Vertical vision and atmocultural navigation. Notes on emerging urban scopic regimes

Andrea Mubi Brighenti & Andrea Pavoni

Published online: 11 Dec 2020.

Submit your article to this journal ⌐

View related articles ⌐

View Crossmark data ⌐

Routledge
Taylor & Francis Group

Check for updates

Vertical vision and atmocultural navigation. Notes on emerging urban scopic regimes

ANDREA MUBI BRIGHENTI and ANDREA PAVONI

This paper analyses vertical vision by tracing its possible genealogy and exploring the forms it takes in the contemporary city. In the first section, vertical vision is situated in the context of its cosmographic tenets. In the second section, the critique of verticality is complemented by a topological approach where vertical vision can be seen folding into a novel visual grammar. The lineaments of this grammar can be retrieved by attending specifically to algorithms and their role in contemporary urban perception, which we discuss in the third section. The fourth section implements the suggestions of two artists: Harun Farocki's notion of navigation, and Hito Steyerl's notion of bubble vision. Exposing the central role played by digital platforms in ushering in this novel paradigm, bubble vision can be reconstructed as the logical end-point of classical vertical vision. This comes in conjunction with the rise of a peculiar visual-cultural configuration, which could be called 'atmoculture.' Section five submits that atmoculture represents the cultural milieu of bubble vision. In conclusion, the paper invites visual scholars interested in the study of verticality to recognise bubble vision, together with its atmocultural background, as a new expression, and a reconfiguration, of vertical vision: similarly, centred and disembodied, exhilarating, and dangerously de-responsibilising.

Comment pourrais-je, en effet, participer à l'ivresse du ciel? Je *regarde: regarder* demande ma présence pétrifiée en ce point de monde. (Bataille 1976, 187)[1]

VERTICAL COSMOGRAPHY

Vertical vision may be characterised as 'Olympian,' in that it places the viewer from a god-like perspective, as if it were an ancient Greek god observing the world from the heights of Mount Olympus. Such placement is neither innocent, nor linear. The vision from above is the domain of religion and utopian projections, the privilege of the all-seeing eye and all-knowing mind – in other words, the hubristic projection of an all-too-human reason.[2] The late

19th-century social theorist Gabriel Tarde remarked that society is an essentially horizontal, rather than vertical, phenomenon. He attributed this fact to 'the physical organisation of man, whose senses and organs respond to the exigencies of an exclusively horizontal development.' In general, Tarde (1893, §IV) argued, the human being is projected forward horizontally, and finds it easier to travel long distances than climb a single wall. Horizontal and vertical vision thus stand before one another as two qualitatively different types of vision, the former being more familiar and 'grounded,' the latter more audacious and challenging. Because of this difference, the problem of how to grant perception a certain stability and a certain foundation ensues.

The whole history of cartography – well before the introduction of the modern notion of perspective – may be seen as a way to provide humans with such a stability, offering a 'cosmographic' perspective to make sense of their place in the universe. As reconstructed by the cultural geographer Denis Cosgrove (2008), historically maps encompassed three sets of functions, embodied by three different disciplines: cosmography, geography, and chorography. The latter, introduced by Ptolemy, and referring to the fine description of the landscape, complemented the totalising abstraction of the map proper, with enhanced attention 'to the individuality, personality and uniqueness of a place,' without much concern with the appropriateness of scaling and proportion. In this sense chorography, as 'the written form of gesture' (Virilio, quoted in Offner, Sander, and Virilio 1991, 49), supported a connection between the vertical cosmological abstraction and the horizontal geographic embodiment of vision, one that would later be sacrificed by the dominance of the vertical gaze.

Only 10 years after Tarde wrote his treaty on social logic, with the Wright brothers' flight in 1903, the airplane (more precisely, the heavier-than-air aircraft)

Andrea Mubi Brighenti is a professor of social theory in the Department of Sociology, University of Trento, Italy. His research topics broadly cover space-power-and-society. His most recent book, co-authored with Mattias Kärrholm, is *Animated Lands. Studies in Territoriology* (University of Nebraska Press, 2020). Research website: www.capacitedaffect.net

Andrea Pavoni is a research fellow at DINÂMIA'CET, Instituto Universitário de Lisboa, Portugal. His research explores the relation between materiality, normativity and aesthetics in the urban context. His book, *Controlling Urban Events. Law, Ethics and the Material*, is out with Routledge.

revealed a hitherto physically inaccessible view from the sky: 'The airplane has unveiled the true face of the earth,' remarked enthusiastically the French writer and aviator Antoine de Saint-Exupéry (1992[1939], 63).[3] Yet it was not truth, but danger, what Martin Heidegger notably saw when cosmonautics provided the first image of planet Earth from space (1993[1966]). What frightened the German philosopher was the *appearance* of the Earth as an object out there, inert and ready to be exploited by the technological mind set. Little more than a decade after, looking down from another proverbial position of vertical power, Michel de Certeau ruminated on the lure and the limits of the embodied vision from above, imagining an observer placed at the 110th floor of the World Trade Center in New York City, 'lifted out of the city's grasp,' captured by 'the exaltation of a scopic and gnostic drive' – an imaginary totalisation at once hubristic and myopic (or rather, hubristic insofar as myopic). As de Certeau (1984, 48) put it, what the panoptic perspective overlooks is the '"*polytheism*" *of scattered practices* [that] survives, dominated but not erased' by the 'monotheistic' gaze. Today, this observation may sound strangely naïve: not only does technological advancement constantly provide us with ever-finer capacities to see, track, and target objects from the sky, but more significantly, the technological reconfiguration of the vertical perspective ushers us into a scopic regime that reorients the way we think, imagine and move around what we still call, for some reasons, 'our world.'

The technological unfolding of the possibility of an actual view from above, in fact, did not simply entail the lifting of perspective from pedestrian horizontality to vertical heights but, more profoundly, the gradual removal of the eye itself. As Laura Kurgan (2013, 11) explains, recent satellite images such as the whole Earth taken from space (e.g. NASA's *Blue Marble Generation 2012*) are images no human could ever see, no matter which perspectives it takes. The reason is that these images are 'not simply photographs taken by a person traveling in space with a camera. They are composites of massive quantities of remotely sensed data collected by satellite-borne sensors'. Similarly, the light wavelength range is skewed and condensed in these pictures to serve our limited vision. The anthropocentric understanding of this view from above in the comfortable projection of vertical topography thus misses completely the complex logistics of this fragmented mosaic of rescaled visual information, which surfaces over the threshold of human perception only thanks to the algorithmic assembling of a 'polytheism' of scattered data, collected across different spaces, at different times.

The kernel of this radical shift towards a visually fragmented normativity had been already explored by Walter Benjamin (2008[1935], 35) in his reflections on cinema, when he argued that 'The painter's is a total image, whereas that of the cinematographer is piecemeal, its manifold parts being assembled according to a new law'. This 'new law', which Benjamin saw as depending on cinema's capacity to 'penetrate deeply into its [reality's] tissue', is further modified by the advent of digital technology, whose algorithmic normativity is no longer even comparable to the human eye, but radically escapes its perception and imagination: 'it is actually impossible to imagine the patterns, to guess the interpretation produced by this sightless vision' (Virilio 1994, 62). Curiously, while their logic of production remains opaque, these images are increasingly available to human consumption via the ubiquitous screens that punctuate our existence. Today, as high-resolution satellite images have become potentially accessible to everyone owning a smart phone, the vertical perspective has become so ingrained in everyday experience that few seem to redoubt or fear (as Heidegger still did) this 'detached, dispassionate and privileged way of interpreting the world's surface, that is a phenomenon which, by its very presence and new mass availability, procures specific concrete effects upon it' (Dorrian 2013, 303). It remains to be ascertained what these specific effects are.

VERTICAL FOLDING

For how much the critiques of the Olympian vision following de Certeau's lead may be necessary (e.g. Dodge and Perkins 2009), they can hardly suffice to grasp the conceptual depths unlocked by the new vertical vision. An array of works has already contributed to complicate the Olympian critique. For instance, the Israeli architect Eyal Weizman (2002, 2007) has finely dissected the three-dimensional scope of Israeli governmentality in the Palestinian Occupied Territories, with control ranging from the sky to the underground. Weizman's work has in turn inspired a number of studies into the relation between the contemporary evolution of surveillance, tracking and targeting technologies, on the one hand, and novel forms of political and legal governmentality, on the other. The vertical, it has been argued, needs to be considered not only with reference to a disembodied 'view from above,' but also as a dense, three-dimensional and volumetric 'sense' (Elden 2013; Bridge 2013). The necessity to move beyond the vertical/horizontal divide has been increasingly recognised by a number of scholars who, accordingly, have sought to understand the problematic three-dimensionality of power relations,

violence and inequality (Graham and Hewitt 2013; Graham 2016). This invitation has led to attend, for instance, aerial governmentality (Adey 2010), the increasingly widespread use of drones (Chamayou 2013; Adey, Whitehead, and Williams 2011; Gregory 2011), and the expansion of high-rise urbanism (Nethercote 2018; Drozdz, Appert, and Harris 2018). These technologies have, of course, also been used in resistance practices and counter-governmental strategies such as, for instance, by the Forensic Architecture research group led by Weizmann himself, whose aim is to investigate cases of state violence and violations of human rights through high-tech reconstructions of the locations of abusive events (Curry 2017).

Understandably, this thread of research has been overwhelmingly attentive to contemporary issues of security, surveillance and control practices in military and civil contexts. While taking all these insights into account, we suggest that additional symbolic, aesthetic and morphological tendencies are also to be considered. The context-specific ways in which these trends are materialised, embodied and reformulated enlarges the field of enquiry. The latter dimensions sometimes tend to be 'overlooked' when taking for granted, for instance, the equation between verticality and power, privilege, domination, with the consequence of depicting those 'below' as unavoidably subject to control, domination – as well as, upon occasion, subjects capable of some degree of resistance. By doing so, the above-ground equation which *grounds* the vertical paradigm of vision is eventually taken for granted (Graham 2016). A more rounded understanding may require to overcome a merely 'topographic,' Euclidean understanding of verticality, towards a 'topological' idea that appears as more appropriate to capture how, especially after the digital revolution, socio-material relations are becoming more intensive, affective, ubiquitous and corporeal (Harris 2015; Harker 2014; Martin and Secor 2014).

An important source for enhanced awareness of the volumetric, dense, vaporous and atmospheric spatiality of co-existence and control can be found in the work of the German philosopher Peter Sloterdijk, notably in his spherology research programme. Yet, inspiration for a full-blown topological approach to contemporary spatiality also comes from the French urban theorist Paul Virilio. Virilio posited the notion of *the oblique*, a diagonal or slantwise approach that rejects the vertical/horizontal dichotomy, developing ideas such as topological inclination and surface orientation (Parent and Virilio 1996). According to Virilio (2001; Virilio and Lotringer 2002), topology emerges as a third urban order, after the horizontality of the first (articulated by

populations, lands and villages) and the verticality of the second (based on towers, skyscrapers and megastructures). With the topological order, the ground is not simply displaced, but rather twisted. In a similar way, the artist Hito Steyerl (2011) has more recently invited to think vision in a condition of 'free fall,' where both the horizon of linear perspective and the ground of vertical perspective have been removed. Surfaces become movable, oriented, tilted by intensities, contingencies and trajectories that are not simply physical, but also cognitive, affective, emotional, and informational. Topology removes the presupposition of a flat ground that is implicit in the verticality discourse, emphasising how each 'plane' is pliable through continuous transformations: this way, elements such as spatial relationality, eventfulness, prolongation and virtuality come to the foreground (Allen 2011; Lury, Parisi, and Terranova 2012; Lata and Minca 2016).

This realisation allows to emphasise how, with the advent of digital computation, vertical vision *folds* into a new technophysics where the relation between the sky, the eye, and the body is topologically reconfigured via the type of 'immanent normativity' that characterises learning algorithms. Virilio already reflected on the ontological consequences of this aspect by arguing that 'between object and subject, between *objective* and *subjective*, there is an enormous gap: trajectory-ness [*le trajectif*]. Object, subject and trajectory are one single being' (quoted in Offner, Sander, and Virilio 1991, 48; see also Armitage 2009; Brighenti and Pavoni, forthcoming). In fact, by allowing a peculiar triangulation between locative technologies, eyeless vision from above, and algorithmic sieving (Lury, Parisi, and Terranova 2012), the new media topologically reshape the visual grammar of urban experience by providing a digitally mediated way to *embody* vertical vision into trajectories that are constantly prompted, multiplied, traced and tracked, twisting and tilting the socio-material plane of the city. This is why thinking verticality in its topological and volumetric quality requires entering an immersive, enveloping condition, exploring how the vertical and horizontal axes are folded and multiplied in the atmospheric coupling of urban togetherness. In sum, to make sense of the new urban scopic regimes, the critique of verticality needs to be supplemented with a consideration of the new embodiments of vision.

ALGORITHMIC VISION

Adopting a concept by Deleuze and Guattari (1980), we may define an 'urban scopic regime' as an *abstract machine*. More precisely, we should speak of abstract

machine *of territorial stabilisation*. The French philosophers theorised abstract machines in terms of diagrams of realisation that differ from both mechanisms (*mécanismes*) and tracings (*calques*). In their view, a machine works as a connection of heterogeneous bits and pieces – 'partial objects', in Lacan's vocabulary – that cannot be reduced to any 'essence' severed from the machine's current functioning. In other words, the 'consistence' of a machine, what keeps the machine together, is nothing but its own way of working, its piecemeal (literally, bits-and-pieces-like) fashion – as we may say, its 'style of making,' or its immanent 'law.' If therefore an urban regime can be said to form one such machine, then it should be regarded as a compositional multiplicity impossible to be further reduced without transforming it into a different entity. If this machine can be characterised as 'abstract,' it is because of its non-figurative and non-representational quality. This means that the urban regime neither 'depicts' nor 'represents' the territory; if ever, it 'charts' it – and does so precisely in terms of its diagrammatic functioning: so, stabilisation is not an external aim towards which the regime works, but the very fact of the functioning of the regime, its way of encoding the machine's diagram in its operating mode. Incidentally, one must recall that Deleuze and Guattari use the terminology of mapping (*faire la carte*) in an unconventional way, as they do not refer to a static visual map, but precisely to the immanent diagrammatic functioning of a machine. The concept of abstract machine of territorial stabilisation may turn handy to grasp the novel visual grammar introduced in the last section, and which has the cybernetic notion of algorithm at its centre.

In her insightful *History of Vision and Reason since 1945*, Orit Halpern (2015, 64–5) observes that with the advent of cybernetics, 'vision came to be understood as an autopoietic process, emerging from within a system of interactions, amenable to algorithmic treatment, and materializable in experimental method in relation to machines'. For cybernetics, patterns emerge through interaction and feedback loops that can be subsequently coded into algorithmic protocols. In this context, an algorithm can be considered as a form that is immanent to the process it encodes, reproduces and optimises: at the limit, it is the process' immanent law.[4] In other words, just like an abstract machine in the sense given above, an algorithm may be understood as a diagram that emerges from the coming-together of heterogeneous parts working jointly. It can be described as a *tuning* simultaneously generated by – and that in turn contributes to fine-tune – a given set of relations, similar to the way in which a harmony emerges in

a non-pre-determined way out of the singing of different voice lines (Pavoni 2018). Algorithms have to do with a peculiar way of framing and encoding events: they embody a type of vision that bypasses the human eye and the subject/object distinction, plugging directly onto the field out of which vision emerges. This extrapolates a 'machinic' point of view, in the Deleuzoguattarian sense exposed above. More precisely, algorithmic vision appears as a second-order vision: organising the functions of data-*mining* and pattern-*finding*, it highlights the conditions of possibility of *a generalised vision*.[5] While the relation between algorithm and space, or code and activation, greatly predates digital computation, with the latter's advent it undergoes significant quantitative and, inherently, qualitative transformations. An example may help clarifying what this entails vis-à-vis vertical vision.

According to Virilio (1989) the first unmanned flight of the US army in Laos in 1967 turned the battlefield into 'a cinema location.' As aerial vision intersects with digital computation and AI, however, the cinematic gaze is superseded. Contemporary UAVs (unmanned aerial vehicle), most notably military drones, in fact, are no longer a simple extension of the human eye via remote control technology. They operate via computational operations and machine learning techniques distributed across a networked topology (Johnston 1999). The 'ground' below is constantly de- and re-composed into a 'mined' constellation of bits of information, which are searched for patterns (in the context of the so-called war on terror these may be *patterns-of-life* models, known as POLs) by means of algorithmic filtering (Bousquet 2018). The ontological assumption has changed. Reality is not simply made of images (the fundamental tenet of Henri Bergson's theorisation, which was great inspiration to cybernetics' father Norbert Wiener), but rather of mathematical data (what Farocki would term *operative images*, see below) which machines can decompose (mining) and recompose in to patterns whose aesthetics is 'visible' only to them. In a sense, from Bergson we 'regress' to Galilei, for whom the 'book of nature' was written in mathematical notation.

In the case of military drones, for instance, the informational processing of the terrain – which may eventually prompt the decision to perform a lethal *signature strike* – depends on finding POLs via an eyeless vision which bypasses both the object (the human target) and the subject (the drone operator) (Bloomberg 2019; Kosek 2010). In this form of vision, seeing and knowing (and even killing) are folded together, dependent on a machine-to-machine traffic of data which occurs outside of the human capacity to perceive. This entails a wholly novel *logistics of perception*, as

per Virilio's (1989) astute definition.[6] Either through drone or satellites, the sky is still central to organise a vision which, however, is increasingly *eyeless*, and in which topographic verticality is folded onto a topological data space. Albeit still entangled with human vision, the new visual grammar appears to be eminently *inhuman*. As Antoine Bousquet (2018, 109) explains,

> The mechanical disembodiment of vision correlates with a biophysical reembodiment, the increasingly complex articulations of which are always further displacing the action of perception from any fixed locus.

As the relation between sky, eye and body appears to be profoundly reshaped, a key question of orientation thus emerges, especially in the context of the contemporary 'iPhone city' (Bratton 2009), where mapping, digital technologies and portable-wearable devices have become the new normal (Figure 1).

BUBBLE VISION

Walking down your local street may appear like a rather straightforward activity of sensorial absorption, yet at the same time it increasingly involves penetrating a dense data-field with which our smart devices interact in a series of back-and-forth data flows. Negotiating this space entails a novel logistics of perception, especially since the provision of 'visual intelligence' to the user – and, of course, the most precious provision of *data* to the service provider – via portable interfaces generally appears as smooth, simple and 'user-friendly' as possible. Therefore, the digital logistics of perception entails a reconfiguration of the relation between vision

and movement. In one of his last public lectures, the late German filmmaker Harun Farocki (2014) stressed that, with the advent of computer animation, a historical turning point in perception had been reached – with *navigation* now supplanting classic vision as the dominant paradigm.[7] Navigation, suggests Farocki, refers to a 'vision' that no longer 'sees,' but more precisely organises, arranges and configures data and patterns in order to provide orientation to the urban dweller. As Holert and Mende (2019) summarise,

> Navigation, instead of framing or representing the world, continuously updates and adjusts multiple frames from viewpoints within the world. Navigation in the digital realm is the modelling and mapping of an elusive environment – in the service of orientation, play, immersion, control, and survival.

Hito Steyerl (2018) has sought to grasp this fact by arguing that the new digital media seem to retrieve the ancient image of the sphere, now refurbished as a bubble of vision into which the viewer is invited to dive. With 'bubble vision', Steyerl refers to the condition of being at the centre of a 360° panorama, as in immersive VR projections or first-person videogames. Within the bubble, vision appears to be at the same time, paradoxically, both immersive and disembodied, both passive and active: 'you are both at the centre, and yet you are not there', a disembodied eye at the centre of things, whose movement literally constructs the environment, since it is now the environment that organises itself around the movement of the gaze. An 'abyssal constructionism' follows, that the cinematic paradigm of montage is not able to

FIGURE 1.   IKKM, "Harun Farocki: Computer Animation Rules ", Vimeo Video, 1:05:04, June 25, 2014. https://vimeo.com/100092938

capture in full (Holert 2017, 95). Computer games may seem more apt for this purpose, as Alexander Galloway (2006, 2–3) has contended, highlighting the dynamic quality of videogame's algorithmic visuality: 'If photographs are images, and films are moving images, then *video games are actions*'. Differently from cinema, a computing visual machine may be defined as an 'action-based medium' whose 'very materiality moves and restructures itself' in the course of the interaction. In the cinematic subjective gaze, as we know, the landscape is pre-constructed by the planned direction of the camera. In the subjective gaze of a first-person shooter video games, instead, the computerised landscape is constantly adapting and transforming according to the unplanned and unpredictable trajectories of the user's point of view: the environment is a bubble that is constantly reorganising around the user's vision. Of course, that does not rule out the possibility of smashing the bubble, but rather points out, in the first place, the complexity of living in it. The experience of videogames represents, as suggested by media theorist Lev Manovich (2000, 179), a close encounter with the algorithm, and an active exploration of its 'diagram' (Figure 2).

Applying these insights to the field of visual ambient urban computation can prove fruitful. Indeed, with ambient computation we assist to a peculiar topological intertwining of movement and space: 'With urban computing,' writes Malcolm McCullough (2013, 200-4),

> relations between embodied cognition, spatial mental maps, and explicit way showing systems now slip apart and recombine …

[urban computing] interleaves media objects among themselves and with unmediated objects, and in effect becomes ambient.

The patterns of attention and awareness are deeply reconfigured. In the 1930s, Benjamin (2008[1935], 40) first distinguished two main ways in which architectural forms are perceived by urbanites: on the one hand, there is what he called 'optical reception,' which is visible and conscious, on the other, 'tactile reception,' which is practical, invisible, unconscious. 'Tactile reception,' Benjamin wrote, 'comes about not so much by way of attention as by way of habit.'[8] It is indeed topological, immersive, tactile and haptic, the form of 'reception' that seemingly characterises urban navigation vis-à-vis ambient computing, except that this sensoriality is often outsourced to the devices themselves. Increasingly, we are both *in there* and *nowhere*, since we increasingly experience our world from within these bubbles.

Digital platforms play a key role in unfolding this immersive mode of action at the intersection between, on the one hand, mapping and interfacing, and, on the other, embodied urban movement, cognition and affect. Benjamin Bratton (2016) has referred to this as *platform logic*, namely, 'the abstracted systems logic of platforms (their diagrammatics, economics, geography, and epistemology of transaction)'. Platform logic is part of a larger trend towards the new urban scopic regime, with mainstream capitalist digital platforms increasingly including users and their trajectories within their ever-expanding precincts. Current applications of AI to urban perception attest this trend, as new machine-
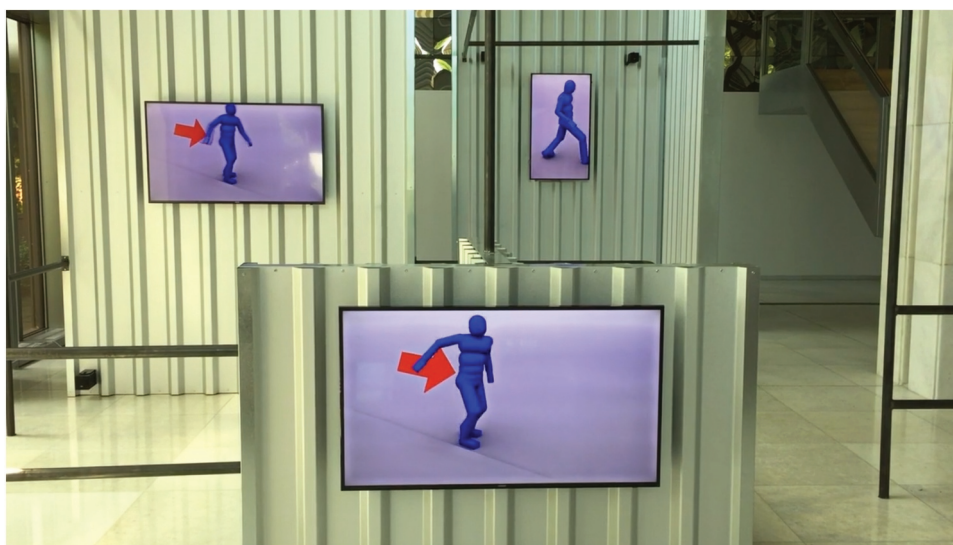

FIGURE 2.   Serpentine Galleries, "Hito Steyerl; Bubble Vision", 14:53, October 7, 2017. https://www.youtube.com/watch?v=boMbdtu2rLE

learning algorithms are being developed to assess, for instance, the level of safety, the level of liveliness, the level of beauty, and so on, of a particular neighbourhood or street, calculated on the basis of online large-scale databases (Porzi et al. 2015; Dubey et al. 2016; Verma, Janaa, and Ramamrithamb 2019; Wang et al. 2019). In short, as large-scale mediators of social interaction, digital platforms have emerged as 'an efficient way to monopolise, extract, analyse, and use the increasingly large amount of data that were being recorded' even independently of them (Srnicek 2017, 43). These infrastructures do not simply connect personal locations and trajectories: they actively shape them via a number of strategies – and, sometimes, various mischievous tricks.[9] Certainly, algorithms do not invent urban qualities, and in this sense they represent the continuation of previous practices of preference and avoidance. But they represent both a quantitative leap and, more troublingly, a systematic delegation in the knowledge and the vision of urban space.

The spread of digital platforms generates a real-time multidirectional flow between the gaze 'from above' and its constant readjustment (or folding) 'from below,' *via* the data-mined experience and actions – or more precisely, *operations* – of urban dwellers. This notion must be emphasised. Whereas action remains inescapably grounded in an individualist theory,

operation can be referred to the Deleuzian notion of assemblage with multiple connecting parts and without any subject–object orthogonal relation. Operation has not to do with a *plan*, but rather with the creation of a *plane*, and it is exactly in this sense that the operation of platforms may be understood.[10] They produce an oriented *plane of operation* equipped with a kind of double-slit experience of visibility: the 'particle' outcome corresponds to the data visualisations afforded by the platform, whereas the 'wave' outcome corresponds to the machine-to-machine traffic of 'instrumental' or 'operative' images. As recalled above, the latter notion was proposed by Farocki to refer to 'images that do not represent an object, but rather are part of an operation' (2004, 17). Interestingly, Farocki also refers to Roland Barthes and his 'distinction between the language of objects and meta-language'. In this sense, operative images have to do with a machinic (meta)language that is productive of a plane of operations in which urban dwellers find themselves navigating, employing the visual intelligence that is made available to them (Figure 3).

Navigation is thus played out in the domain of the visible (Brighenti 2017), and this domain appears to be reconfigured in two main ways: first, through the machine-to-machine traffic of instrumental images produced by the constant feedback of urban computing and filtered via algorithmic coding; second, through the
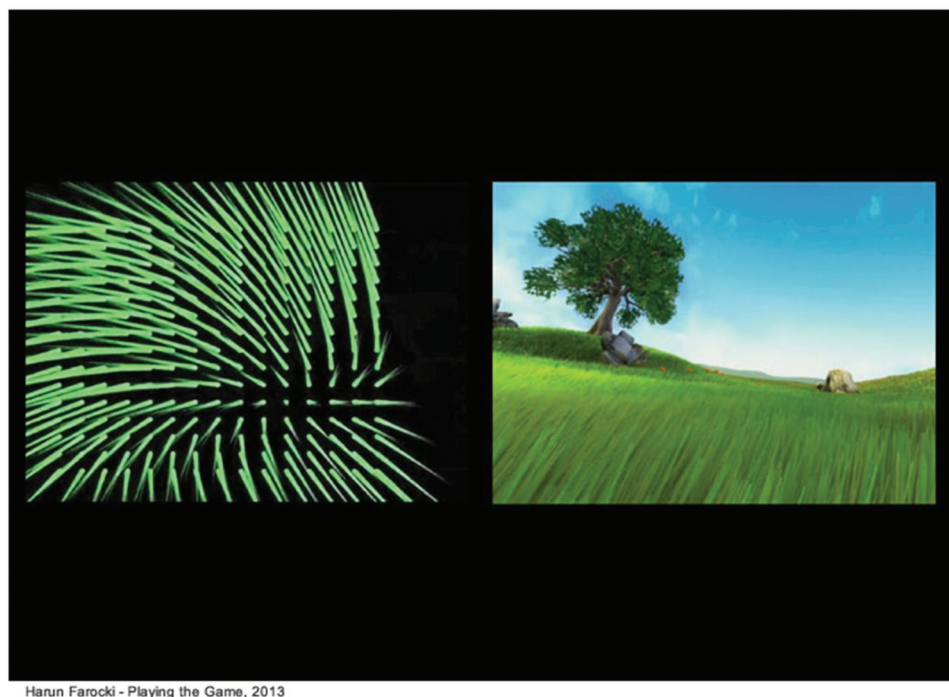
Harun Farocki - Playing the Game, 2013

FIGURE 3. Galeria àngels Barcelona, "HARUN FAROCKI / LOOP Fair 2013 with àngels Barcelona", 1:10, July 29, 2013. https://www.youtube.com/watch?v=fxvDuSVVpvY

logic of the interface, the ubiquitous screens in which the traffic of data is translated into end-user information for the urban dweller and her/his 'mobile,' demoted view from above. In this context, the image loses its principal representational value, and turns into a machinic operational mode.

As urban life comes to be shaped by spaces, scales, and temporalities well beyond human capacity to understand and perceive, navigation is severed from seeing, and turns into a pseudo-visual praxis of being-in and moving-through, a way of mediating and organising an otherwise unbearable amount of data (a veritable 'return of crowds'). Both physical and social orientation are outsourced to digital platforms that filter one's location, one's movement and, increasingly, one's desires, by providing 'optimised' channels for them. The inadequacy of the human vision is therefore compensated by outsourcing attention and decision-making to digital devices that *curate* the bubbles of vision through which the urban is increasingly apprehended. Naturally, people are not just passive recipient of these tools, with which they interact and that they can react to. Yet, the immersive nature of digitally filtered navigation makes it difficult to perceive the new normative habits that crystallise along the way: playing the new urban (video)game means not only to probe, but also to incorporate its rules – often, with a number of undesirable effects. While few would doubt that behind the interface multiple informatic protocols intersect, it is rather harder to convey the idea that such protocols are not innocent, and that behind their technocratic functionality there are always asymmetries of visibility.[11] (See Figure 4[12])

To sum up the argument advanced so far, we are now confronted with a new type of vertical vision that folds into a distributed and topological configuration, a newly emerging visual grammar which notions such as 'bubble vision' and 'digital navigation' seek to grasp. New concepts are required to explore the socio-spatial arrangements that simultaneously constitute, and result from, the new scopic regime associated with the new urban machinic diagrams.

THE RISE OF ATMOCULTURE

In this final section we explore the aesthetic-political configuration in which urban vision is materially arranged. To do so, it may be useful to refer to the peculiar notion of *lived distance* elaborated by the Russian-French psychiatrist Eugène Minkowski. In the 1930s, Minkowski (1970[1933]) explored the psychopathology of space, singling out the notion of

distance as key to the experiential significance of ease. Such a 'positive distance,' as one could also call it, cannot be reduced to metric translations; Minkowski connects it to what he refers to as the 'fullness of life,' or the 'organopsychic solidarity' of the living thing with its environment.

Together with the biologist Jakob von Uexküll and the physician Kurt Goldstein, Minkowski contributed to a relational, non-individualist theory of the lived environment. There is a fundamental phenomenological difference, Minkowski argued, between the 'clarity of visual space,' where the fullness of life unfolds, and the 'black night' where an intimacy of contact occurs. We are porous to a 'black light' whereby the individual finds itself permeable to the milieu: in the dark, we do not know the boundaries of our own body, just as when we are immersed in a sound, or a music. Whereas the visual space preserves the positive distance, in black space, the phenomena not only penetrate one another, they also penetrate the subject and mix with it. The fullness of life, in a sense, coincides with the fact of positive distance, understood as a breadth where phenomena, people and events can be located and hosted in a respectful way. This is why the positive distance proves essential for psychological wellbeing: whenever it is compromised, phenomena become cluttered and can no longer be disentangled. Psychotic states, Minkowski suggests, are precisely characterised by a shrinking of positive distance and the individual's space of ease – a contraction and undue agglomeration of facts that are normally set apart. In the psychotic mind, everything becomes connected, but also short-circuited, knotted, conflated, impossible to be spaced out. That does not mean that the 'black light' is in itself negative in an absolute sense: everything that relates to intimate participation in the world also requires to some extent the permeable condition of the black light – despite the fact that such condition cannot properly be qualified as 'subjective.'

What is the role played by positive distance and the black light in the platform city? As we have seen, the contemporary urban experience appears to be of an increasingly immersive nature, because of digital prolongations and on-going feedback processes filtered by algorithmic patterns that mediate perception and socialisation. Basic activities such as inhabiting, travelling, eating, drinking, sporting, hanging out, partying, but also increasingly protecting one's health by avoiding crowded places, are being perceptually transformed. Digital platforms operate as technophysical infrastructures that drastically modify both contingent perception and, more deeply, key
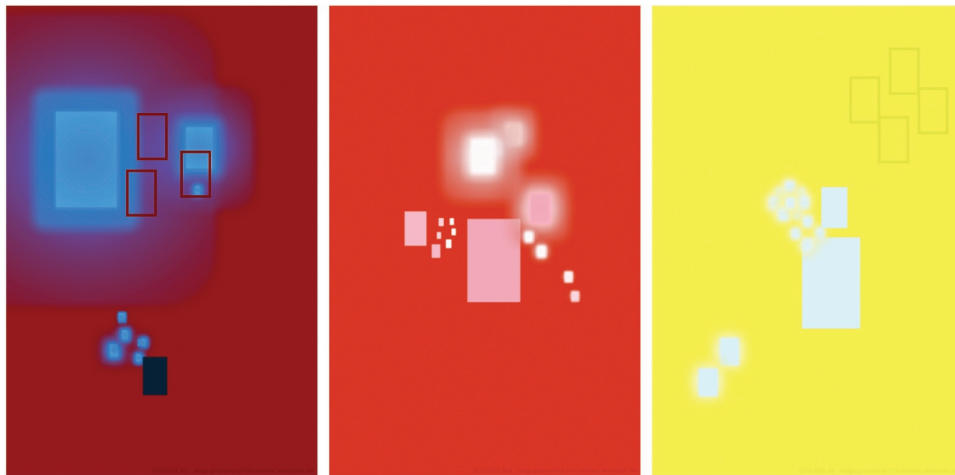
FIGURE 4.   Cada. TimeMachine. https://www.cada1.net/works/timemachine/

cultural notions.[13] The immersion within this dense computing clouds comes always-already *tuned* on its immanent normativity. The state of immersion tends to become pervasive, ambient. Computational and algorithmic secrecy is the new rule. The black light of our bubbled condition, however, is constantly illuminated by the white (well, blueish …) light of our screen interfaces. The establishment of positive distance is then outsourced to the technophysics of digital computation. Of course, new orientation forms have always, to some extent, been outsourced to an array of media – previously, for instance, cosmographic maps, architecture, and the collective imagination (myths, the 'imaginary' …). Yet, the profound technological changes described above push towards the de-personalisation and de-responsibilisation of orientation, one that is made less intelligible by the structure of bubble vision.

If today the overabundance of contradictory information has increased political scepticism and made it harder to reach consensus on most matters of concern, our perceptual visual reliance is, on the contrary, increased to the point that many people would no longer be able to read through an urban environment without massively relying on digital navigation – for instance, they could not reach a place without the map app in their phone directing them step-by-step. It is even possible that in 30 years from now average people in the Western society will no longer be able to drive a car. We do *believe* less and, at the same time, we *rely* more. Surely, belief and reliance are connected, in the sense that we rely on what we trust. But, while belief is explicit, reliance is often implicit, unreflected, and automatic. Contrary to the original situation described by Minkowski, where

positive distance marked the inception of a truly subjective moment, in contemporary digitally-infused urban environments the production of a bubble of ease is outsourced to what we may term a 'new perceptual mainstream.' In this mainstream, our visible urban trajectories are concretely played out, yet their techno-social composition – as well as its biases in terms of gender, class and race discrimination – remains largely opaque to us.[14]

This peculiar configuration we have termed *atmoculture*: the immersive aesthetics of today's comfort society (Pavoni and Brighenti 2017). Atmoculture is the cultural correlate of the bubble vision described by Steyerl: a regime that reshapes the city into a surface of comfortable and safe perceptions – pushing aside, in the process, considerations of inclusion, equality, access, discrimination, and control. Within the atmocultural ethos, conflict is only conceived of as *noise*, which the system has for its mission to eliminate or, at the very least, minimise. Contemporary atmoculture favours a pacified vision that presents itself as cosy and immersive, but that is in fact always premised upon the warrants of vertical vision. The new freedom of movement is played out within a horizon immanently surfacing around users, allowed by smart interfaces, digital architecture and comforting aesthetics. In atmocultural spaces, discomforting feelings are diluted via a technophysics of seduction, tailoring various sensuous regimes to foster inclusion within a comfortable, consensual atmosphere (Allen 2006, 442).

Under these premises, insofar as perception and attention have become a material commodity, the urbanite's sphere of ease results in the capacity to access atmoculturally defined trajectories: subjectivation is

revealed as subjection. Comfort, as a synaesthetic notion, crafts an aesthetics of navigation where perception and sensoriality are directed to minimise disturbance and out-of-placed-ness. In this context, sensoriality itself becomes a resource (once it is archived, monitored, mapped, shaped) around which the urban scopic regime constantly reconfigures itself by extracting valuable patterns from the environment and its events – operative patterns that, in turn, reshape the city on the ground. Digital urban navigation finds itself encapsulated in a number of 'spheres of ease' produced at the intersection of the technophysical and atmocultural dimensions. With the contemporary shift from classical vision to a navigational one, the platform city ushers in a remarkable de-reponsibilisation (Brighenti and Pavoni 2019). In a number of situations and cases, what 'used to be a sociological or ethical problem, how to get a community to function, [is transformed] into an engineering problem' (Arvidsson and Peitersen, quoted in Hearn 2010: 431). A similar engineering of perception, orientation, and ease seems to be at stake in the new urban scopic regimes, with political consequences which are still to be fully explored.

CONCLUSIONS

A cultural history of urban visual perception seems to present us with a situation where the modern vertical vision now manifests itself as a bubble, immersive vision underpinned by algorithmic navigation. Bubble vision in this sense represents the logical endpoint of vertical vision. The latter is therefore not supplanted by, but prolonged into, the former. Bubble vision thus gives a new sense to verticality and the search for cosmographic privilege, perhaps even at the price of inverting the position of a viewer now having to look up, rather than down, to the world. The urban dimension is increasingly 'occupied' by and 'preoccupied' with a comfort- and safety-oriented socio-material arrangement that rigidifies visibility clusters without necessarily crystallising them. This configuration can be understood as an emergent aesthetico-political paradigm of urban vision which we have proposed to call 'atmoculture.' In this context, the problem posed by the urban perceptual experience appears as twofold: on the one hand, one needs to recover spaces of ease and 'positive distance' (in Minkowski's original sense) from the excess of stimulation, stress, or violence of the urban (Brighenti and Pavoni 2019); on the other hand, however, one also needs to challenge the sphere of ease, unpacking the political and economic

asymmetries that constitute it and that, through it, are perpetuated and expanded.

In conclusion, we would also like to enter a reminder about the non-determinism of the processes we have described: the seemingly seamless topology of control ingrained in the new urban regime might also be prone to loopholes, frictions and incongruences. The intrinsic, univocal abstraction of digital navigation grapples with the contingency and inconsistencies of urban space – with its lived nature. Exploring and exploiting the perceptual disruptions, the accidents, the inconsistencies, the moments in which the seeming smoothness of urban topology is fractured, cannot certainly be performed as an individual task. Differently from psychological models tying 'clarity of vision' and 'positive distance' to the image of an individual subject achieving a properly clear and distant point of view, the individualistic, exclusionary and de-responsibilising dimensions of atmoculture must be countered by public discussion and collective awareness – as the ability to question, repurpose and reconstruct those environments. A veritable reconstitution of the techno-physics of the urban lies ahead, and is predictably becoming one of the major political challenges of the future.

NOTES

[1] 'How could I take part in the exhilaration of the sky? *I look: looking* requires my petrified presence in this point of the world.'
[2] In classical culture, *hybris* indicates an act of human arrogance that is going to be met with punishment by the gods. *Hybris* always preludes to human disaster.
[3] To the earth, one must also add the city: 'the advent of airplanes changed the image of the city as this would no longer be approached gradually and slowly, from the ground-level, as when arriving by couch, train or ship, but rather will appear 'rapidly, from the air … oddly splayed in abstraction' (Gordon 2008, 9).
[4] As Matteo Pasquinelli summarises, 'an algorithm is an abstract diagram that emerges from the repetition of a process, an organization of time, space, labor, and operations: it is not a rule that is invented from above but emerges from below', a form that is immanent to a given process which, by imitation, does encode, optimise and reproduce (2019).
[5] In the strictest Kantian sense, such algorithmic vision can be called 'transcendental.'
[6] Virilio (2001, 186) defines this term as follows: 'The idea of logistics is not only about oil, about ammunitions and supplies but also about images. Troops must be fed with ammunitions and so on but also with information, with images, with visual intelligence. Without these elements

troops cannot perform their duties properly. This is what is meant by the logistics of perception.'

[7] Not coincidentally, the word 'cybernetics' derives from the Greek *kybernetes*, i.e. steersman, which in Latin translated as *gubernator*: the verb *to govern* initially developed from the field of navigation.

[8] It is worth quoting Benjamin at length: 'The tasks which face the human apparatus of perception at historical turning points cannot be performed solely by optical means – that is, by way of contemplation. They are mastered gradually taking their cue from tactile reception – through habit.'

[9] Hwang and Elish (2015) show for instance the way Uber works by showing 'surge zones' (where demand from customers is supposed to be high) to drivers, which are based on predictions which may work, or not: drivers will move around waiting for a surge to happen, and waste time and fuel if this is not the case (for an experiential take, see Poier 2018). Conversely, the app may show 'phantom cabs' to users in order to give the impression of high offer. Using a visual metaphor, Hwang and Elish note that Uber 'has produced a *mirage* of a marketplace,' concealing its invasive influence on the image of the city, under the rhetoric cloak of the 'transparent software.'

[10] A reviewer has astutely noticed that the word 'platform' speaks precisely of a horizontal plate, plane or plateau.

[11] Authors such as Benjamin (2019) and Espeland and Yung (2019), for instance, have drawn attention to the racism that may be encapsulated in algorithmic language, and made accordingly invisible.

[12] These pictures are from project TimeMachine by the art group CADA. TimeMachine aims at capturing and visually translating the elasticity of time as it is experienced in everyday life. The project seems to provide an artistic visualisation of the navigational grammar of algorithmic vision. See https://www.cada1.net/works/timemachine/

[13] For instance, Airbnb reformulates what constitutes a home, Uber reframes the ideas and practices of the car and private transport, TripAdvisor rearranges the urban geography of enjoyable places (visiting a place, eating out), and so on.

[14] Something similar already happened with previous technologies. In the case of photography, for instance, see Blight (2019).

DISCLOSURE STATEMENT

No potential conflict of interest was reported by the authors.

FUNDING

REFERENCES

Adey, P. 2010. *Aerial Life: Spaces, Mobilities, Affects*. Oxford: Wiley-Blackwell.

Adey, P., M. Whitehead, and A. J. Williams. 2011. "Introduction: Air-target: Distance, Reach and the Politics of Verticality." *Theory, Culture & Society* 28 (7–8): 173–187. doi:10.1177/0263276411424759.

Allen, J. 2006. "Ambient Power: Berlin's Potsdamer Platz and the Seductive Logic of Public Spaces." *Urban Studies* 43 (2): 441–455. doi:10.1080/00420980500416982.

Allen, J. 2011. "Topological Twists: Power's Shifting Geographies." *Dialogues in Human Geography* 1 (3): 283–298. doi:10.1177/2043820611421546.

Armitage, J. 2009. "In the Cities of the Beyond: An Interview with Paul Virilio." In *Open: Cahier on Art and the Public Domain*, 18. www.onlineopen.org/in-the-cities-of-the-beyond

Bataille, G. 1976. "La Limite de l'utile." In *Oeuvres Complètes*, Vol. VII, edited by G. Bataille, 181-280 . Paris: Gallimard.

Benjamin, R. 2019. *Race after Technology: Abolitionist Tools for the New Jim Code*. Hoboken, NJ: Wiley.

Benjamin, W. 2008[1935]. *The Work of Art in the Age of Its Technological Reproducibility, and Other Writings on Media*. Cambridge, MA: Harvard University Press.

Blight, D. C., Ed. 2019. *The Image of Whiteness: Contemporary Photography and Racialization*. London: SPBH.

Bloomberg, R. 2019. "Dronological Power: Remote Control Occupation and the New Epistemo-Technologies of Sovereignty." PhD diss., Goldsmiths, University of London.

Bousquet, A. 2018. *The Eye of War: Military Perception from the Telescope to the Drone*. Minneapolis: University of Minnesota Press.

Bratton, B. H. 2009. "iPhone City." *Architectural Design* 79 (4): 90–97. doi:10.1002/ad.923.

Bratton, B. H. 2016. *The Stack: On Software and Sovereignty*. Cambridge, MA: MIT press.

Bridge, G. 2013. "Territory, Now in 3D!" *Political Geography* 34: 55–57. doi:10.1016/j.polgeo.2013.01.005.

Brighenti, A. M., and A. Pavoni. 2019. "City of Unpleasant Feelings. Stress, Comfort and Animosity in Urban Life." *Social and Cultural Geography* 20 (2): 137–156. doi:10.1080/14649365.2017.1355065.

Chamayou, G. 2013. *Théorie du drone*. Paris: La fabrique.

Cosgrove, D. 2008. *Geography and Vision: Seeing, Imagining and Representing the World*. London and New York: IB Tauris.

Curry, A. 2017. "The Rise of Forensic Architecture." *The Journal of the American Institute of Architects*, April 24. https://www.architectmagazine.com/design/culture/the-rise-of-forensic-architecture_o

de Certeau, M. 1984. *The Practice of Everyday Life*. Berkeley: University of California Press.

de Saint-exupéry, A. 1992[1939]. *Wind, Sand and Stars*. Boston: Houghton Mifflin Harcourt.

Deleuze, G., and F. Guattari. 1980. *Mille Plateaux*. Paris: Minuit.

Dodge, M., and C. Perkins. 2009. "The 'View from Nowhere'? Spatial Politics and Cultural Significance of High-resolution Satellite Imagery." *Geoforum* 40 (4): 497–501. doi:10.1016/j.geoforum.2009.04.011.

Dorrian, M. 2013. "On Google Earth." In *Seeing from Above: The Aerial View in Visual Culture*, edited by M. Dorrian and F. Pousin, 290-308. London: I. B. Tauris.

Drozdz, M., M. Appert, and A. Harris. 2018. "High-Rise Urbanism in Contemporary Europe." *Built Environment* 43 (4): 469–480. doi:10.2148/benv.43.4.469.

Dubey, A., N. Naik, D. Parikh, R. Raskar, and C. A. Hidalgo. 2016. "Deep Learning the City: Quantifying Urban Perception at A Global Scale." In Computer Vision – ECCV 2016. ECCV 2016. Lecture Notes in Computer Science, vol 9905, edited by Leibe B., Matas J., Sebe N., Welling M. . Springer, Cham. https://doi.org/10.1007/978-3-319-46448-0_12

Elden, S. 2013. "Secure the Volume: Vertical Geopolitics and the Depth of Power." *Political Geography* 34: 35–51. doi:10.1016/j.polgeo.2012.12.009.

Espeland, W., and V. Yung. 2019. "Ethical Dimensions of Quantification." *Social Science Information* 58 (2): 238–260. doi:10.1177/0539018419851045.

Farocki, H. 2014. "Computer Animation Rules." Lecture at IKKM, June 25. https://vimeo.com/100092938

Galloway, A. 2006. *Gaming. Essays on Algorithmic Culture*. Minneapolis: University of Minnesota Press.

Gordon, A. 2008. *Naked Airport: A Cultural History of the World's Most Revolutionary Structure*. Chicago: University of Chicago Press.

Graham, S. 2016. *Vertical: The City from Satellites to Bunkers*. London: Verso.

Gregory, D. 2011. "From a View to a Kill: Drones and Late Modern War." *Theory, Culture & Society* 28 (7/8): 68–90. doi:10.1177/0263276411423027.

Halpern, O. 2014. *Beautiful Data: A History of Vision and Reason since 1945*. Durham: Duke University Press.

Harker, C. 2014. "The Only Way Is Up? Ordinary Topologies of Ramallah." *International Journal of Urban and Regional Research* 38 (1): 318–335. doi:10.1111/1468-2427.12094.

Harris, A. 2015. "Vertical Urbanisms: Opening up Geographies of the Three-dimensional City." *Progress in Human Geography* 39 (5): 601–620. doi:10.1177/0309132514554323.

Harun, F. 2004. "Phantom Images." *Public* 29: 12–22.

Hearn, A. 2010. "Structuring feeling: Web 2.0, online ranking and rating, and the digital 'reputation' economy. „ *ephemera X* (3/4): 421–438.

Heidegger, M. 1993[1966]. "'Only a God Can Save Us': Der Spiegel's Interview with Martin Heidegger." In *The Heidegger Controversy: A Critical Reader*, edited by R. Wolin. trans. M. P. Alter and J. D. Caputo, 105–107. Cambridge, MA: MIT Press.

Holert, T. 2017. "Meshed Space: On Navigating the Virtual." In *Myths of the Marble Exh. Cat.*, edited by M. Hoegsberg and A. Klein, 95–112. Berlin: Sternberg Press.

Hwang, T., and M. C. Elish. 2015. "The Mirage of the Marketplace. The Disingenuous Ways Uber Hides behind Its Algorithm." *Slate* July 27. https://slate.com/technology/2015/07/ubers-algorithm-and-the-mirage-of-the-marketplace.html

Johnston, J. 1999. "Machinic Vision." *Critical Inquiry* 6 (1): 27–48. doi:10.1086/448951.

Kosek, J. 2010. "Ecologies of Empire: On the New Uses of the Honeybee." *Cultural Anthropology* 25 (4): 650–678. doi:10.1111/j.1548-1360.2010.01073.x.

Kurgan, L. 2013. *Close up at a Distance: Mapping, Technology, and Politics*. New York: Zone Books.

Lata, I. B., and C. Minca. 2016. "The Surface and the abyss/Rethinking Topology." *Environment and Planning D: Society and Space* 34 (3): 438–455. doi:10.1177/0263775815622086.

Lury, C., L. Parisi, and T. Terranova. 2012. "Introduction: The Becoming Topological of Culture." *Theory, Culture & Society* 29 (4–5): 3–35. doi:10.1177/0263276412454552.

Manovich, L. 2000. "Database as a Genre of New Media." *Ai & Society* 14 (2): 176–183. doi:10.1007/BF01205448.

Martin, L., and A. J. Secor. 2014. "Towards a Post-mathematical Topology." *Progress in Human Geography* 38 (3): 420–438. doi:10.1177/0309132513508209.

McCullough, M., 2013. Ambient commons: Attention in the age of embodied information. Cambridge: MIT Press doi:10.7551/mitpress/8947.001.0001

Minkowski, E. 1970[1933]. *Lived Time. Phenomenological and Psychopathological Studies*. Evanston: Northwestern University Press.

Nethercote, M. 2018. "Theorising Vertical Urbanisation." *City* 22 (5–6): 657–684. doi:10.1080/13604813.2018.1549832.

Offner, J.-M., A. Sander, and P. Virilio. 1991. "For a Geography of Trajectories. An Interview with Paul Virilio." *FLUX: Cahiers scientifiques internationaux Réseaux et Territoires* 7 (5): 48–54. doi:10.3406/flux.1991.1158.

Parent, C., and P. Virilio. 1996. *The Function of the Oblique: The Architecture of Claude Parent and Paul Virilio 1963-1969*. London: AA Publications.

Pasquinelli, M. 2019. "Three Thousand Years of Algorithmic Rituals: The Emergence of AI from the Computation of Space." *e-flux* 101. https://www.e-flux.com/journal/101/273221/three-thousand-years-of-algorithmic-rituals-the-emergence-of-ai-from-the-computation-of-space/

Pavoni, A. 2018. *Controlling Urban Events: Law, Ethics and the Material*. Abingdon: Routledge.

Pavoni, A., and A. M. Brighenti. 2017. "Airspacing the City. Where Technophysics Meets Atmoculture." *Azimuth. International Journal of Philosophy* V (10): 91–104.

Poier, S. 2018. "My Boss Is an App. An Auto-ethnography on App-based Gig-economy." *Émulations. Revue De Sciences Sociales* 28: 23–29.

Porzi, L., S. R. Buló, B. Lepri, and E. Ricci. 2015. "Predicting and Understanding Urban Perception with Convolutional Neural Networks." Conference paper presented at MM'15, October 26–30 2015, Brisbane, Australia.

Rouvroy, A. 2013. "The End(s) of Critique: Data Behaviourism versus Due Process." In *Privacy, Due Process and the*

Computational Turn. Philosopher of Law Meet Philosophers of Technology, edited by M. Hildebrandt and K. de Vries, 143–167. Abingdon: Routledge.

Srnicek, N. 2017. *Platform Capitalism*. New York: John Wiley & Sons.

Stephen, G., and L. Hewitt. 2013. "Getting off the Ground: On the Politics of Urban Verticality." *Progress in Human Geography* 37 (1): 72–92. doi:10.1177/0309132512443147.

Steyerl, H. 2011. *The Wretched of the Screen*. Berlin: Steinberg Press.

Steyerl, H. 2018. "Bubble Vision: Aesthetics of Isolation." *Presentation, Yale University*, February 22.

Tarde, G. 1893. *La Logique Sociale*. Paris: Alcan.

Tom, H., and D. Mende. 2019. "Editorial: Navigation beyond Vision." *e-flux* 101. https://www.e-flux.com/announcements/178893/e-flux-journal-issue-101-navigation-beyond-vision-guest-edited-by-tom-holert-and-doreen-mende/

Verma, D., A. Janaa, and K. Ramamrithamb. 2019. "Machine-based Understanding of Manually Collected Visual and Auditory Datasets for Urban Perception Studies." *Landscape and Urban Planning* 190: 103604.

Virilio, P. 1989. *War and Cinema: The Logistics of Perception*. London: Verso.

Virilio, P. 1994. *The Vision Machine*. Evanston: Indiana University Press.

Virilio, P. 2001. "Paul Virilio and the Oblique: Interview with Enrique Limon." In *Virilio Live: Selected Interviews*, edited by J. Armitage, 51–57. London: Sage.

Virilio, P., and S. Lotringer. 2002. *Crepuscular Dawn*. Los Angeles: Semiotext(e).

von Uexküll, J. 2010[1934]. *A Foray into the Worlds of Animals and Humans*. Minneapolis: University of Minnesota Press.

Wang, R., Y. Yuan, Y. Liu, J. Zhang, P. Liu, L. Yi, and Y. Yao. 2019. "Using Street View Data and Machine Learning to Assess How Perception of Neighborhood Safety Influences Urban Residents' Mental Health." *Health & Place* 59. doi:10.1016/j.placenta.2019.08.008.

Weizman, E. 2002. "The Politics of Verticality." *Open Democracy*, May 1. http://www.opendemocracy.net/conflict-politicsverticality/article_810.jsp

Weizman, E. 2007. *Hollow Land: Israel's Architecture of Occupation*. London: Verso.