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Journey to the centre of the world: Google Maps and the abstraction of cybernetic capitalism

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Abstract

Across human history, many cultures have produced different 'centres of the world', with cartography often being bound up in the construction and representations of this *axis mundi*. A contemporary manifestation of these ancient phenomena can be seen in Google Maps, the most popular world-map ever made. Google use surveillance to present various types of customized centres-of-the-world, with their global representation being automatically tailored for specific subjects. This study uses engaged theory to analytically separate the levels of abstraction inherent in these processes, connecting empiric observations with large-scale historic transformations, with a focus on subjective and material changes in relation to the capitalist world-system. It is argued that the automated, atomizing processes bound up in Google Maps serve to projects intensifying abstractions into everyday social practice, thus reconstituting how space and time are experienced, as well as being intimately bound up with intensifying processes of capital accumulation and social control.

Keywords

abstraction, capitalism, cartography, ontology, space-time, surveillance, technology

Where is the centre of the world? This simple question contains many possible responses depending on one's ontological, cultural or political orientation. As Jules Verne described in his 1864 sci-fi classic *Journey to the Centre of the Earth*, the planet's centre lies deep below the surface: on average 6,371 km beneath, to be specific. This fact matters little in the creation of most world maps, which present a flattened representation of the Earth's surface. This makes the creation of a centre a deeply social process worthy of critical exploration. The influential historian of religion Mircea Eliade discussed the symbolism of the 'Centre' in *Images and Symbols*.[1] In speaking of the centre-of-the-world, Eliade drew on the Latin concept of *axis mundi*: an 'axis' being an imaginary line

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around which an object revolves, and 'mundi' being the word for 'world'. An *axis mundi* is a place which acts as a symbolic 'centre-of-the-world', a metaphoric pillar that connects the Heavens and the Earth – however they are conceived – a place where it was imagined as possible to pierce through to another plane of existence. In one way or another, this concept has appeared in the philosophies, religions and belief systems of a very diverse array of societies.[2] This article uses the concept of *axis mundi* as a departure point to look at the centre construction in Google Maps, currently a powerfully dominant cartographic representation of the world.[3] Through this discussion, I am interested in exploring the abstraction of space-time under conditions of capitalism, particularly since its cybernetic reconstitution that began during the Second World War and intensified at a seemingly exponentially rate ever since.

As Henri Lefebvre famously noted, space is not a given, rather it is socially produced. Following from this, each social formation produces its own kind of spatiality, which includes physical space, as well as the ways of organizing and imagining it.[4] Building on this, space it is increasingly produced in ways that are more *abstract*, more drawn away from phenomenological grounding and more susceptible to the remote control and technological projections of power. These insights can be reworked to apply to temporality as well, for time can also be seen as socially produced with distinctly cultural ways of organizing and imagining it. Taken together, one may inquire into how the space-time of cybernetic capitalism is produced, and thus what kind of an ontological world is reconstituted in Google Maps dominant representation. This is important, for these drawn-away practices have long been intimately bound up with capitalism 'quest for power by means of abstraction', to use Lewis Mumford's words.[5] Following this, I am here interested in critiquing Google Maps as a compelling example of abstraction in service of cybernetic capitalism.

As I have noted elsewhere, 'production' and 'abstraction' are intimately connected.[6] This line of argument draws on generations of critical theorizing associated with Arena, a Melbourne-based publishing cooperative founded in 1963 and has been independently publishing radical material and critical theory ever since.[7] Geoff Sharp, one of the journal's founders, conceived of abstraction as a material process, a lived social relation with the world.[8] Taking this core thesis – sometimes called the 'levels of abstraction' argument – and its connection to capitalism's long-term effects, one can rework Lefebvre, seeing space-time as being both socially produced and socially abstracted. Space is simultaneously *produced* (from the Latin, 'brought forth') and *abstracted* (from the Latin, 'drawn away'), with many contradictions bleeding from this tearing movement that has long characterized the intensifications and reorganizations of capitalst modernity. So, to go about this analysis of the social production and abstraction of space-time, I have used an integrated theoretical framework, that builds on Arena's collaborative effort, called 'engaged theory', which I have combined with emergent theories of cybernetic capitalism and a geographic sensibility.[9]

As capitalist modernity began in the 'Long 16th Century', the forces of the state began working in concert with scientific practices and the dynamics of capital to produce and abstract a newly dominant ontological conception of space-time: empty space and empty time.[10] Here, at one level, time/space was emptied of its cosmological infusions, and refilled with the sense of human agency. To note immediately, these ontological formations became dominant because they *dominate*, social power is crucial to the process. This domination should not be interpreted as meaning that newer spatial systems simply replaced the old. Meanings and practices are more complex and interwoven than this, the overlaid can haunt the overlayer in complex and contradictory ways, yet nevertheless, a multidimensional historic intensification of abstraction is visible on a large scale.[11] The dominant layer is contested, complimented and contradicted by emergent, residual and archaic layers, to use Raymond Williams' scheme.[12] This layered conceptual approach goes against the grain of the popular flattening of being into a one-dimensional 'flat ontology', as much of the 'new materialisms' would have it.[13] While very sympathetic to the critical rethinking of fracturing dualism,

questioning assumptions behind agency – particularly with respects to ecological and technological issues – the approach advanced here is sceptical of dissolving actually existing complexity into a single dimension. Rather, this critique builds its argument on another tradition of materialism which seeks to critique the abstractions of capitalist modernity.[14]

To make a point of comparison within geographic debates, in 'Rethinking Maps', Kitchen and Dodge sought to 'de-ontologize' cartography, describing maps as having 'no ontological security' and instead being 'off-the-moment; transitory, fleeting, contingent, relational and context dependent'.[15] While on-board with their critique of cartography as technically abstracting, as well as their emphasis on the procedural nature of cartography rooted in social practice, I am critical of their easy dismissal of ontology through a simple postmodernist flattening. Rather, this essay suggests that ontologies exist in complex, co-existing layers that can conflict or contradict with one another. Engaged theory and the levels of abstraction argument allow for an *analytic* separation between different layers of the social. This is important, for conflict over differing ontologies are key sites of power struggles. Think of the imperial surveyor carving up space, the colonist trying to regiment 'the natives' out of their apparently 'lazy' temporality. In both cases, complex indigenous ways of being in time and space come into conflict with a dominating modern social formation which violently overlays; it does not necessarily fully replace the older ways.[16]

To provide another point of comparison, in their work on Google Earth Kingsbury and Jones noted the optimist/pessimist binary appearing in critiques of contemporary maps – with the former celebrating their playful, democratic potentialities, and the latter lamenting their totalizing, controlling order.[17] Their influential approach sought to get beyond this thorough dialectically pairing 'Apollonian' control-projection and order-making with a 'Dionysian' emphasis on uncertainty, confusion and intoxication, with their work concentrating on the more neglected latter. However, their exploration lacked any ability to differentiate between levels of abstraction and hence it rapidly loses touch with the world of subjective material practice. For instance, the authors repeatedly and unproblematically compare walking through a street to observing a reproduction of said street on a monitor, without pausing to consider the qualitative differences between them in terms of technological reproduction, embodiment and abstraction.[18] Phenomenologically, these are completely different embodied practices: physically moving one's body down street whist immersed in space is very different from sitting before a networked computing-machine, yet their one-dimensional method flattens the manifest differences between 'strolling' and 'scrolling'. Rather, the approach advanced here is attentive to the importance of embodied material practices – be it feet treading pavement or fingers pressing buttons – and how it relates to more concrete or abstract social formations and technological reproduction.[19]

As the social-material transformations discussed in this article intensify, people are increasingly engaging with the world through disembodied abstractions mediated by vast and thoroughly commodified techno-scientific apparatuses and this reconstitutes social practices. This is intimately bound up with transformations in ontological ways of being-in-the-world and questions of power, hence to interpret and analyse such phenomena requires methods that can attempt to deal with these complexities and tease out their contradictions. To flesh out these theoretical points, it may be helpful to foreshadow the discussion of cybernetic maps with a longer historical and cross-cultural discussion as to how various social formations ontologies of space have been constituted through the constructions of 'centres'.

World-historic context

Historically, many natural formations have fulfilled the role of an *axis mundi* in different traditional and customary societies. Consider Mount Meru, the most holy mountain in Hindu, Jain and

Buddhist cosmologies. Meru was being imagined as rising somewhere in the Himalayas and extending upwards for 1 million kilometres. It was thought to be the literal centre of all physical and metaphysical universes, with the Sun and planets revolving around its holy peak. Sometimes an *axis mundi* can be a specific urban formation, such as Delphi in Ancient Greece. This small mountainous city was broadly considered the spiritual centre of the Hellenic sphere. Within Delphi stood the 'Omphalos', a beautiful marble monument that marked the 'navel' of the world. Likewise, Mecca is a key spiritual centre of the Islamic sphere, and more specifically the al-Ka'aba, the cuboid building at the centre of Islam's most sacred mosque. Muslims traditionally must pray in the *Qibla* – the direction of the Ka'aba from wherever they are in the world – an act which symbolizes the unity of the *Ummah*, the supranational community of believers under the Law of God (more on this below).

Practicing in such societies, mapmakers are conferred the ability to choose where to place the centre-of-the-world, with this choice often coinciding with the *axis mundi*. For example, medieval Christian world maps placed Jerusalem at the centre, with the city functioning as a holy anchor that connecting the world with the cosmological order. One of the most iconic of the surviving medieval maps is the 13th century *Hereford Mappa Mundi*. Drawn onto the skin of a flayed animal, this map attempted to synthesize the entire Christian world-view, complete with an eschatological trajectory towards the Final Judgement. More based on theology than geography, this spatial representation is centred on Jerusalem, in Jerry Brotton's words, 'like a giant theological cog'.[20] Pivoting on this holy *axis mundi*, the Christian world-picture is oriented with east-as-up: the archipelago we now know as the British Isles is in the bottom left corner, and an enlarged island now called Sri Lanka is in the top right corner. The whole world is all presided over by the bearded God who sits on a throne atop of the map; the absolute head of the Great Chain of Being.[21] These maps make sense within traditional ontological frames, they are decidedly not modern and make on claims to represent the world objectively through scientific techniques. They make sense through connection to systems of meaning-making and social practice centred on cosmological questions. Christian *Mappa Mundi* specifically sought to grant a certain kind of ontological security by condensing a whole world order into an image – analysing them through postmodern sensibility misses how they function in social practice. Of course, the ontological security offered by such maps was later undermined by the rise of capitalist modernity – which sought to create another more abstract kind of ontological security.

Importantly, a modern *axis mundi* can also be secular. Eliade noted, 'to the degree that the ancient holy places, temples or altars, lose their religions efficacy, people discover and apply other geomantic, architectural or iconographic formulas which, in the end, sometimes astonishing enough, represent the same symbolism of the "Centre"'.[22] This secularized dynamic of centre-making occurred frequently after the rise of capitalist modernity and the scientific practices that empowered it. One enduring example of this was seen after Britain became the dominant hegemon in the capitalist world system. Despite occupying a small archipelago at the fringe of Eurasia, Britain imagined itself as the *axis mundi* by placing the Prime Meridian, the origin of time, through its Royal Observatory at Greenwich, London in 1721. This centre-of-the-world was a place of abstract intellectual inquiry in the service of empire, symbolic of the increasingly important role that the sciences played in the expansion of imperial control. After a century and a half of imperial expansion, this imaginary line was established as a global standard at the 1884 at the International Meridian Conference held in Washington, attended by representatives from 26 nations. Of these, only Japan and Turkey were represented from Asia, and only Liberia from Africa. Despite the protests of the French, London's Greenwich Observatory was selected to be the 'Seat of Time'. This decision was officially justified because many authoritative navigational aids, such as tide timetables, had long been published using the Greenwich Prime Meridian.[23] That the British Empire was

the most powerful commercial and military force in the world at the time was likely taken into consideration as well. This move helped to naturalize the world-picture, rooting it into the fabric of global spatial representations.

This is curious, for the modern ontology of space had its origins in Ptolemaic systems, but remained emergent until its rise to dominance with the coming of capitalist modernity and its colonial projections. Over those centuries, this more constitutively abstract order unevenly overlaid the residual traditional ontologies of space in its rise to dominating dominance. Then, since the Second World War, the modern mode is likewise being unevenly overlaid by cybernetic reconstitutions, with this emergent layer being instated on a far higher level of abstraction. For instance, the modern Greenwich Mean Time has been extended beyond the Earth's surface, being transformed into 'Universal Time', or UT1, which is calculated through observations of distant quasars light years away, hence showcasing the supreme abstractions of the techno-scientific order.[24] This article shall fleetingly describe this qualitatively step into abstraction that has come with the cybernetic reconstitution of capitalism.

On Google and their maps

Today, a compelling case can be made that Google Maps is the most popular and wide-reaching map of all time, and hence playing an important role in the ongoing reproduction, negotiation and naturalization of particular world-picture. Google are a hegemonic company within the hegemonic social formation that I call 'cybernetic capitalism'. The concept of cybernetics emerged from the military-industrial complex laboratories of the Second World War, with the word's coiner, Norbert Wiener bringing it to the highest level of synthesis in the title of his book, *Cybernetics: Or Control and Communication in the Animal and the Machine*.[25] The four terms from Wiener's formulation – control, communication, humanity and technology – can be made into a thematic lens through which to critically approach contemporary capitalism as a world-historic system. In this way, it comes from the intensifying interaction between disembodied communication, capitalist production, techno-scientific inquiry and military-industrial power. I use the concept of cybernetic capitalism as an analytical category which can be imagined as a kind of abstract layer that is spread unevenly across the capitalist world-system, a layer that bleeds through and reconstitutes patterns of social practice, bringing new abstractions to bear on the production of subjectivity and materiality.[26] For the purposes of this article, a key component of this conception to focus on is how cybernetic feedback loops enable surveillance data to be extracted from people and drawn away into the realm of networked computing machines, only to be fed back into social practice at a more abstract level, hence reconstituting how we be and act in the world. Moving forward to the early 21st century, cybernetic capitalism has expanded both intensively and extensively, reorganizing and abstracting social practices unevenly around the world, with the forces of control and communication more integrated than ever. One of the most visible manifestations of this world-historic change can be grasped by looking at the tremendous power of the tech-titans, the 'human face' stapled onto the inhuman apparatus of cybernetic capitalism. A brief quantitative measure of this power can be seen by looking at market capitalization. As of October 2019, Alphabet Inc., Google's holding company, had a market capitalization of US$863 billion. To put this into some perspective, this figure is more than the majority of the International Monetary Fund's (IMF) 2019 estimates of the gross domestic product of nation-states, sitting at number 19 above Saudi Arabia. According to *Forbes Magazine*, in October 2019, 7 of the top 10 corporations by market capitalization are cybernetic tech-titans, namely, Apple, Microsoft, Amazon, Alphabet Inc., Facebook, Alibaba and Tencent. Their combined market capitalization is US$5,151 billion, which if put into the IMF's table would sit in the number four slot, narrowly below Japan and considerably above Germany.

Drawing power from this social formation, Google Maps has a monopolistic grip on contemporary popular cartography. This is not to suggest a strawman absolute monopoly, but rather a structural domination that comes from actual-existing monopoly power.[27] This is propelled by Google's position as the world's number one search-engine, controlling around 90 per cent of the global search market, as well as its default status on Android operating system. This Alphabet-owned system captures around 86 per cent of smartphones globally – far more than its nearest competitor Apple, let alone alternatives such as OpenStreetMaps.org, or other more radical experiments. Back in 2012, when Apple launched its own maps as a direct challenge to Google's cartographic hegemony, the later responded with an uncharacteristic announcement from a Vice President: 'More than a billion people use Google Maps each month to find their way around town and around the world'.[28] If, according to Google, more than 1 billion people used Google Maps each month in 2012, then 6 years later in 2018 – where the global population of people using the Internet has grown from 2.5 billion to well over 3.5 billion – it seems likely that there are now significantly more people using their map. This is difficult to confirm because, according to *Search Engine Land*, Google is 'notorious' for not sharing such figures publicly, thus making estimates a complicated guessing game.[29] Not getting caught up in this frequently sycophantic game, I will stick with a purposefully vague estimate by suggesting that around 2 billion people regularly use Google Maps. The sheer scale of this number is tremendous, never before has a single map had such a vast and diverse audience. This dominance gives Google Maps the ability to function as a kind of abstract infrastructure, with many other geospatial web services running through its Application Program Interface (API) and other 'participatory' aspects, which lead to intensifying enclosures and more monopoly power.[30] Certainly, critically studying Google Maps can tell us a lot about the production and abstraction of space in the early 21st century.

The infinite axes of Google Maps

As the dominant cartographic image of the world, one may ask, where is Google Maps' *axis mundi*, and hence, where is the dominant *axis mundi* of cybernetic capitalism? Unlike paper maps, which must fix a centre for printing, Google's digitized map has the flexibility to change it depending on feedback from the apparatus' surveillance-engines. My inquiry has revealed at least four different sets of axes that Google Maps can centre on, with these defaults being discoverable by directing a browser to 'www.google.com/maps/', and noting what loads up in the window, and what is added to this URL. If the tech-titan has comparatively little surveillance data accumulated about a person, then its map may open by displaying the Google Maps' default *axis mundi*, whereupon '@37.0625,-95.677068,4z' is added to the URL. This string of numbers represents 'decimal degrees', a Geographic Information System (GIS) translation of latitude and longitude co-ordinates. The '4z' tacked onto the end represents the level of zoom. Figure 1 is a reproduction of a Google Maps artefact depicting its default *axis mundi*.[31]

To anyone familiar with the visual language of modern political maps, Figure 1 is instantly recognizable as the United States and some adjacent countries. In this, Google are following the time honoured practice of placing their own culture at the centre-of-the-world. From the ancient inhabitants of the Nile Valley to the contemporary inhabitants of Silicon Valley, map-making cultures have often displayed various degrees and forms of ethnocentrism in their depictions of the world.[32] Today, this centring must be understood as entangled with the United States' somewhat faltering hegemony, with Google projecting a contradictory vision that is simultaneously national and global. It is an image of globalization that shows the enduring importance of the national frame and the tensions between the United States as a nation and as an empire.

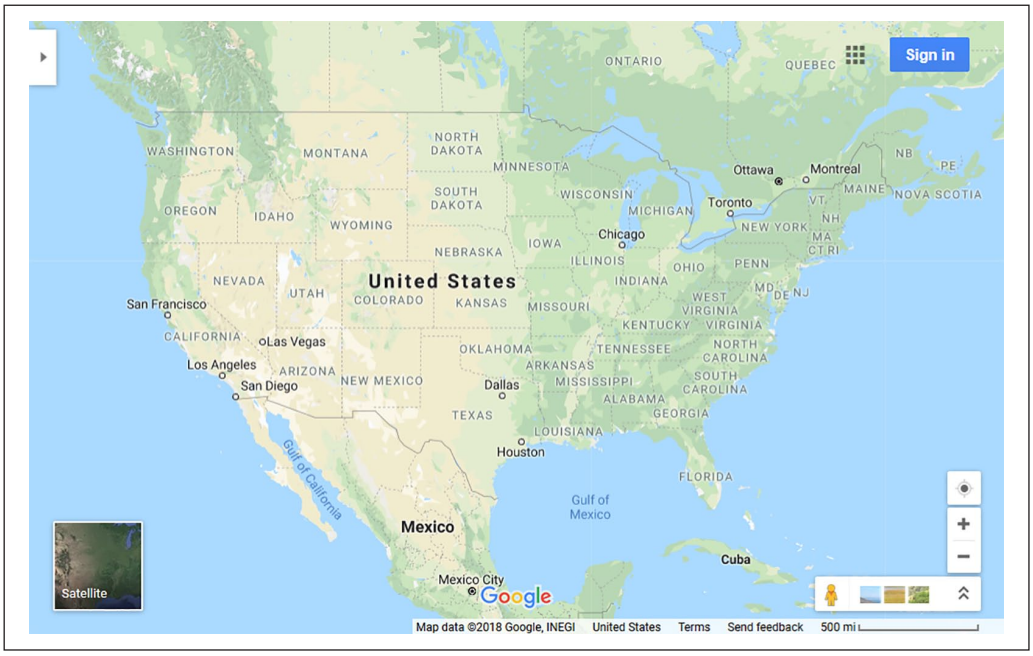

Figure 1. Google Maps' default centre-of-the-world as captured on the 25 June 2018. See: www.google.com/maps/@37.0625,-95.677068,4z

The map in Figure 1 fits squarely into the tradition of political cartography. It focuses on territory, boundaries and a highly uneven spread of major cities. Other common features draw from political mapping include its north-is-up orientation and the use of the General Perspective projection, a projection described by Ptolemy in the oldest known articulation of a modern ontology of space.[33] The landscape is abstracted to a few mottled colours across a flat plane. The perspective that modern maps offer can promote a disinterested rationality, a drawn-away contemplation of the globe's surface, as projected as a neat, minimalistic 2D image. Using the empiricist claim to objective knowledge that has motivated much modern map-making, the image creates a gaze which, in Denis Cosgrove's words:

> pulls diverse life on earth into a vision of unity, [and which] is individualized, a divine and mastering view from a single perspective. That view is at once empowering and visionary [. . . The gaze] seizes divine authority for itself, radiating power across the global surface from a sacred center, locating and projecting human authority imperially toward the ends of the earth.[34]

From this, one may ask, what is Google Maps' 'sacred centre'? From their default global centre, it is possible to travel down the *axis mundi*, descending into details through the map's zoom function. Zooming in on the base of Google Maps' *axis mundi* reveals an empty field just north of Coffeyville Country Club, Kansas. This less-than-monumental centre-of-the-world has no omphalos to mark the navel, no ziggurat or epic natural formation. Rather Google Map's centre is blank, nothing but a uniform and indifferent shade of grey. Switching to 'satellite mode' reveals Google's *axis mundi* to be a pixelated paddock.[35] Curiously, this default centre-of-the-world is different in Google Earth, where it centres on an apartment building in Lawrence, Kansas: a building in which

Brian McClendon lived while attending university. After graduating, McClendon founded the mapping start-up Keyhole, taking Central Intelligence Agency (CIA) venture capital funds and military contracts, before selling it to Google in 2004 and overseeing their mapping projects for a decade. In this way, the idiosyncratic biography of an engineer is woven into the abstracted fabric of the cybernetic map. This is an aspect of the light-hearted, nerdy humour that the self-styled 'playful' company sometimes exhibits. This is part of a contradiction that exists within many tech-titans who are simultaneously engaged in some very serious activity – profit maximization, struggling for monopoly, profiting from the military-industrial complex, and so on – while also engaging in playful performances, as can be seen in Google's numerous 'Easter Eggs', April Fools' Day pranks and other geeky tropes.[36] The default *axis mundi* is not Google Maps only option, indeed it is increasingly difficult to find the default centre-of-the-world. In mid-2018, I could access Google Maps from IP address around the world, thanks to virtual private networks (VPNs), and see this *axis mundi* unevenly appearing as the default core. Re-attempting this observation in mid-2019, I could not find the global default, probably as a result of shifting internal policy within Google. This issue is symptomatic of the constant changes in cybernetic maps, which when combined with black-boxed technology, bureaucratic degree behind closed corporate doors and personalization dynamics, all serve to present methodological issues to researchers. It is apparent that corporation is increasingly using their powerful surveillance-engines to determine where someone is accessing their map from and presenting various customized centres-of-the-world, with three broad levels being apparent beyond the global default.

First, if Google is aware of the nation-state from within which a search comes, they can load up the map centred on the country in question. For instance, if I access Google Maps from my home computer without altering my IP address, the apparatus determines my location and loads a map that is centred on Australia. The centre of the island-continent – which falls in the Great Victorian Desert; an imperial name projected onto the homelands of the Pitjantjatjara and Yankunytjatjara people, again with customary ontologies being violently overlaid by more abstract conceptions of space. Indeed, from this example, we can tease out multiple layers of ontological space: the customary ontology of the Aboriginal custodians who never ceded their sovereignty, the residual traditional Christianity embodied in the 'Her Majesty Victoria, by the Grace of God', were functionally subordinated to British colonialisms modern ontology of cartographic control, and only to be overlaid again by Google's cybernetic reconstitution of space as customizable, relativizing and interactive. This continental centre functions as something of an *axis natio*, or a nationalized version of the *axis mundi*, with there being potentially as many of these national axes as there are nations. Indeed, the above described Kansas *axis mundi* is actually an *axis natio* projected on the planet. Ironically, that the American 'global' centre has now been subordinated to nation-centred defaults can be read as fitting in a time when reactionary populists rhetoric against globalization, albeit while also embracing many of the very forces they are allegedly opposed to.[37] One may recall Yates: 'Things fall apart, the centre cannot hold'. Second, if Google is aware of which city the request is coming from they can load it up as the default starting position. As with the *axis natio*, they can surveil the IP address and have the map centre on a more localized level. In this, it is unclear how Google determine whether to default to national or localized starting position. For example, if I open Google Maps with an IP address in Melbourne central business district, then the city appears as the default starting position, a kind of *axis urbis*. From there, I zoomed in, as I did previously to get to Coffeyville, and discovered that Google Maps depicts Melbourne's *axis urbis* as anchored on 101 Collins Street, a skyscraper that harbours Goldman Sachs, among other financial corporations.[38] While this location is somewhat arbitrary, it also seems quite apt. The skyscrapers that populate the financial centres of trading cities can symbolically be seen as commercialized ziggurats. They function as an *axis mundi* connecting the 'heavens' of high finance

to the earthly cities over which they rule. Be that as it may, this does not hold as a systematic argument, as other cities do not necessarily follow this logic. For instance, the *axis urbis* of Sydney centres on the headquarters of an online florist.

Third, stepping another tier closer takes this trend to its customized conclusion. If one accesses Google Maps on a mobile-device, it can default to centring on the portable computing-machine itself, thus making an individualized centre-of-the-world; an *axis singularis*. This centring is a direct result of the apparatus' surveillance-engines which allow a feedback loop to be formed through the cybernetic map, a loop connecting the person in their embodied context to the abstracting computing-machines. Such loops are key moment in contemporary cybernetic capitalism and its power to localize, customize and surveil. Practically speaking, this kind of centring can be convenient, for many requests – probably the vast majority – concern people inquiring into or attempting to navigate through their immediate surroundings, hence having an individualized centre is likely a useful place to start. It is from there that they will engage Google Maps as a practical wayfinding device and follow its navigational directions. This taps into a much-discussed area of concern, for the prevalence of such automated systems is implicated in how people understand space and physically move across it.[39]

Furthermore, it is also convenient for Google for it is at this level that the representation may display nearby advertisers which, if engaged with, contribute to the cyber-capitalist firm's accumulation strategy, a model rooted in surveillance, commodification and cybernetic feedback.[40] Through their map, Google use surveillance to target advertisements at specific people, at specific times and places, again showing the importance of temporality in cybernetic maps.[41] For instance, an advertiser could aim to have their advertisement appear to someone conducting a search on a Friday at 7.30 pm, from a smartphone near the restaurant district on Lygon Street, Melbourne. Advertisers are even given the possibility to increase their bid according to the specific location of a person using Google, hence they could bid higher if a person was within a certain radius of their store.

The *axis singularis* is a moving centre, a centre that follows the mobile-device through space, a centre enabled by surveillance. Indeed, all of the customized axes – *natio, urbis* and *singularis* – are contingent on surveillance. Google Maps automatically fragments itself, presenting different centres to different people, depending on the precision of their surveillance. Yet, beneath the atomized automations lies the increasingly obscured global default; the *axis mundi* which runs through the hegemonic core of the contemporary world-system, the United States. From that faltering, eclipsed core spreads increasing fragmentation, with the centres crumbling into greater degrees of customization. Viewed from the level of an individual, the *axis singularis* may seem the least abstract starting position, for it begins with 'here'; wherever the person accessing Google Maps happens to be. Yet, on closer examination, it is ironically perhaps the most abstract of all as it requires the highest degree of precision to determine. It is one thing to use the *axis mundi* as a one-size-fits-all global centre, and another to pin-point a centre onto planetary space to within a matter of metres. To obtain this atomized centre, the apparatus necessarily draws on a complex ensemble of surveillance-engines – including IP address, WiFi location and planet orbiting military satellites (Global Positioning System (GPS), more on this below) – to accurately pin-point the location of a mobile-device, and thus the machine's human appendage. It is worth emphasizing that the mobile computing-machine is the centre, and only by extension the person holding it. Through this complex system, a highly abstracted representation of 'here' is shown as the *axis singualris*. In this respect, it is detached from the lived experience and embodied perception of the person using the map, while being treated as an everyday, normalized phenomenon.

Surveillance and cybernetic feedback enable Google Maps to automatically relativize itself in ways that differ greatly from the less abstracted earlier ontological modes, including both

traditional cosmological centres, such as Jerusalem, as well as modern universalizing centres, such as the Greenwich Observatory. Rather, it functions as a kind of 'postmodern' individualizing centre, that overlays the other ontological layers, reconstituting them in its cybernetic circuits. A compelling example of this can be seen through the *Qibla* apps that are available for download onto a smartphone. Google Play has hundreds of such apps, many of which run through Google's API, and all of which use cybernetic surveillance to determine the *Qibla* – the relative direction from where one is to Mecca's most holy mosque, and hence it is an important everyday practice of Islam. This cosmological centre is now easily findable through techno-scientific gadgetry, with many apps offering pray times alerts localized to one's current time zone, with the embodied practice of prayer being interwoven with disembodied integration. Again, this example shows a traditional ontology being overlaid by elements of modern ontology, such as through the time zones, before being drawn away into the abstractions of networked computing machines and their cybernetic surveillance. The older layers do not disappear, they are reconstituted through the intensifying abstractions. Furthermore, many such apps also smuggle in additional layers of surveillance and commodification. The seldom read list of permissions often usurps the right to 'read phone status and identity', 'read your Web history', and other such parasitic practices. Indeed, such usurpations are disturbingly common and are certainly not restricted to apps that determine prayer direction; indeed, the market for such pillaged data and the potential for manipulation that comes from it makes for a very profitable industry.[42] Hence, a person's traditional religious practice is reconstituted through cybernetics in such a way as to intensify the projection of control, the extraction of profit and the centralization of social power.[43] When people engage Google Maps, their practice begins with one of these more-or-less atomized centres. From these default beginnings, a person can search or explore the representation of space and begin engaging with the world in an abstracted and technologically augmented manner. As these kinds of practices are increasingly taken up by around 2 billion people unevenly scattered around the planet, it can have major consequences for how space is imagined and navigated. This produces enormous amounts of subjective data that Google can harvest with their surveillance-engines and sell to their advertisers, hence contributing to the firm's accumulation model as they systematically encourage more consumeristic patterns of practice through their highly targeted advertising.[44] The unparalleled popularity of Google Maps also serves to naturalize the cybernetic capitalist world-picture, hence granting more hegemonic power to this social formation.

Eliade argues that there is a deep social

> desire to find oneself always and without effort in the Centre of the World, at the heart of reality; and by a short cut and in a natural manner to transcend the human condition, and to recover the divine condition – as a Christian would say, the condition before the Fall.[45]

Perhaps, this 'nostalgia for Paradise' helps in part to explain the enthralling power of Google Maps, a technology that produces a world-picture that is centred on the self.

The atomization of space

In an episode of the online TV series questionably called *Revolutionaries*, the Computer History Museum interviewed Google's Marissa Mayer, a significant figure in the realm of cybernetic capitalism. Graduating from Stanford University with a major in 'symbolic systems', Mayer became one of the original Google employees and a key spokesperson for the corporation. Shortly after having left Google to be the CEO of Yahoo, Mayer gave this interview in which she spoke of 'personalized smart maps':

> Like on your Android phone, we actually start to look for what you normally search for – with your permission – and start to light up the map a different way. We ultimately would love to get to a place where maps are so personalized that they're almost like phones. Like if I handed you my map you'd be like, 'This is your map, it's not my map, I can't use your map'. The same way it's hard to use someone else's phone, you could imagine saying, 'What is your personalized lens onto the world?'.[46]

In this fantasy – which Google are actively pursuing – Mayer imagines technological personalization processes progressing to such an extent that they create a world-picture tailored for each user-subject. As noted earlier, these customizations can allow the corporation to charge more money for these targeted advertisements with the logic running that more targeted ads are more likely to be activated, leading to more engagement with advertising, thus more consumerism, hence more capital accumulation and control for the tech-giant, and more hegemony for cyber-capitalism. As a necessary precursor to Mayer's fantasy lie even more powerful surveillance-engines to appropriate more and more subjective material traces of a person's actions to enable a map to be personalized. This necessarily involves a greater penetration of cybernetic systems into everyday lifeworlds and the reorganization of social practice in more constitutive abstract ways.[47] In this context, the term 'personalization' sounds too *personal* to properly describe the processes at play: processes that are automated, algorithmic and increasingly abstract. Having said that, perhaps the morphological extension of the concrete noun (person) to the adjective (personal) to the verb (personalize) to abstract noun (personalization) is itself an enactment of the 'depersonalizing' dynamics of abstraction that I am describing. Nevertheless, perhaps the concept of *atomization* fits better, for it also resonates with the individualistic framework of the market and broader alienating social forces under cyber-capitalism. In this, Google Maps is one part of a larger tendency towards the cybernetic fragmentation of experience, with other prominent examples including Google's Search, Amazon's recommendations, Facebook's newsfeed and many others.

In these cases, the tech-titans employ feedback loops to extract data from people's everyday actions and then to recursively use it to tighten their ability to promote more consumeristic patterns of practice. This dubious practice is central to the ability of cyber-capitalist firms to centralize power and project social control. The atomization dynamics that cyber-capitalist corporations unleash upon the net are highly problematic. Timothy Berners-Lee, one of the web's key inventors, specifically notes the lack of privacy and atomized projections at its centre preventing the web from serving humanity more broadly.[48] In examining this tendency, it is necessary to draw on critiques of the 'filter bubble', and to push beyond them by considering the effects of this atomization on subjectivity and the broader implications of the hegemony of cybernetic capitalism.[49] If each person has their own hyper-individualized map, their own technologically 'personalized lens onto the world', then this contributes to the fragmentation of 'our common world'. Hannah Arendt emphasized the importance of a common world, arguing that there is no possibility of politics, in her sense of the term, without a world held in common.[50] Cybernetic apparatuses like Google Maps can be seen as contributing towards a fragmentation and atomization of social practices, with this feeding into broader processes of depoliticization.[51] In 1973, Raymond Williams wrote about how older forms of public technology, such as city lighting, were giving way to broadcast technologies which were focused on the lounge rooms of suburban houses. He called this a form of 'mobile privatization'.[52] Williams saw this process as resulting from the contradictory pressures of capitalist society, which resulted in a dialectic of isolation and participation; locomotion and stagnation; centralized transmission and atomized reception. The lounge rooms that Williams was imagining were spaces where a family would sit and collectively watch something on the television. Now the family may still sit in the lounge room, and the TV may still be on, but perhaps, each member of

the family sits looking into their hand-held devices, stroking their fingers in infinite circles across their little atomization machines. This has become a vision and a practice of augmented mobile privatization, one involving the feedback mechanisms and automated atomizations of cybernetic capitalism, and hence, playing out at a higher level of social abstraction than the anlogue broadcast.

Google Maps plays into this dynamic in multiple ways, with privately owned devices running patented software across a privatized Internet to deliver information (and advertising) tailored to the algorithmically atomized people. It projects an augmented field of privatization around the people, so that even as they move through more public places, such as footpaths and roads, they can be engulfed by a privatization that moves with them – moreover, a privatization that specifically targets them. If one blindly follows the directions of Google Maps, they can be seen as essentially outsourcing their spatial awareness and orientational abilities to the tech-giant.[53] In this way, their movements across space are drawn in by surveillance and commodification, where they are assimilated into the functioning of the global techno-market. This further embeds Google, and the regime of cybernetic capitalism and disembodied communication, into the lifeworld and increasingly.[54] None of this is to suggest that people are hapless flesh-wads totally enthralled by these apparatuses, for the matter is far more contradictory than this, with tensions existing between different levels of abstraction and with competing ideological practices always complicating and contesting.

As it was formulated across the centuries of capitalist modernity, empty space is drawn away from the sensual, the embodied, the lived diversity of the everyday – even as it gives it back in a new abstracted form. Space is objectified as an empty, Euclidean plane where rationalized Cartesian co-ordinates can be expressed (and presented subjectively in the service of the projective individual making their own lives). It is a space that can be endlessly quantified, commodified and controlled; a space subject to simplifications, standardizations and regimentations.[55] For example, back when the revolutionary France promoted the metric system, this new form of abstract planetary consciousness operated on a scale far removed from everyday life. The growing importance of military mobilization and market exchanges encouraged standards of uniformity in measurement to facilitate the free flow of troops and goods. Being constituted at a higher level of abstraction, this modern ontology of space overlaid older and localized systems. Localized systems of measurement were contextual and historically specific to the locality, with whatever differences that arose being negotiated in face-to-face meetings. As modes of exchange were increasingly abstracted from the face-to-face level of integration and more abstract systems came into place. As James Scott notes, state-sponsored impositions of order were necessary to force complex, local practices to fit within the standardized grid where they could be centrally surveyed and controlled.[56]

As customary ways of being in space were overlaid by more abstract modern ways, so too are the modern ways being overlaid by a far more abstract cybernetic layer of social practice. These abstracting dynamics of atomization change ontological ways of being-in-space, reconstituting them through a technological apparatus and the set of social practices and relations that it manifests. The fundamental practice of being-in-space becomes embroiled with the possibilities and limitations of the technological apparatus and the demands of the global market and the military-industrial complex. This serves to disembed space from the lived phenomenological world and remake it on a plane, a one-dimensional space of atomized abstraction in service of processes of accumulation and control. To analyse these developments, it is important to use theories that can distinguish between this most abstract level and the more concrete levels that remain beneath it. Unreflective flattening in theory can miss many of the contradictions that arise between the layers, as well as potentially misinterpreting the great unsettling currently underway.

The augmentation of empty time

On the deepest biological levels, our bodies are intimately entangled with the Earth's circadian, circannual and lunar rhythms. These kinds of temporalities are largely absent from Google Map's representation of the world. The apparatus marches to a different rhythm: a machinic rhythm; an abstracted, mechanical temporality of a technologically augmented empty time that exhibits an extraordinarily high degree of compression, synchronization and standardization. J.B. Harley noted that 'Maps are often representations of time as much as space'.[57] With this observation in mind then, Google Maps can be critically interpreted to see what kind of social temporality it both represents and reproduces. For as the lived world of space is reconstituted by the apparatus, so too is the lived world of time. Technology has long been entangled with the reconstitution of social time. For instance, Mumford noted that the clock

> is a piece of power-machinery whose 'product' is seconds and minutes: by its essential nature it dissociated time from human events and helped to create the belief in an independent world of mathematically measurable sequences: the special world of science.[58]

According to Mumford, the clock served to abstract human events from natural events, subsuming the organic rhythms to the linear march of the machine.

In a tangled parallel with abstract space, the temporal aspect of this dominant conception is often called homogeneous empty time. For Walter Benjamin, this modern conception of time is considered empty because anything, including deeply felt emotional responses, can be put within its framework, and homogeneous because no events affect its monotonous, linear passage.[59] Everything happens in time but is unable to affect it. For instance, on 12 October 1492, Columbus first arrives in the Americas or on the 6 August 1945 at 08:15, Japanese standard time, 'Little Boy' exploded over Hiroshima, and so on. This temporal system can extend well beyond social events to include, for example, the estimation that the Sun was formed about 4.6 billion years ago, or that it may transform into a red giant around 5 billion years in the future and swallow the Earth. The abstraction and emptying of ontological categories of time and space feeds into the expansionist project of capitalist modernity:

> the abstractions of measured time and measured space undermined the earlier conceptions of infinity and eternity, since measurement must begin with an arbitrary here and now even if space and time be empty. The itch to *use* space and time had broken out: and once they were co-ordinated with movement, they could be contracted or expanded: the conquest of space and time had begun.[60]

Capitalist modernity's conception of abstract space and empty time has become highly normalized and are now the grounds for much of everyday practice.[61] 'Meet you at 10.30'; '. . . it's 300 m north'; or 'Our anniversary's the 12th of March'. These rationalized, standardized and universalized systems are internally coherent and in a position of dominance, thus giving them the illusion of being without contradiction. Other ontological conceptions of space-time are also subordinated and placed within its terms: for instance, the traditional Islamic calendar begins in 622 CE, hence is seamlessly absorbed into the universalizing scheme. The process of abstracting, globalizing and emptying space-time was largely conducted in service of the integration of markets, the centralization of state-power and scientific control. For example, David Landes argued that in the 19th century the 'entire consciousness of time [was] altered by the requirements and opportunities of a railway world'.[62] Railways, steamships and telegrams came into an ensemble with capitalist modes of practice, military concerns and ideologies of communication and progress, to push for

the imposition of a single temporal frame, unification under a global empty time.[63] This process facilitated the centralizing power of states/empires and the integration of global markets, as well as enormously enhancing 'the value of time measurement, for it eliminated all manner of confusion and of pretext for inexactitude and made possible a far more efficient ordering of activity'.[64] In this respect, changes in ontological categories are bound up with changes in patterns of social practice, which include technological engagements.

Drawing on these long historic developments, obviously Google did not invent the modern concepts of empty space or empty time. Rather, in creating their world-picture, they draw on these dominant ontological conceptions that are deep-set in modern thinking. Yet, while Google Maps engages these conceptions, it cannot be understood through them alone, for the abstracted materiality of the apparatus and the intensity of cybernetic abstraction also represent something qualitatively new.[65] It is more than just a compression of space-time, beyond a simple shift into some 'information age', and not captured by prefixing modern with 'post'. Beginning in the Second World War, an ensemble of techno-scientific practices have become increasingly tightly integrated with capitalist and militarist projects leading to the rise of the increasingly dominant mode of practice that I am calling cybernetic capitalism. These developments have caused a great intensification in the abstraction of space and time, which has led to a constitutive transformation in social practice and the ontological way of being in space-time. As modern ontologies overlaying traditional and customary practices, they are now being overlaid by social formations on a higher level of constitutive abstraction.[66]

Thus, as conceptions and practices of time and space were dramatically altered in the 19th century, so they were again under conditions of cybernetic capitalism. For instance, in 1967, the ancient time unit of the second – first formulated by the Babylonians – was redefined as 'the duration of 9,192,631,770 periods of the radiation corresponding to the transition between the two hyperfine levels of the ground state of the caesium 133 atom'.[67] This technologically augmented definition is radically abstracted from the phenomenological realm and enframed with an extreme atomic precision. Building on this definition of a second, in 1983, the 17th General Conference on Weights and Measures declared a new, even more abstract definition of a metre-based on the speed of light. It pronounced, 'the length of the path travelled by light in vacuum during a time interval of 1/299 792 458 of a second'.[68] Space was defined by time and both were reduced to supreme abstractions as an increasingly rationalized order was imposed on the embodied Earth. These abstractions make the metric systems' divisions, or the clocks mechanical tick seem thoroughly concrete in comparison.

These abstractions are a constitutive part of Google Maps, for the apparatus draws on GPS technology. Designed and owned by the Pentagon, this cybernetic system was developed to aid the control and communication of world-spanning war-machines. As in the 19th century, the centralization of state/imperial power was a prime concern, with symbiotic benefits of GPS facilitating the logistics of global trade – through airlines and container-ships – the integration of markets, and hence the capitalist mode of practice. GPS satellites orbit about 20,000 km above the Earth's surface, at a speed of around 14,000 km/h, thus lapping the planet every 12 hours.[69] Each satellite carries an atomic clock that 'ticks' – to use that obsolete mechanical metaphor – in nanoseconds, which is to say one billionth of a second. To suggest the order of magnitude involved in this fraction, a nanosecond is to a second what a second is to 39 years. To relate this back to the scale of the body, a blink of an eye would take a decade; hence it can perhaps be thought of as a 'post-phenomenological' measurement.[70] For GPS to be able to calculate locations, it requires extreme accuracy of the satellite's atomic clocks. This is complicated because Einstein's theories of special and general relativity predict that clocks on satellites moving at such speeds would run comparatively slower than identical clocks on the surface. Special relativity takes into consideration the dilation

of time with respect to relative speeds between inertial frames of reference; and general relativity considers the curvature of space-time with respects to the mass of a large body, such as a planet.

So, putting these theories together and applying them to a GPS satellite going 14,000 kilometres-per-hour at 20,000 kilometres above the surface, the on-board clock will run 38 microseconds per day slower than an identical one on Earth. If left unchecked, this would lead to GPS accumulating errors of about 10 kilometres-per-day, enough to make the entire system rapidly and spectacularly useless. The satellite's designers predicted this problem and slowed the on-board atomic clocks to deal with general relativity. Special relativity is calculated by the GPS-receiving device, which uses data packages from the satellite and algorithms to calculate an accurate position.[71] Thus, when engaging Google Maps on a smartphone, the apparatus itself must compensate for the curvature of space-time, hence subsuming Einsteinian relativism to augmented empty time. This is a prime example of the high degree of abstraction inherent in the apparatus: it draws on post-phenomenological measures, world-spanning cybernetic systems and space-time dilation just to give a representation of 'here'. One-dimensional analyses of technology, be them through flattening ontologies or ignoring embodiment, cannot grasp the social importance of these material abstractions.

Such formulations of space-time are far more abstract than those from earlier in capitalist modernity: GPS makes the Great Trigonometrical Survey of colonial India seem comparatively crude and concrete.[72] Through quantitative intensification, these abstractions have reached a qualitatively new level with the rise of the technosciences and its synthesis with cybernetic capitalism.[73] Curiously, as this emergent layer becomes increasingly dominant in the early 21st century, these intense abstractions are rendered into the invisible infrastructure, part of the technological black-boxing and the cybernetic reconstitution of the lifeworld.[74] Herein lay contradictions in social practice between everyday life and the machines that reconstitute it, between the experiential register and the apparatuses that reshape it. Hence, as the modern ontology of space-time violently overlaid customary and traditional modes of being – without flattening or fully erasing these residual ways – so too the emergent cybernetic intensification increasingly gaining dominance, and in so doing, it reconstitutes older ways. More concrete ways of being-in-the-world can clash and contradict with more abstract emergent layers. None of the above is to suggest that abstractions are inherently 'bad' – although, of course, important politico-ethical questions are every present – and nor is it to suggest some neat and impossible return to a pure, more concrete time. Rather, I have sought to briefly examine the ways in which powerful abstractions are put into the service of particularly ends – specifically, the concentration of power and profit in cybernetic capitalism – and also how such abstractions reconstitute social being. While not the focus of this article, it is possible to make abstractions serve other political ends, likewise ontological abstractions can also be reflexively grounded in more concrete practices without dominating nature, other people, and other ways-of-being.

Conclusion

As the most popular map in history, Google Maps presents multiple centres-of-the-world, atomized representations of space that are enabled by surveillance and commodification. In so doing, it partakes in an intergenerational and multicultural process of creating an *axis mundi*, albeit one that is fragmented, atomizing and exceedingly abstract; while simultaneously appearing neatly free of contradiction. Through using engaged theory and the levels of abstraction argument, I have briefly shown how ontologies of space-time can transform, conflict and layer across history. Such analytical separations of levels are distinct from theoretical moves to flattening ontologies into one-dimensional frameworks, or ignore questions of embodiment. An advantage of this approach is that

it is sensitive to contradictions that can arise between ontological formations, as well as being able to integrate large-scale transformations with detailed empirical assessments. Thus, this approach can help to reveal how cybernetic maps are intensely disenchanting on one level, and simultaneously re-enchanting on another: as seen between the instrumental calculations of techno-science, and the techno-fetishism of their 'evangelists'. Such contradictions are rife in cybernetic capitalism, itself a social formation that is seriously rational on a level, yet wildly irrational at another; with engineers and scientists coolly constructing abstract mechanisms in service of capital's desperate demand for infinite accumulation within finite nature, a crucial moment in a most vicious contradiction currently tearing at the eco-social fabric of the world.

In this light, Google Maps represents a society being thoroughly reconstituted by cybernetics – as in technologies of control and communication whereby feedback loops and algorithmic automations that reorganize social practices – thus contributing to a qualitative intensification in the social forces of abstraction. The abstraction of ontological categories of space and time has significant social consequences. The more abstract the means of relating to others and to nature, the more the potential there is for exercising power at a distance. The same abstractions of GPS can be interwoven with different ensembles of technology to allow someone to 'check in' with Google Maps at a restaurant on their smartphone or guide a 'smart-bomb' from a drone down onto a Pashtun wedding procession. Likewise, under capitalism, technological abstraction has often facilitated the centralization of power – the ability to act at a distance, and through the tightening of systems of surveillance and control – while simultaneously projecting atomization across the social sphere. These intensifying abstractions are bound up with the structural promotion of consumerism and the accumulation of capital on a world-historic scale. In short, the cybernetic reconstitution of capitalism is having very real implications for the organization of nature and power in our world and the intensification of inequalities and increasingly unstable ecologies.

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Notes

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