wolf's imaginary journey we start to see the contours of a wider argument about global space as being a natural spatial arena for social practice. The Ptolemaic projection produces space-equalizing and area-fixing properties of the graticule, and this frictionless extension privileges no specific point (Cosgrove 2003: 105). It is because the scientific map projects space as something natural – as opposed to something cultural – that we can maintain the understanding of a unitary global space in which various social groups can interact with each other, rather than considering the spatial dimension part of this social interaction itself. In the polemic essay, *War of the Worlds*, Latour argues that the most significant impact of 'the West' in the history of the world is the 'insertion of a unified nature' behind cultural differences (Latour 2002: 11-12). This makes conflicts over space as simply social or cultural affairs while leaving 'the unified space of nature' as an undisputed settlement. Latour's claim points to the need to recognise the notion of a unified global space as being a consequence of a specific mode of assembling space which unifies while simultaneously allowing for a socio-political differentiation. Not as a natural fact to be uncovered, but in cartographic practice which in itself is social.

Mobility of the Globe

In 1599, the Globe Theatre was first built in London emphasising the linkage between globe, stage, and actors. Even though the comparison between person and actor, and the world as a stage or a theatre has longer historical roots, the metaphor of the world as a stage is striking. In Shakespeare's *As You Like It* performed at the Globe in 1600, the character Jaques declares: "All the world's a stage. And all the men and women merely players" (Jacquot 1957: 345). This was thirty years after Ortelius had published his *Theatrum Orbis Terrarum* – theatre of the global world which is known as the first published atlas of the world in Europe. Just like the theatre was composed of a stage and corresponding persons acting on this stage, so the world and the individual were seen as the two main building blocks of the cosmographical world. There was a widespread tendency to combine mapping of the globe with the mapping of the human body. In Martin Borrhaus' *Elementale Cosmographicum*, the world is divided into 5 climate zones which correspond to the five fingers of a hand (Short

2004: 44). In Peter Apian's *La Cosmographie*, geography as the description of the earth, and chorography as the description of particular places, is compared to a portrait of the head and the eyes or ears respectively (Lestringant 1994: 110). As a final example, Henri Hondius and Jan Jansson wrote in the preface of their five volume atlas in 1646 (translated and quoted by Cosgrove 2003: 157):

> All visible creatures made by God are comprised by these two here, Man and the World. The former has been made lord of the Universe, the latter the seat of his empire. The former is the guest and inhabitant of the world, the latter the most magnificent and spacious house for such a great guest. In Man we recognize the image of the excellent Artisan who created him, and in the world, the image of Man.

Of course this was part of a wider development within the sciences, where tellingly, Copernicus' seminal treatise on astronomy *De Revolutionibus* was published the same year as Vesalius' foundational text in anatomy *De Fabrica* in 1543 (Eisenstein 1979: 575). These texts indicate a growing concern with the human body as well as with the human environment. This was also a time that, in the words of Helgerson, saw "a self-consciously new literature and a still more self-consciously new geography", which mutually encouraged and confirmed each other (1998: 1). These developments emphasised two 'levels of analysis', so to speak: that of the stage, the Globe, and that of the actor, man, and subsequently the state. Publications like these disseminated a novel picture of the world to the literate Europeans and cemented the dramatic change of the world from the medieval *mappaemundi*. This first step was to complete the 'global scale'.

As a consequence of the emergence of America, European cosmography faced a challenge of re-creating the spherical order of Ptolemy's geography depicted on Behaim's globe. Where the medieval *mappaemundi* would not have been able to contain a new continent, the geometric map episteme was able to accommodate the new discoveries without the whole system breaking down. In the words of Cosgrove, "Ptolemaic science fitted a theoretically unlimited set of spatial data onto a geometrically predetermined surface" (2003: 103). Thus, even though Columbus emphatically sought to comprehend the areas he found in terms of his traditional worldview and posit them as parts of Asia, the cartographic industry, in general, was able to place these lands into the geometric map as a wholly new continent.

Ptolemy's map only covered 180 degrees of latitude and Behaim's 1492 globe showed the three continents of the 'old world' as covering the entire globe. Yet, within the first two decades of the sixteenth century, the world map had been expanded to cover 360

degrees and thus completing the sphere, and America had been established as a fourth continent. As Magellan's circumnavigation rendered the globe a political space, the demand for globes increased dramatically (Cosgrove 2003: 113). In the attempts by the Castilian state to establish a global space their efforts had been divided according to two 'traditions', oceanic mapping focusing on the contours of coastlines and navigational purposes on the one hand, and more topographical style mapping focusing on filling in these contours on the other. In the large cosmographical projects of the mid to late sixteenth century these traditions were merged into great global mapping projects doing both. They were following the cosmographical scheme as laid out by Ptolemy of cosmography and chorography – adjusted to a three tier scheme in 1524 by Apian to cosmography, geography, chorography – concerned with describing localities within a single order. In that respect, the different concerns of navigation and surveying were tied together within the same project and, as a result, the map makers would be concerned both with surveying and navigational concerns. And, as such, cosmography developed a specifically technical gaze in order to capture the essence of the world (Short 2004: 40).

When explaining the powerful impact of European cartographic practices on the world, authors such as Craib stress the significance of printing and the ensuing distribution of spatial representation (2000: 22), and it would indeed be difficult to complete this narrative without taking the impact of print into account. In her seminal study on the impact of the printing press, Elizabeth Eisenstein discusses how the relocation of book-making from the monastery to the print workshop had a profound impact on the collection and accumulation of data (1979: 88). Not only did the printing press enable a distribution of identical publications, it also allowed an accumulation of data. As soon as one edition had been printed, new data could be added to the framework which could be rapidly expanded and developed. The early atlases are good examples of this and point to the importance of these processes.

Abraham Ortelius not only provided the first atlas of the world to Europe, but at the same time, he made available a truly global scale to the literate population for the first time (Eisenstein 1979: 448). This atlas became incredibly influential and it was sold out within three months of its first issue (Brown 1949: 162). Ortelius was very well connected to a network of the best map producers in Europe and it was on the request of the merchant Hooftman that he produced his Atlas. To replace a large number of maps, differing in size and scale, Hooftman asked Ortelius for a uniform collection of maps that could be printed. On

completing this request a commercial and cartographic success was born. By his death in 1598, Ortelius' Atlas had been published in at least 28 editions in 5 languages and it continued to be published in new editions until 1612 (Brown 1949: 164).

Due to the way in which Ortelius had compiled his work, his office effectively worked as a hub for a large network of map-engravers in Europe. From the beginning, it was this network which made possible the publication of the *Theatrum Orbis Terrarum* and each subsequent edition presented maps of new areas and updated maps of areas already covered. Cartographers were very eager to send Ortelius their latest maps and gave advice on how to make improvements. In return, Ortelius made careful dedications to the origins of all the maps he printed. Structure-wise *Theatrum* opened with a world map presenting the entire setting. This was followed by maps of the four continents and then maps of various countries and regions. In this way, he followed the two-tier order of cosmography and chorography describing the stage and the actors (Ortelius and Skelton 1964). Apart from its form and structure, the *Theatrum* set itself apart by representing a turning point away from Ptolemy in that Ortelius did not present his work as an edition or an up-date to Ptolemy. In a message to the reader, the "limits of ancient knowledge were graphically and textually underlined so that the reader could see 'how maimed and imperfect' were ancient world views which comprised 'scarce one quarter of the whole globe now discovered to us'" (Eisenstein 1979: 193, quoting from Ortelius and Skelton 1968: vi). In consequence, the atlas had become much more orientated towards the contemporary work of cosmographers and surveyors than looking towards the ancient traditions and this pushed cartography towards being a more empirical science.

Inheriting the success of the *Theatrum*, Mercator's *Atlas sive cosmographicae meditationes de fabrica mundi et fabricati figura* took over the leading position after its completion in 1595. Ortelius' and Mercator's two atlases became a new standard reference instead of Ptolemy. Willem Blaeu, who came to dominate the industry, published his first atlas in 1631 and described it as an appendix to Ortelius' and Mercator's work (Brown 1949: 171). With Blaeu's dominance, Amsterdam became the absolute centre of the European map industry and the family also came to play a dominant role in the expansive movements of the Dutch commercial empire. In 1633, Blaeu was appointed head of the Dutch East India Company's department of hydrography and he also received the title 'Map Maker to the Republic'. His dominance is reflected in the ruling that merchants dealing with India were

allowed to send no other maps than those produced by Blaeu on their ships and hence, in effect, Blaeu had monopolised chart making in the Dutch Republics. It was in this intersection between state and corporate patronage and private entrepreneurship as a commercial publisher that Blaeu established his fame as a publisher and produced, what some consider the most beautiful geographical work ever: *Atlas Maior* published in the 1660s (Brown 1949: 168-73). This twelve volume atlas was a compilation of all geographical knowledge assembled in the main centre of European map-making, but, as argued by Cosgrove, it also appears as a "total artwork, synthesizing, illuminating, and celebrating an imperial mastery of creation […]. The whole work acts as a totalizing emblem of knowledge, illumination, and global acquisition" (2003: 158).

Where the Spanish projects to establish a global cartographic space had been centralised and controlled efforts to collect and assemble spatial data, the atlas makers of the Netherlands relied to a larger extent on a growing international network to gather their geographical information. As surveying techniques and instruments were developed and Europeans states became increasingly concerned with mapping their realms more detailed maps became available from more and more countries. In addition, the Dutch East India Company, under Blaeu's instructions, issued orders to their pilots to observe and record eclipses and take measure of relevant locations (Brown 1949: 171). The Dutch cartographers thus utilised tactics similar to the ones used by the Castilian state, but also benefited largely from being part of an international network of scholars and publishers. And where the two traditions of oceanic mapping of coastlines were separate from land surveying, the atlases combined the entire surface of the globe in a single volume. It was thus the marriage of the private entrepreneurship of commercial publishers and humanist scholars with states with imperial ambitions and large companies such as the Dutch Indian Companies which produced a single global cartographic space.

The atlases not only brought the world back home, it also rendered this world movable and, with later pocket editions, the world could be carried around, studied, comprehended and action planned at one's convenience. In the words of a satisfied customer of Ortelius: "You compress the immense structure of land and sea into a narrow space, and have made the earth portable, which a great many people assert to be immovable" (quoted in Brotton 1997: 175). This fitted well with the heliocentric ideas about the universe, first published by Copernicus in 1543 where the globe was no longer a static centre of the universe

but a smaller part in a larger whole. At the same time, the atlas provided a representation of the globe as being a single space, navigable by entrepreneurs in the name of colonisation and commerce, and it thus provided the global scale for the actors of an emerging European international politics. Rephrasing Chandra Mukerji, atlases like Ortelius' did "present the world as a singular and knowable entity" (Mukerji 2006: 660) and thus substantially unified the globe as a single space. Instead of being the partly unknown abstract entity of the Treaties, the globe was becoming an abstract, but known, space to the Europeans who were then able to spread their world of commerce, civilization and Christianity in their efforts to merge the European world with a global world.

Conclusion

In this paper, I have analysed how a single global space was assembled cartographically in order to provide a space serving as a stage for the European actors competing for commerce and spatial control towards the end of our period. In short, I have aimed to show that a global space preceded and was completed as European interstate and commercial relations 'globalised'. This analysis supports the argument of how a transition in cartography altered the conditions for the production of political space. The globe was rendered a political space in the Iberian competition for trade routes to India during the second half of the fifteenth century. The two treaties of Tordesillas and Saragossa conceptually required an abstract global space, which in its spherical form was in place, but its content was lacking. Following a Latourian understanding of knowledge production, I have shown how attempts to gradually complete the global image were seeking to make 'other worlds' mobile and create a unified cartographic representation being able to incorporate a global spatial totality. An important dimension of scientific cartography is made visible in the encounter between different map epistemes. Dissolving the symbolic centre of authority, the scientific map can, in principle, be applied anywhere and centre on any location in the world. This, in combination with European imperial practices, served to make the scientific image of space universally accepted. Private Dutch map-makers and publishers, working under the Hapsburg state or large private companies, completed a mobile representation of the globe as a singular world-stage which provided the natural background against which merchants, missionaries and state patrons would act.

Of course, global mapping was not completed by the time of the publication of Blaeu's *Atlas Maior,* but the great atlases of Ortelius, Mercator, and Blaeu set a standard for how to view the world. For overseas mapping, Europeans had to adopt local knowledge until they were technically able to coordinate large scale surveys such as the ones undertaken by the British in India during the first half of the nineteenth century. In that respect it was a long and arduous process to complete the representation of global space according to the scientific standards inherent in the Ptolemaic episteme. The idea that there was a global space which had to be completed underlies the analyses of the notorious geopolitician Halford J. Mackinder who famously stated that with the exploration of the North and South Pole "the book of the pioneers has been closed. […] Whether we think of the physical, economic, military or political interconnection of things on the surface of the globe, we are now for the first time presented with a closed system" (Mackinder and Pearce 1962: 29). What was new for Mackinder under this condition, writing in 1919, was that there was no longer any elasticity of political expansion. The entire system was known, the stage was locked – and in a fashion echoing claims to globalisation – all places were interconnected such that an event occurring in one location would have effects far beyond this location. Hence, the recent war had involved "every considerable state" (Mackinder and Pearce 1962: 30). And this system, I have argued, is based on Ptolemaic mapping principles and was inaugurated by the Iberian states, the Pope, and renaissance cosmographers from the end of the fifteenth century.

This implies that the common notion of global space as simply waiting ready to be flooded by European mariners, merchants, and missionaries is flawed one. Global space should not be considered as something eternally present bringing social unity to the globe. Furthermore, to regard the process of mapping the globe as a victory of unified science in the name of accurately being able to map the world would be misleading. Rather, it should be considered as a social transformation which participates in transforming the nature of the international itself. The spherical basis of scientific cartography, firstly, provided the global space before this in any sense had been established through social practices. Secondly, it was the geometric cartography which allowed the European cosmographers to bring the rest of the world back to Europe and, hence, enabled the possession through knowledge of, and coordination of action at distance on, the gradual expanding spaces claimed by European states.

The consequence of these arguments is that as long as there remains a unified cartographic production of the globe, the spatial underpinnings for socio-political agency with a global reach are in place. Rather than considering the abstract global space of Euclidian geometry a static entity, one needs to keep in mind that, because the scientific map renders space 'mobile' (and later, the chronometer makes it possible to keep track of time in other places), that European culture was made mobile. It could be said that this mobility and knowledge networks preceded and conditioned the constructions of allegedly empty and abstract global space.

Endnotes

[1] Quoted from an un-named owner's letter to Abraham Ortelius in 1579 in Brotton (1997: 175).
[2] I consciously avoid the term 'modern cartography' to describe the cartographic trends in Europe from the Renaissance onwards. Scientific or geometric cartography, I believe, provide a more apt description of this mode of cartography, and avoid the problematic connotations associated with the term modern. For a comprehensive critique of the use of the term modern see Bhambra (2007).
[3] Quoted from http://www.yale.edu/lawweb/avalon/modeur/mod001.htm, last accessed 17-11-2006 12:32:10.
[4] The lack of 'an inherent centre' in the map has also resulted in political disputes concerning the production of international standards such as the location of the prime meridian. Due to its central position for navigation the Azores, for example, have been used as prime meridian. Later, national capitals and observatories were typically used. The Greenwich line was agreed upon as international standard in 1884 (Howse 1980: 127-51).
[5] Note that during the sixteenth century, Ptolemy's spatial order would be extended to a three level canon with geography becoming a level concerned with the earth's surface between cosmography and chorography (Cosgrove 2003).
[6] It is well established that Vikings reached North America (*Vinland*) and it has been suggested that a joint Danish-Portuguese expedition might have landed in North America during the fifteenth century (Larsen 1925). On a similar note, it has been claimed that merchants from Bristol should have encountered America in the 1480s (Harley 1990). Whether this is true or not it indicates that possibility that a new continent may not have been a revolution to everyone.
[7] See Russell (1991) for a thoughtful rejection of the 'flat-earth' thesis. He convincingly argues that this idea was an invention of enlightenment in order to ridicule the previous religious order thus being portrayed as being backward.
[8] See Stevenson (1927) for other maps that are thought to resemble the Padron Real.
[9] For a famous study of imperial mapping see the work of Matthew Edney, who argues that the "British created an imperial space defined by European principles which enabled them to reduce India's immense diversity to a rational and ultimately controllable structure" (1993: 61, see also Edney 1997). This process followed the supposed ordered sequence of mapping: start with triangulation as the basis and then undertake topographic or cadastral surveys. In this way the disparate 'local' surveys can be fitted into a uniform whole. Around the time of the eighteenth century geographical societies were formed around Europe. The English Geographical Society, for example, was dedicated to the interest and the good of the empire (Heffernan 2003: 7).
[10] Another illustrative example can be found in Inca mapping which divided the Inca territory into districts according to a grid (*ceques*) which, like spokes, radiated from the capital Cuzco following the surrounding mountain landscape. This grid structure also builds on an abstraction of space but the grid is different as the centre was not flexible. It was a system specifically developed for the site of Cuzco (Turnbull 2000: 27-31).

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