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Cutting the Cord: A Corrective for World Navels in Cartography and Science

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ABSTRACT
A map is not its territory. Taking a map too seriously may lead to *pernicious reification*: map and world are conflated. As one family of cases of such reification, I focus on maps exuding the *omphalos syndrome*, whereby a centred location on the map is taken to be the *world navel* of, for instance, an empire. I build on themes from my book *When Maps Become the World*, in which I analogize scientific theories to maps, and develop the tools of *assumption archaeology* and *integration platforms*. Here I argue that excavating assumptions helps fill *cartographic silences*, showing the limitations of perspectives often at war. Furthermore, integrating perspectives permits resisting imperial *central* or *master images*. A worthwhile future project would be a repository of world-navel maps, critically annotated with cultural context and imperial information. Mutual understanding may result from such an integration platform, perhaps implemented online or in a museum.

KEYWORDS
Omphalos syndrome; assumptions; reification; cartographic representation; philosophy of science; cartographic silence

Introduction

Maps of any territory require and assume a partial perspective, a projection, and a centre. The problem is that taking the map too seriously may lead to *pernicious reification*: map and territory are conflated; no other perspective, projection, or centre is permitted. The map is the entire world.

My thesis is that two related families of remedies for pernicious reification are available. The first I call *assumption archaeology*: uncovering the assumptions behind and under maps, and thereby identifying their blind spots and limitations. The second is to respect inevitable map pluralism – the variety of perspectives creating alternative maps of that same territory – and employ *integration platforms* to hold multiple maps in our awareness simultaneously. Because every cartographic representation is incomplete and partial, we must accept this plurality of maps, systematically dissecting and comparing their respective assumptions about the world, their scope of application, their operative analogies, and their other components. Here, I focus on maps evoking the *omphalos syndrome*, whereby a location – on the map and in the world (and often contained in a city) – is taken to be the *world navel* of, for instance, an empire. Territory and map are conflated. The map is perniciously reified.

Turning subsequently to resources from cartography, I propose that we fill *cartographic silences* (Harley, [1988] 2001) by excavating assumptions. This archaeological procedure reveals some of what the map has left out, thereby giving every adequate perspective a voice. This tool shows the strengths and limitations of perspectives often at war with one another. Furthermore, robust knowledge requires resisting imperial *central* or *master images* by contrasting and integrating valid perspectives, such as maps of other empires, or counter-maps telling a narrative distinct from the imperial one.[1] In so doing, we can avoid the universalizing, narrowing, and ontologizing of any one perspective. These three cognitive and social practices mark the omphalos syndrome. Filling cartographic silences is analogous to my assumption archaeology; contextualizing master images is analogous to my integration platforms (Winther, 2020).

Elsewhere, I make this argument for scientific theories, analogizing scientific theories to maps. Both of them domesticate and manage a variety of spaces, represent territories of many kinds, and are representations suffused with power and value (Winther, 2020). Perhaps critical analysis and future integration are possible, if not in maps of world empires, then at least in scientific theories. Regardless, a repository of world-navel maps, annotated with cultural context and with critical comments on power structures and imperial intentions, would be a worthwhile future project. Mutual understanding may result from such an integration platform.

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Single world navels

Empires measure and understand the entire world with respect to themselves. Space and time emanate from the empire's centre or *world navel*. Power and meaning radiate from these cartographic centres, as I shall illustrate with notable examples. The Roman Empire held Rome to be the world's navel. Distance itself existed and was measured in radial lines from Rome. Indeed, the city contains the Umbilicus Urbis Romae, or 'navel of the city of Rome'. Within just a few metres of this centre, a Milliarium Aureum, or 'Golden Milestone', was placed by Emperor Augustus circa 20 B.C. (Murphy, 2007: 44). In practice, distances 'were calculated […] from the gates in the Republican wall' (Favro, 1992: 77). Such ways of defining space reflected the Romans' beliefs about their natural role as 'masters of the *oikumene*' (Murphy, 2007: 47). *Oikumene*, Greek for 'inhabited world', is the term the geographer, mathematician and astronomer Ptolemy of Alexandria used, in the second century CE, to denote the entire territory, the entire world, that he was mapping.

The Peutinger Table illuminates how the Romans saw themselves as living in the centre of the oikumene. This map is an 'itinerarium' or road map of the *cursus publicus*, the transportation system run by the Roman government. While dated to the twelfth or early thirteen century CE, the map can be traced to a 'fourth-century archetype' (Harley and Woodward, 1987: plate 5). Unsurprisingly, Rome can be found at the map's centre. Given that it represents the Indian subcontinent on the right-most edge of the map, the Italian (Roman?) peninsula – and, indeed, the whole oikumene – the map twists and transforms its territory. The Peutinger Table 'personified [Rome] as an enthroned goddess holding a globe, a spear, and a shield' (Harley and Woodward, 1987). Given that the symbol of Rome is a she-wolf with suckling twins, Romulus and Remus, this navel seems to be significantly more female than male. After all, a navel denotes a past birth and, ultimately, the female life-giving potential – the vulva, the vagina and the uterus. This is just one of the varied bodily metaphors, drawing upon both male and female imagery, that maps have used to signify the world navel.

Second, many medieval 'T and O' maps take Jerusalem to be the centre. Such maps orient Asia on top of a T inscribed inside a circle. Europe and Africa are placed to the left and right, respectively, of the stem of the T, and the stem is the Mediterranean (Alexander, 1999). For instance, the Ebstorf Map places Jesus' head at its top, glorifying Jerusalem with a centrally placed inset (Figure 1). In the Christian Quarter of the actual Jerusalem, an *omphalos*, or navel, stone is located in the Church of the Holy Sepulchre; many Christians believe Jesus to be buried there. The Foundation Stone at the centre of the nearby Dome of the Rock, widely held to be the exact location of the Temple of Solomon, is identified by the Jewish sacred text Midrash Tanhuma as the navel of the world. This Dome is also crucial to Islam (e.g. it is argued that Prophet Muhammad rose to the heavens from the Rock). Jerusalem is thus the world navel for three religions. Its centrality is captured both architecturally and through cartographic reason.

As the centre of one of the largest colonialist European empires, Madrid has also been viewed as the centre of the world, and this vision has been reflected architecturally. La Puerta del Sol indicates the 'Kilómetro 0'. Roughly 50 kilometres from this 0th kilometre, King Philip II ordered El Escorial constructed. It took 21 years (1563–1584) to complete the complex. The graticule-like grid system of El Escorial's buildings and grounds vibrantly suggests a cartographic matrix extending like a rhizome across the expanding Spanish Empire, calibrating and capturing it. The art historian Samuel Edgerton writes, 'Philip was also an admirer of Abraham Ortelius, the famous Dutch mapmaker, and he must certainly have watched in fascination as more and more new lands found their places in the expanding web of Ptolemaic coordinates' (1987: 48). We can indeed believe that King Philip II, 'as he stood in his vast Escorial plaza, must surely have imagined himself standing at the umbilicus of the world' (1987: 48–49). As different as the Roman and Spanish empires were, each ushering in unique historical epochs, cartographic reason in both cases structured time and space in a similar way, centred on a specific location. Power is taken to flow from this omphalos, umbilicus, ombligo, navel, and so on. 'Here we are. Here we stand, live, and love. From here we conquer'.

The Western context, unfortunately but perhaps inevitably, dominates the social sciences and humanities as practised in many, if not most, Western research institutions and cartographic journals, and in this article. Considering contexts from outside the Western one generatively and usefully decentres my analysis thus far. The Ming Dynasty map 'Da Ming Hun Yi Tu' ('Amalgamated Map of the Great Ming Empire') places China in the world's centre, portraying the empire fairly robustly (Figure 2). However, it spatially distorts (by contemporary, Western cartographic standards) the Arabian Peninsula, Africa and Japan. This map likely originated in the late fourteenth century CE, during the reign of the Hongwu Emperor, founder of the Ming Dynasty. Hongwu's son, who ascended the throne as the Yongle Emperor several years after his father's death, materialized a more explicit world navel by ordering the construction of the Forbidden City. Nestled in the new capital of Beijing, the Forbidden City was taken to be the literal centre of the universe, perhaps a more closed and integrated universe than the ones imagined by European imperialism (Yu, 1984; Ebrey, 2010).

Turning to Mesoamerican indigenous empires, the Templo Mayor in Tenōchtítlān was understood to be the centre or navel of the Aztec empire and thus of the world. Indeed, one likely meaning of the word *Mexico* is

Figure 1. This map is probably from the late 13th century, perhaps created by nuns in a convent of Ebstorf in Lower Saxony. This 'T and O' arrangement, with Jerusalem at the center, was common in medieval world maps. The Ebstorf Map was the largest known European medieval map at about 3.6 meters squared (painted on 30 goatskins sewn together). The original was destroyed in Allied bombings of Hanover, Germany, in 1943. (Barber 2005, 58; Pischke 2014). https://en.wikipedia.org/wiki/Ebstorf_Map (accessed 19th of February 2017). Public Domain.

'navel of the moon', from Nahuatl, the Aztec (or Mexica) language (Anders *et al.*, 2001–2018). In their violent conquering lust, the Spanish assimilated and promulgated this cartographic and architectural vision as the Zócalo, which today remains the centre ('el centro') of Mexico City.

At the UNESCO World Heritage site of San Bartolo, Guatemala, lies the Mayan Pyramid of '*Las Pinturas*', the North Wall of which (Figure 3) depicts 'mythical scenes that narrate the birth of the first men through a ritual that is conducted by the Maize God' (UNESCO, 1992–2018). Modern rediscoverers of this pyramid argue that 'the placement of the five infants at the center and four corners of the San Bartolo birth scene suggests a cosmological plan of the four directions and world center' (Saturno *et al.*, 2005: 12; cf. Saturno *et al.*, 2006). This mythical scene (dated 400 BCE to 200 CE) does not imagine a universe in a cartographic manner, per Western standards. However, it certainly visualizes the universe spatially, with four infant-adults spat out from a 'world centre' in a typically Amerind diagonal arrangement. Umbilical cords hang from the four figures as they explode out of their vagina world navel.

Examples could be multiplied (e.g. British Empire, Mughal Empire and Ottoman Empire) to demonstrate a certain 'habit' that seems to be a nearly universal imperative of cartographic reason: 'the habit of equating one's age with the apogee of civilisation, one's town with the hub of the universe, one's horizons with the limits of human awareness' (Levin, 1963: 268). In other words, centred maps instantiate and assert the empire's power. This power itself tends to be made concrete through cosmological navels which, perhaps more so in the West, are typically a monument or a physical object such as a gate, rock or cross.

Decentring world navels

An early and important effort of decentring world navels is the counter-map created by Felipe Guaman Poma de Ayala (ca. 1540s–1616). His 'Mapa mundi de[l] reino de las In[di]as' ('World Map of the Kingdom of the Indies'; Figure 4) is found in his *El primer nueva corónica y buen gobierno* (*The First New Chronicle and Good Government*),

Figure 2. Surrounding landmasses are distorted to fit around China in 'Da Ming Hun Yi Tu' ('Amalgamated Map of the Great Ming Empire'). The map is 386×456 cm in size. https://upload.wikimedia.org/wikipedia/commons/c/cd/Da-ming-hun-yi-tu.jpg (accessed 19th of February 2017). Public Domain.

Figure 3. The arrangement of five infants in this mythological Gourd Birth scene suggests a world centre and four directions. It appears on the North Wall of the Mayan Pyramid of '*Las Pinturas*' in Guatamala (Saturno, Taube, and Stuart, with renderings by Hurst, 2005: Figure 9, p.13. Used with permission.).

Figure 4. In sixteenth-century Peru, Felipe Guaman Poma de Ayala resisted the Spanish colonial power structure by depicting four world navels in his 'Mapa mundi de[l] reino de las In[di]as' ('World Map of the Kingdom of the Indies') (Royal Danish Library, GKS 2232 4º: Guaman Poma, *El primer nueva corónica y buen gobierno*, 1615/1616)

written in a blend of Quechua and Spanish. The chronicle makes deep and pained observations regarding sixteenth-century colonial Peru from the perspective of 'indigenous Andean resistance and consciousness' (Adorno, 2011: 77).[2] The volume includes a prophetic cosmological vision of the past and future of '*las Indias*' and the globe, which explicitly includes four world navels (Wachtel, 1973; Adorno, 2000). Guaman Poma's chronicle, re-rooting multiple world navels, remains the longest and most important indigenous critique of European imperialism in written form.[3]

The key map in this chronicle resists standard colonialist power structure, assumption set and historical narrative. 'The great city' of Cuzco can be found at the map's geometric centre as the 'head ['*cauesa*' (rather: '*cabeza*')] of the kingdom of Peru'.[4] Moreover, the two diagonals divide the Incan '*reino de las In[d]ias*' into its four *suyus*, thus:

Antisuyu

Chinchasuyu (Cuzco) Qullasuyu

Kuntisuyu

Following the conventional Andean opposition of 'upper' (superior, male) and 'lower' (inferior, female) (Gelles, 1995; Adorno, 2000: 91), Antisuyu and Chinchasuyu are the Hanan or 'upper' regions, while Qullasuyu and Kuntisuyu are the Hurin or 'lower' divisions.[5] In accordance with Renaissance cartographic tradition, Guaman Poma appears to orient the map with north at the top, though it can also be interpreted with *east* at the top (Adorno, 2011: 76).[6] While the map's orientation remains indeterminate, a clear representational desire emanates from it: Cuzco, Lima, Guayaquil, Santiago de Chile, the Pacific Ocean, and so forth are shown in their appropriate relative positions. A graticule is also included.

Guaman Poma's map implicitly pleaded for grand-scale colonial reform. He had hoped to convince the Spanish King Philip III to (re)turn the current 'world upside-down' ('*el mundo al rreués*') to its natural order, an order violently disrupted by *la conquista*, the conquest (Wachtel, 1973: 221 ff.; Adorno, 2000: 106).[7] The map shows seaports, silver mines, monsters and mermaids, and Spanish galleons. The latter may have represented Poma's panic regarding Amerind wealth feeding Spanish greed. Even so, Lima is designated as a capital, the 'head of his majesty's empire'. Perhaps with that wording Poma was trying to placate the king, the son of Philip II, creator of El Escorial, who had cartographically and architecturally visualized the heart of Spain as the single world navel.

The map projects Guaman Poma's prophetic *cosmovisión*: a Christian world, with the Indies occupying the first part (namely, Chinchasuyu [Wachtel, 1973: Fig. 6, 215]), or perhaps the third (Qullasuyu [Wachtel, 1973: Fig. 8, 218]). There would be *four* world navels: *Cuzco, Rome, Guinea,* and *Turkey* (Guaman Poma, 1615/1616: 949 [963]).

Each world region would remain separate – no mixing or *mestizaje* allowed. In this understanding of space, time, power, and culture, the 'synthesis' of Christian tropes and indigenous perspectives is 'constantly threatened with an explosion'. Guaman Poma expressed a 'pathos-laden messianism' wherein his hopes for a redemptive, strong future for his people were combined with a dire expectation of continued tragedy (Wachtel, 1973: 227 [my translation]).

Interestingly, an attempt to imagine or reimagine, to map and remap, the world as given by power structures – what I call *cartopower* (Winther, 2020) – was part and parcel of Poma's mapping. Guaman Poma's 'Mapa mundi' counter-map encapsulates a future indigenous reorientation of modernity: a divided globe, with a return to traditional indigenous culture in the Americas. Considering El Escorial's cartographic message, and other European colonialist mappings such as Martin Waldseemüller's 1507 map (Winther, 2020), the Americas were – and continue to be – a stage for contested representation and power.

The omphalos syndrome, cartographic silences and master images

This set of representational practices and habits surrounding world navels has been called the *omphalos syndrome*.[8] The original characterization seems to be Samuel Edgerton's:

> The omphalos syndrome, where a people believe themselves divinely appointed to the center of the universe, shows its symptoms in the history of cartography as often as in ancient city planning. The oldest extant world map, inscribed on sun-dried brick from sixth-century B.C. Mesopotamia, illustrates a circular cosmos with Babylon in the middle. Both the early Christians and the Mohammedans placed their own holy shrines in the center of similarly circular charts of the cosmos. [1987: 26 (footnote suppressed)]

Murphy (2007) underscores the negative, and what I shall call the *pernicious*, aspect of the omphalos syndrome:

> Something happens to imperial capitals, something psychological and, over time, corrosive and incapacitating. It happens when the conviction takes hold that the capital is the source and focal point of reality – that nothing is more important than what happens there, and that no ideas or perceptions are more important than those of its elites. This conviction saturated imperial Rome, as it saturates official Washington. (43)

Eliade (1987) explores the religious context of world navels:

> *The religious man sought to live as near as possible to the Center of the World*. He knew that his country lay at the midpoint of the earth; he knew too that his city constituted the navel of the universe, and, above all, that the temple or the palace were veritably Centers of the World. But he also wanted his own house to be at the Center and to be an *imago mundi*. […] houses are held to be at the Center of the World and, on the microcosmic scale, to reproduce the universe. (43)
>
> *Settling in a territory is equivalent to founding a world*. (47)

Map users – whether institutions or individual users, such as regents, priests or scholars – *universalize* by overgeneralizing the cartographic grid; *narrow* by insisting on one oversimplified map, with only one possible imperial and world centre (in contrast to denigrated 'outlandish' or 'provincial' areas); and *ontologize* by forgetting that the map is not the territory, conflating the two in thought, desire, and action, and seeing the map *as* the territory.[9] The maps and monuments of an empire sing out a single perspective, projection and vision from which to draw, imagine and measure the world, declaring, 'Our map is the truth; there is no other perspective; you cannot have any other projection; no other vision of the universe can, may, or should exist!'

Fist, bullet or nuclear missile violently imposes an empire's will. Yet the empire's map imposes its own stiff vision of the world's shape, nature and constitution, and the map's physical navel reifies the literal centre of the universe. As one reviewer of an earlier draft of this article correctly notes, 'It is not just about power of [map] projection but also about power behind the map, isn't it?' That is the power of perspective. As this reviewer points out, consider Arunachal Pradesh, the northeastern-most state of India, also claimed by China as 'South Tibet' and represented differently on each country's maps. Or reflect on the naming wars of 'The Gulf' vs. 'Arabic Gulf' vs. 'Persian Gulf' on maps.[10] World-naveling cartographic representation interacts dynamically with the military and political institutions imposing the state's will.

Interestingly, hegemonic empires may be so strongly associated with the omphalos syndrome that the latter is a mark of the former. The empire is defined by the existence and ubiquity of its world-navel narrative. Then again, all peoples – and perhaps even all individuals – might exhibit the omphalos syndrome, thereby making world navels a signifier not just of empire, but of culture in general.[11] From where else could we start when drawing our maps? We might even consider bee dances or beaver dams as fundamentally world naveling for a bee colony or beaver colony.

In the argot of cartographic theory, the omphalos syndrome can be interpreted as resounding *cartographic silences* effected by a *master image*. Considering the master or central image, and what other voices it drowns out, is one way to think of the potential abuses of every map.

The concept of cartographic silences originated with Harley, who wrote that maps 'exert a social influence through their omissions as much as by the features they depict and emphasize'. For instance, 'in colonial mapping, as in eighteenth-century North America, silences on maps may also be regarded as discrimination against native peoples. A map such as Fry and Jefferson's of Virginia (1751) suggests that the Europeans had always lived there […]'[12] (Harley, [1988] 2001: 67). Indeed, 'silences on maps […] came to enshrine self-fulfilling prophecies about the geography of power' (Harley, [1988] 2001: 69). Mercator's projection also led to particular kinds of silences. It eclipsed other projections and continues to do so today as the online standard, Web Mercator. Moreover, it perniciously reified Europe as the centre of the universe, silencing other potential centres and even the possibility of *not* having a centre.

According to Holton (1977: 40), a 'central image' such as Newton's 'clockwork' universe provides a 'single, almost hypnotic image' that serves as a 'fruitful oversimplification'. Borrowing this concept, cartographers speak about the master or central image of, for instance, the Mercator projection, suggesting that perhaps we need another master projection.

But we already tried this. Recall the now-infamous cartographic row about the political counterpoint to the Mercator projection, when Peters defended a 'new cartography' with a 'revolutionary character' (Peters, 1983: 150). Purportedly, Peters had 'combined in a single projection' ten 'attainable map qualities', including 'fidelity of area', 'fidelity of axis', 'proportionality' and 'universality' (Peters, 1983: 105–118; table on 114). Peters taught that there was only one way to see the world, supplanting one master image with another master image. However, much of the cartographic establishment responded by implicitly and explicitly claiming that two projections were automatically and inherently invalid: the Mercator and the Gall-Peters projections.[13] The overarching suggestion of this article is that each accurate and viable projection is valid and that we should dissolve master images – and their concomitant silencing acts – altogether.

When Maps Become the World: undoing pernicious reification

My suggestion is to develop forums, spaces, computational platforms, and communal practices for filling silence with dialogue. Critically and humbly engaging with your own favoured representations, and reading and listening to others, is key for understanding the strengths and limitations of your perspective, of your representation. In so doing, we may find new loci for the integration of different viewpoints.

As I discuss in *When Maps Become the World*, what is pernicious is not that we take an embodied, centred perspective in drawing a map or in formulating a scientific theory. We must start from somewhere. And as long as the map or theory birthed from that centred-on-self perspective does not become reified, it avoids the negative connotations of being 'self-centred'. The pernicious reification of a map or a scientific theory occurs when we insist that a single map or map projection – or a single scientific theory, model or hypothesis – is a uniquely *right* and *absolute* representation. Perniciously reified master images lead to cartographic and scientific blind spots and biases, even to the stifling of new maps and new theories. The epistemological dangers of blocking the road of inquiry (Peirce, [1898] 1998: 48) and turning science into 'mob psychology' (Imre Lakatos's critique [1970: 178] of Thomas Kuhn) arise when the community is swayed by a master image such as the Mercator projection in cartography or selfish gene theory in evolutionary biology. Progress towards a richer empirical theory, and towards a plurality of perspectives on a complex world, is hindered by insistence on the One Representation.

Just as *a scientific theory is a map of the world* (Winther, 2020), a map is in certain general respects like a scientific theory (Winther, 2015a). One similarity between maps and scientific theories is that power and value suffuse the making and using, the abstraction and ontologizing, of both cartographic and scientific representations. Some representations, like Mercator's projection, selfish gene theory, and rational choice theory, dominate others, while many useful alternative representations languish for lack of attention. Influence begets influence – sometimes independently of a concern for truth or empirical adequacy – through mentorship lineages, institutional prestige, journal editorial positions, uneven interdisciplinary training, economic incentives, and the unequal values ascribed to different research programmes and research domains.[14] Individual researchers rarely intend to block alternative perspectives, but decision makers who profit from the status quo shunt aside theories and practices disfavoured by the professional *nomenklatura*.[15] Pernicious reification emerges as a result.

Counteracting such tendencies is not easy. Resistance requires intentional effort, including the development and implementation of specialized tools for de-reification. One such tool is *assumption archaeology*. World-navel maps and scientific theories are prime candidates for assumption archaeology. 'Archaeology' is here intended to evoke 'notions of the repressed, the lost and the forgotten, and of the drama of discovery, which are often spatialised in terms of the relationship between depth and surface' (Thomas, 2004: 149).[16] Archaeology pinpoints contingencies

and logical dependencies among assumptions, bringing to light implicit rules or heuristics that shape representations and representational practices.

Consider the symbols and icons in different parts of each world-navel map investigated, especially the density and level of detail represented as a function of distance from the map's centre. In our archaeology, we should also reflect on which representation is centred on the map. Is it of a city, a person, a building, a deity? What kind of space is imagined? If it is not the space of the physical world, is it some kind of sacred or psychological phenomenological space, or a more abstract or vaguely metric space? Is space expanded, compressed or distorted, and does this occur in non-uniform ways in different parts of the map?

One could set out an array of world-navel maps and put them on the same level, as alternative perspectives, identifying each as having certain historically contingent assumptions. For example, a comparative study, even if just qualitative, of the distortions in the Ming Dynasty Amalgamated Map and the Peutinger Table, collated with historical background, could shed light on biases about the way the world was constructed and thought to be. These assumptions may be unmasked (Hacking, 1999) by rebellious students, intellectuals, museum curators or organized political and social resistance.

Another group of people who can be a valuable part of this sort of public discussion is artists. Argentinean artist Pablo Carlos Budassi, for one, has actively begun. Sharing what he calls 'this quest to know more about the cosmos',[17] he hosts Facebook pages to invite discussion of the illustrations he creates, which draw on scientific data maps and the beautiful images astronomers have taken of outer space's unspeakably immense vastness. To domesticate and manage space by fitting the cosmos into a wall- or monitor-sized radial image ('Observable Universe Logarithmic Illustration', Figure 5), Budassi works in powers of ten (i.e. orders of magnitude).[18] Two-

Figure 5. Earth and Sun are the world navel of the universe in Pablo Carlos Budassi's 'Observable Universe Logarithmic Illustration'. The scale is logarithmic. The artist relied on scientific data and images provided in Gott, *et al.* (2005: Figures 7 and 8) and by the National Aeronautics and Space Administration. (Used with permission. https://www.facebook.com/observableuniverse/)

dimensionally, he arranges the universe in all directions around Earth and our Sun, the world navels of our world. Then, at increments visually equal to that diameter, he compresses increasingly distant portions of the universe: first our local planetary system, then Alpha Centauri and the rest of the Milky Way galaxy, and then the large-scale galaxy clusters known as 'walls' and 'filaments'. Finally, encircling it all is the cosmic microwave background radiation, the faint, 14 billion-year-old afterglow – visible amniotic fluid, as it were – of the Big Bang that falls on Earth uniformly from all directions.

Budassi's map-like image serves as a visual analogy of scientific theory about the nature, structure and history of the universe. The 'observable universe' is what falls within the 'light cone' defined by the theory of relativity – the most distant parts we can see because their light eventually reaches us at the unchangeable speed of light. The light cone sets the limit for the very possibility of mapping the universe.

A second tool for de-reification, the *integration platform*, helps us to promote a plurality of representations. Respecting a plurality of maps permits us to undo – or even preemptively block – pernicious reification. Integration platforms can take many forms. For instance, Wood *et al.* (2006: 127–131) create a simple integration platform by listing the characteristics of the Mercator and seventeen other map projections in tabular form. This particular approach counters pernicious reification by showing the strengths, weaknesses and contextual uses of each projection.

In three ways, integration platforms help us appreciate a plurality of perspectives. First, as opposed to universalizing, an integration platform enables us to de-universalize or *contextualize*. We contextualize by systematically comparing maps with other maps, theories with other theories, or models with other models, allowing us to pinpoint the assumptions, practices and purposes of each. For example, this process allows us to understand that the captain of a clipper ship would not consult the Gall-Peters projection map, because it does not show the true shape of the shoals the captain must navigate and does not conserve the bearing angles so valuable for crossing seas and oceans; pilots prefer maps preserving azimuth angles from a central point such as the North Pole when they fly over that point, rather than a Mercator projection, which explodes to infinity at the poles. Similarly, we come to understand the strengths and purposes of world-navel maps from very different cultures by contextualizing and comparing them vis-à-vis their respective myths and religions or their understandings of space (metric or customary?) and time (linear or circular?). In science, multiple models are often used in a given field of study, each of which is applied under particular boundary or initial conditions. For instance, scientists use different models of evolution for different population sizes and structures.[19]

Second, as opposed to narrowing, an integration platform allows us to *broaden* and *decentralize*. We broaden maps and models by considering other central points or by questioning the supposition that a centre is even necessary. In the case of Mercator, we might consider China or the Americas more central, turn the projection upside down, or compare it to the Miller projection, which is a scaled Mercator projection. Regarding world navels, consider Guamam Poma's World Map, which features a decentralized system with four world navels. In science, we could think of a theory not as a single model, but as a decentred yet robust family of mathematical models, where each model has differing assumptions, content and purposes.[20]

Third, by expanding and nuancing how we ontologize – how we imagine and construct the world – we can employ the full repertoire of maps and map projections, or scientific theories and models, with the understanding that every perspective is context-dependent. We can then *re-ontologize* – rebuild the world – in multiple ways, respecting alternative worlds. Re-ontologizing could have profound effects. Perhaps diplomats could review basic, modern maps of the schools and state governments of sworn national enemies to find common ground. Less ambitiously, a museum's public outreach or educational programming could include comparison of the maps used for teaching in select countries, highlighting political and cultural biases and limitations of each map.

Through contextualizing, decentralizing and re-ontologizing, we can block, avoid or dispel the pernicious reification of representations and their assumptions. A corrective for world navels in cartography and science is possible and desirable.

Conclusion

I am not the first philosopher of science to attempt to undercut pernicious reification or world navels. Cartwright (1999: 1) speaks of 'a dappled world, a world rich in different things, with different natures, behaving in different ways', described by laws that are 'a patchwork, not a pyramid'.[21] Longino (2002: 142) writes, 'The complexity of the natural world is such that a single unified picture of the world is not possible'. Hacking (1996: 43) presents a whole taxonomy of senses in which one may posit either unity or disunity in the sciences.[22] I have here attempted to approach the issue through an analogy between maps and scientific theories, which draws upon cartography to think about scientific theory in general, and vice versa (Figure 6 renders this metaphorically).

Figure 6. 'Caught in the Legend' by artist Larisa De Palma (commissioned by Rasmus Grønfeldt Winther) expresses the author's hope that we can counter dominant views such as the colonialist 1507 Waldseemüller Map. One way to decentre our perspective from reified world navels (such as the Sun, the genetic code) is by considering three other tropes or themes of centring: the *tree of life* (here represented in black) is a recurring theme of rooting and the sacred across many cultures; the *vagina* or *vulva* (here represented at the top, with an emergent face) has long been considered a life-giving centre, as in the Las Pinturas depiction (Figure 3), and as comparative mythology shows (e.g. Hindu and Chinese; Blackledge, 2004; Winther, 2020); third, the *ocean* (the variegated background) is another common symbol of centredness and origins, especially in cultures deeply connected with the oceans and seas. Through pluralistic decentring, we achieve a more balanced awareness of other aspects of our existence (the far galaxies, the multiplicity of human forms and cultures). As argued in Winther (2020), science also guides us toward a more integrative, holistic vision when it adopts pluralistic views and mappings of space, brains, bodies and genes. (Waldseemüller map: Library of Congress, Geography and Map Division).

Excavating and integrating world-navel maps is not an idle pursuit. It could lead to a more hopeful future, in science and perhaps in politics as well. In science, we can combine distinct theories or models, lay bare their respective domains of application and explanatory and predictive tools, and even hybridize them. A growing repository of centralized world-navel maps could be a most useful exercise for critical diplomatic, pedagogical and museological reflection. In any event, the universe is an interesting and variegated place, deserving of our most interesting and variegated representations.

Notes

1. On master and central images, see Holton (1977); Myers (1988); MacEachren (1995: 455); Vujakovic (2002: 190–191); Monmonier (2004: 143). There is significant intertextual referencing among these authors.
2. Only one copy of the chronicle is known to exist; it is held in the Royal Library in Copenhagen.
3. A few other indigenous Amerind maps are known. Rich map-making and map-use traditions existed on the pre-Columbian continent(s). For instance: 'Oztoticpac Lands Map', ca. 1540 (Mundy, 2011) and 'Aztec Map of Tenochtitlan', 1542 (Brotton, 2014: 104–105). Regarding the map she was charged to explicate, the art historian Barbara Mundy writes: '[The Oztoticpac Lands Map] shows how surviving members of [don Carlos Ometochtzin Chichimecatecatl's] noble family used maps to defend their hereditary rights and reaffirm long-standing traditions of land-holding in the face of Spanish threats' (Mundy, 2011: 57). These types of maps were not brought by Europeans but 'were closely related to maps […] once […] made for […] the Aztec state' (Mundy, 2011: 56).
4. World-navel overtones can be found here: 'The roads not only depart from Cuzco, but also arrive at the capital city from the entire empire, somewhat like the saying that all roads lead to Rome' (Gasparini and Margolies, 1980: 60). See also Winther (2014, 2020).
5. See Wachtel (1973) for a discussion of the relative placement of the four divisions.
6. Along the borders, Guaman Poma annotates the four kingdoms or parts of the Incan empire. Consistent with Adorno's analysis, the right border says, '*COLLA SVIO sale sol*' (Qullasuyu the sun comes out). But on the top border he writes, '*ANTI SVIO*' ([to] the right of the sea to the north), and in Quechua, '*anti*' clearly means east. The directionality of '*Antisuyo*' could thus be north or east, as I discuss further in Winther (2020).
7. Although Guaman Poma had hoped that the Spanish King would inspect and publish his work, we do not know whether Philip III ever saw it. However, it almost certainly did reach the Spanish royal court. The manuscript eventually found its way to the Copenhagen Royal Library via a Danish diplomat who presented it to his king, Frederik III (Adorno, 2011: 78).

8. E.g., Edgerton (1987: 12, 17, 26–27, 37–38); Harley ([1988] 2001: 66); Murphy (2007: 43–48, 56–57).
9. See Borges ([1954] 1975); Bateson, 1972; Korzybski ([1933] 1994); Muehrcke and Muehrcke (1998); Turnbull (1993); Wood (1992) (with Fels), 2010 (with Fels and Krygier). For an idea related to my concept of 'ontologising', see Goodman's 'world-making' (1978). I discuss important differences between our concepts, including that I take mine to be broader, in Winther (2020).
10. As just one discussion of this topic, see Alai (2000, last updated 2012).
11. Of course, this habit also exists at the personal level – and, as Bulgarian artist Yanko Tsvetkov notes in his *Atlas of Prejudice* project, it is being exacerbated by social media. His 'World According to a Facebook User' (2015: 139) satirises the omphalos syndrome of a narcissistic 'Me'.
12. The Jefferson of the quote is Peter Jefferson, the father of Thomas Jefferson. Peter was a surveyor and cartographer. Young Thomas also learned surveying practices (Farrell, 2012).
13. See Robinson (1990); Monmonier (2004); Wood (2010) (with Fels and Krygier).
14. For instance, governmental funding and prizes flow more readily to 'star' researchers than others. See Kuhn (1970); Foucault ([1969] 1972); Bourdieu ([1979] 1984); Longino (1995, 2002); Solomon (2001).
15. See Beckwith (1970); Pollack (2005). Thomas Heimburg (Niels Bohr Institute, Copenhagen University) provided constructive feedback.
16. Further details are provided in Winther (2020).
17. Budassi personal communication, June 16, 2018.
18. Differently put, in logarithmic measurement, an accumulation of equal increments on the map does not represent a growth in actual distance by a linear 1, 2, 3, 4 … multiplication of the first increment; rather, equal increments correspond to multiplying each previous one by 10: 1, 10, 100, 1000 … Thus actual space becomes increasingly and massively compressed as we move out from the centre. For a graph-like representation of this same data and scale, see Figures 7 and 8 of Gott *et al.* (2005).
19. See Winther (2006).
20. See the discussion of Semantic and Pragmatic views in Winther (2015b).
21. The table of contents to Cartwright's 1999 book expresses this in an almost direct metaphor to cartography: Part III is titled 'The boundaries of quantum and classical physics and the territories they share'.
22. Hacking distinguishes among three kinds of commitment to unity or disunity, including *metaphysical*, in which arguments revolve around whether the world and phenomena are simple and unified, or complex and various; and *methodological*, in which scientific and philosophical debates revolve around what the 'one scientific method applying across the board in the natural and human sciences' actually is; this led to strife among philosophers of science (Hacking, 1996: 43).

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