# Changing What Infrastructure Means: Instituting critical models for curatorial-infrastructural practice, artefacts and imaginaries

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## Abstract

What does infrastructure institute? What can be imagined through and by infrastructure? Can the curatorial figure and reconfigure the relationship between this image and form? This thesis turns to the thoroughgoing reconfiguration of the scope of the curatorial because of, and in response to, shifts in post-global and planetary imaginaries of infrastructure. It considers how infrastructure displaces the institution as both a frame of reference and site for instituting. It tests how curatorial practices can be positioned, patterned, configured and narrated at the meso-scalar intersection of material infrastructural shifts, disinvestment and the legacies, realisation and promises of organisational imaginaries emerging because of and despite those shifts.

This thesis is constructed through a series of test cases that both stage and examine the problem as (and potential of) the embodying and embedding of infrastructural meaning-making and staging in the competing alignments of the curatorial in the following infrastructural scenes: cultural infrastructural provision in the Granby Four Streets area in Liverpool by Assemble and Steinbeck Studios (2013–); in tensions implicated in infrastructural patterns of evidence in the work of the research agency Forensic Architecture; in the formal potential in configuring open and closed imaginaries in the infrastructure-critical propositions of EURO-VISION by FRAUD (2021) and Danish curatorial project Primer; and in the capacity for ongoing transformation in scalable and non-scalable infrastructural futurity staged in Alliance of the Southern Triangle's *Protocols for Phase Transition* (2021) and *Feral Atlas: The-More-Than-Human Anthropocene* (Tsing et. al., 2020).

Modelling difference staged to produce recursions, frictions and tipping points in the continuity promised by the convergence of infrastructural materialisation, mediation and practice, this thesis develops a sequence of transformative threshold concepts. Concerned with how this requires an ongoing negotiation of infrastructural difference, the thesis presents through these concepts a new vocabulary and set of procedures. Here, dynamic cura-infrastructural artefacts are used to situate the curatorial across the expanded temporal scenes of anticipation, performance and repetition of infrastructure. At stake is the capacity of expanded curatorial and artistic practice to create and meaningfully affect change in the intimate and planetary worlds that infrastructure imagines.

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# Acknowledgments

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**<u>Note</u>**

Some of the material for this thesis has been developed in published essays.

Some material for Chapter four is adapted from "Restaging Infrastructural Images That Make the World: Reconfiguring Scale", published in *Between The Material and the Possible* (London and Oldenberg: Sternberg Press and Edith-Russ-Haus: 2022).

Ideas developed in Chapter three are drawn from "The Maintainer and the Rouge Reader," published in Sully I., Sweetman E., eds., *kunstlicht*, vol. 41 no 4 (2020).

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# **Introduction**

> From which point in the complex matrix of our infrastructurally entangled existence can critical perspectives — that perform something other or more than complex descriptions and denunciations — still emerge today? (El Baroni 2022, 29)

## 0. Setting a scene

This thesis departs from the thoroughgoing reconfiguration of the scope of the curatorial because of and in response to a series of shifts in infrastructural extent, scale and imaginaries. One is the increasing recognition of the role of infrastructure — that which Easterling defines as a "soupy matrix" of repeatable spatial and procedural phenomena, interoperable systems, populations of connected devices and […] shared standards (Easterling 2016, 11) — in displacing of the institution as reference frame for expanded artistic and curatorial practices. A second shift is how these expanded practices and their contexts are *positioned, patterned, configured* and *narrated* into intersections of material infrastructural shifts. This includes widespread disinvestment, legacies, extensions and the promises of organisational imaginaries because of or despite that shift. While, as Rossiter writes, such infrastructural imaginaries are realized in and as the conditions of present, a "real time" model, which, "for many has become the world" (Rossiter 2017, 101; xiii), a third shift explored is of practical and conceptual responses in the fields of curatorial and arts which have expanded their role, scope, scale and ambition to meet these shifts, and which generate new critical and exploratory approaches to this reconfiguration.

In this schema, however, new curatorial conceptual vocabularies and procedures are necessary. This thesis establishes a critical framework for enacting speculative models and artefacts of what can be described as infrastructural meaning. It focuses on the intersection between curatorial and infrastructural modes of meaning making and making public. In this space there is not yet a fully robust, systemic account of the more than technical, meaning embodied and embedded in infrastructure, nor of critical modes for making that meaning 'public' in infrastructural and curatorial theory, nor a consolidated connection between literatures and practices of infrastructure and curating. This thesis addresses and bridges these gaps. Infrastructure not only displaces institutional forms, but also the scope of its critiques (Vishmidt 2017b). For instance, where infrastructural forms increasingly create planetary scale imaginaries, which mediate the articulation and instituting of meanings in the world (Bratton 2021), the thesis seeks to bring infrastructure and the curatorial to interact meaningfully, to affect infrastructural change. Concerned with the capacity of the curatorial to produce and stage meaningful interventions in infrastructural scenes such as those explored here, the methodological proposition made in this thesis, therefore, develops the possibility for curatorial

debates and practices to intervene on such systemic and recursive forms of infrastructural meaning.

On the one hand the theoretical and conceptual approach developed here responds to the meso-scalar dimensions of infrastructure which extend beyond what can be literally 'seen'.[1] On the other, it responds the methodological limits of non-systemic modes of staging and modelling in the curatorial. Ultimately, the thesis offers a new conceptual and methodological approach to thinking about and acting on the realities constructed by infrastructure. This approach is, however, mobilized out of a practical problem. As will be discussed in Chapter one, this problem turns on the capacity of the curatorial to mediate between these scales and modes, and on the artefacts through which to propose and negotiate its reconfiguration — something I have encountered in practice.

### A problem Space: imagining infrastructure

In 2017 I was invited to develop a public programme, online platform and map for *Transformer,* a residency, exhibition and network-building project as part of the 2018 European Capital of Culture (ECoC) in Valletta. *Transformer* was co-organised by Blitz, an Artist Run Organisation (ARO) in Malta's capital Valletta, and Central Saint Martins College of Art and Design. The project aimed to build local cultural infrastructural capacity and discussion. The project aims were driven by the paucity of physical infrastructure, and factors leading to what was felt locally to be an either parochial and retrospective or outwards looking attitude. This was an environment either focused heavily on the cultural heritage and idiosyncratic themes of the island, or imported contemporary art debates. Critical, debates were not developed organically and locally. The lack of local cultural infrastructure in Valletta was compounded by several factors: gentrification of housing; competition for available studio space (with the games industry, 'golden passports' and tourism-regeneration); the effects of ECoC's focus on major institutions (MUŻA and Valletta Design Cluster), business, heritage and tourism-oriented capacity — all potentially exacerbated by profile raising and Europe rather than local scale policy agenda of the ECoC designation itself. These issues inhibited the stimulation of cohesive debate *within* a nascent scene.

*Transformer* was established within the ECoC framework, itself defined by the directives of EU cultural policy, and within which the ECoC designation and the rationale of the funding of the

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[1] Meso, meaning of indeterminate scale.

project lay.[2] Broadly, European cultural policies such as ECoC are driven by ambitions to deepen European-level coherence and sustainability, tying the cultural diversity of host cities to the bloc's unified economic, political and cultural power. The ECoC concentrates its cultural remit to the development of cities, focusing the criteria for the designation of ECoC on: deepening a city's *international*, national and internal profiles; regenerating their physical infrastructures; making them more *sustainable*; *professionalizing* cultural sectors and boosting tourism; and responding to the programme's emphasis on a shared European identity.[3]

The intention and structuring of the *Transformer* project were, therefore, to bridge these contexts and to develop the public's and practitioners' understanding of them (Finch 2019). The project sought to mobilise this interaction of possibilities to develop an artist network with Malta as its hub, incorporating a series of invited residencies with artists nominated by AROs from around the Mediterranean and Maghreb region. Through EU framing and funding, local questions of access, need and capacity could be re-configured and this framing could be questioned by those 'on the ground'. Participants would collaborate with local artist-guides to develop and exhibit site-specific work as part of a multi-site public programme of talks and interviews. With the exception of Blitz, who selected local artist duo Fenêtreproject (Dustin Cauchi and Francesca Mangion), the other AROs all sent one of their own artist members.[4]

Like the programmes of the commissioning organizations, the works produced during these residencies sought to interrogate key critical and political dynamics in the region: migration, memory and heritage, constituency and the role of new European institutions**.** For instance: Moroccan socially-engaged artist Mohamed Fariji invited residents of the Hamrun district of Valletta (home to many migrant communities) to a square to help write banners with stories of arrival and settlement as part of his *Le Musée Collectif* a community-driven history project. The resulting banners were flown high above the local 1st Scouts Group in the area. Elsewhere was *In Limbus*, a short looping video made by Spanish artist Ro Caminal in response to her residency travelling between Valletta and Sillema, the city directly across the bay to its north west. The video set rapidly-intercut footage of local building work and the often-migrant

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[2] ECoC is a designation that unlocks match funding, profile and branding, requiring member states to hone cultural and infrastructural investment to the ECoC monitoring and evaluation framework.
[3] See: https://ec.europa.eu/culture/policies/culture-in-cities-and-regions/european-capitals-of-culture. Last accessed: 30-6-2022.
[4] The other participants were: L'Atelier de l'Observatoire, who nominated Moroccan socially-engaged artist and L'Atelier co-founder Mohamed Fariji; Laila Hida, from LE 18 in Morocco, also co-founder; Ro Caminal was nominate by CeRCCa (Centre for Research and Creativity Casamarles), Barcelona, of which she was a member; Greek artist Kosmos Nikoloau was nominated by 3137, a gallery in Athens, he co-runs.

labourers carrying it out against a voice over based on a description of Malta's history, visa and citizenship by investment programmes.[5]

Capitalizing on the cultural infrastructure developed by the ECoC, the residencies and exhibition at the core of the Transformer project were intended to generate participation and artistic research which could initiate this distributed network.  My own role was to record, foster and shape the dialogue of this network through an online editorial platform and public programme.[6]

### Mismatch of needs and capacity

The residencies and exhibitions did for a time bring international artistic practice and discussion to Malta, for example through public panels, exhibition, interactions between artists, guides and others in the process of realizing site-specific research and projects. As one of the project directors, Mick Finch, wrote in 2019 the project's residencies were crucial to its claim to enable cross-border research, the movement of concepts and the diversification of cultural hubs — given the politics of movement and the local infrastructure for contemporary art production (Finch, 2019, 10–11). There were, however, a number of other effects and problems raised and encountered by staging the project within the infrastructural conditions that pre-existed the ECoC designation and those which were imported as part of it.[7]

These issues included a mismatch between the expectations of more-experienced and qualified organizations and artists and the lack of local infrastructural capacity and organisational engagement necessary to achieve the intended network in the Maltese scenario. This latter fact was in part the point — by giving rise to this need, artists would have to self-organize — but it also generated 'working frictions' rather than conditions to develop a self-supporting network. Similarly, from Q&A discussions held after public events it was clear that

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[5] It was shown at Blitz and Spazju Kreattiv, St James Cavalier, Valletta.
[6] The web platform is archived here: http://transformer.tomclrk.com Last accessed: 30-6-2022.; originally: http://transformermalta.com. Available: https://web.archive.org/web/20191216015621/http://transformermalta.com/ Last accessed:  30-6-2022.
[7] See: https://web.archive.org/web/20191216015621/http://transformermalta.com/2018/08/30/interview-with-blitz-process-legibility-diversity-and-infrastructure-building/ Last accessed:  30-6-2022.; https://web.archive.org/web/20191216015621/http://transformermalta.com/2018/07/05/transformer-informal-2-listen-back/ Last accessed:  30-6-2022.; https://web.archive.org/web/20191216015621/http://transformermalta.com/2018/06/04/transformer-informal-1-listen-back/ Last accessed:  30-6-2022.

there were also wider reasons for the lack of capacity felt by the artists.[8] These included no real local art school and graduate culture, a lack of affordable housing and the studio shortages outlined above, local policy indifference / complications organized crime and commercial galleries whose interest was in the valorisation of internationally-recognized artists. Additionally, the local emphasis on cultural heritage over contemporary art, including in its new arts institution MUŻA, compounded the difficulties of translating local participation and culture into the contemporary art frames preferred by project-funders and Arts organizations.[9]

### Infrastructural tensions and conceptual limits

Of course, like any social network and participatory project, a key factor is bringing the personalities together through the long, careful work of building and maintaining relationships. These issues can appear as simply 'local', but are familiar difficulties of practicing and instituting artists run projects outside of major institutional centres. However, these issues were also indicative of wider infrastructural conditions necessary for a self-generated infrastructural transformation, and how these do not necessarily match those utilized in shaping 'the curatorial' aspects of this project. Predominantly, these gaps, centred on how the both ECoC and project aims met the reality on the ground and the realization of an international exhibition without local cultural infrastructure. This also raised more general questions of the practical and theoretical problems of generating transformation within multi-scale and multi-level infrastructures such as those which are consolidated by the ECoC or EU paradigms. In the case of *Transformer* and between the competing layers of need, stakeholder, activity and context, it was clear that at least three dynamics were at play.

One was the simultaneously macro-scale framing and micro-intervention of the ECoC policy designation on the structuring of the projects involved. The 'action' or treaty-bound act of legislation leading to the ECoC directly instrumentalizes and extended the impact of EU values through the intended establishment of cultural hubs, cultural destinations and widening participation (Fox et. al., 2019 24; 25).[10] Mandating this within a highly regularized, legal-

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[8] See:
https://web.archive.org/web/20191216015621/http://transformermalta.com/2018/07/05/transformer-informal-2-listen-back/ Last accessed:  30-6-2022.;
[9] Given these issues, my role morphed to trying to find out what specific needs and capacities were for this project and whether this ARO network would meet that.
[10] Actions function as a kind of cross-bloc legal infrastructure creating common conditions across the EU in areas such as the terms of the customs union, competition rules or monetary policy; or by supporting / guiding member country legislation in areas such as culture, as in the case of the ECoC. See:

bureaucratic framework these imaginaries come to operate as a continent-scale conceptual, legal and economic infrastructure within which the cultural production for the ECoC must be legible. At one level, this raises a familiar conceptual problem: how to account for infrastructure in the curatorial. Curatorial discourse and practice see infrastructure as a problem of standardised determination according to a global imaginary of shared and thus exchangeable time (Osborne 2014 a; b; Smith 2012). This can be challenged by the staging of critical images, or critical intentions in the exhibition, gallery or the institution of art more generally — i.e., not an engagement *within* the infrastructural, but *with* it as a topic or distinct object. But by determining the conceptualization and materialization of this production according to these expectations, the ECoC also deepens the control, interoperability and closure of possibility within the ECoC frame, operating as an infrastructural whole through which the EU/EC policy can work.

Similarly, but at a different level, the aims of Valletta 2018 ECoC fed into this project and intersected a legacy of cultural and historical idiosyncrasies as well as the multiple international, local, regenerative and heritage directives of official Maltese cultural policy. Indeed, the arts and heritage had long been a political football and signalling device for local political priorities around traditional culture.[11] Especially in this project and the wider ECoC framework, these were put in tension with different infrastructural scales of the European Union which sought to transform local conditions, apparently odds with local bureaucracy.[12] Finally, therefore, it was clear that given the means of opening these questions, contemporary art, could not address the lack of capacity to resolve them.

The *Transformer Malta* project indicated a two-fold problem. Firstly, how is infrastructure a problem for the curatorial. At one level, the infrastructural dynamics, imaginaries and instituted forms at stake either preceded, or operated at scales and in forms, beyond the scope of the project and its curatorial approaches (i.e., residency, exhibition, public panels and even its proposed network). The second is that the curatorial can be understood as a problem of infrastructure. That is, it poses the question of how can the critical and exploratory forms of

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https://commission.europa.eu/about-european-commission/what-european-commission-does/law/areas-eu-action_en. Last accessed: 22-12-2023

[11] It was adopted by different government depts. Seeking to instrumentalize its output and institutional cache to internal and external political imaginaries: moving between Education (2001); to Tourism (2004); and back to Education and Youth (2011). See: https://www.culturalpolicies.net/country_profile/malta-1-1/ Last accessed: 30-6-2022.

[12] See: https://web.archive.org/web/20191216015621/http://transformermalta.com/2018/09/14/how-to-bring-people-together-to-change-the-city-interview-with-valletta-design-cluster/ Last accessed: 30-6-2022.

meaning-making and making public used by curatorial practices be both thought and practiced as addressing infrastructures in form, content and approach?

Through these three problems, it is clear that the scales into which this network was being imagined and the infrastructures it intersected, comprised imaginaries, histories and invested power, were frequently at odds with whether this network could actually be instituted within the project at all. As conceptual infrastructures, the *internationalization*, *sustainability* and *professionalization* of the Transformer project, were tied to expectations that those cultural and political forms could be made relevant (add value) in the designated locality. And thereby develop the conditions, economic sustainability and structural unity of the bloc itself (European Commission 2020, 13–20).

In so doing, the project, like others in the ECoC year, was established within a framework whose scope, design and intention which existed at scales and levels of diffuse effect at odds with the more particular infrastructural needs for achieving them and the questions at stake in the work of artists asked to meet those needs. Despite the stated aims of the ECoC, there remains unresolved tensions and limits in the infrastructural conditions for achieving these imagined aims. At stake here is not a criticism of the intentions and aspirations of the project, but an exploration of this gap as a space for critical creation and invention. While the *Transformer* project can be used to register and address the differing scales of infrastructure and infrastructural politics at stake in contemporary art, at least thematically addressing these scales and systemic imaginaries, it does diagrammatically capture a curatorial problem. That problem comes from how these scales are each generated in and by different layers of operation, intention or organisational image (local artist-run organisations and initiatives, culture-led regeneration efforts, gentrification and migration); as well as from tensions in how these layers are combine, interoperate and block or determine the parameters of one other. This problem can be framed through two central conceptual questions:

1) How to address this convergence of meso-scalar and multi-dimensional infrastructural meaning, materialisation, mediation and practices through curatorial tools, venues and approaches?
2) How can the curatorial be reposed at this convergence so that infrastructure can be figured into this field critically and speculatively?

These constitute the central conceptual problems of the thesis.

At stake, therefore, is how infrastructural imaginaries define and support a project, shaping its emergence, acting as a vehicle of embodied and embedded meaning construction, materialisation and mediation. That is, how infrastructures not only define the conditions of the project's emergence, but what it could mean in an expanded creative and critical sense (for the project) to be embedded in, or embody those conditions. This definition of infrastructure moves away from that which is beneath, which supports something else, to surface it as an actively constructed reality and mediating form. One, in which infrastructural imaginaries gather form, figures and practices and are instituted. These are convergences which are not only technical, but points at which multi-dimensional, meso-scalar and multi-actor imaginaries are constructed and manifest. If infrastructure makes a world, to try and imagine new infrastructure also means asking what infrastructure institutes, and following this: how is the meaning that defines the worlds it creates composed, understood, enacted? By addressing these, it is possible to ask in a robust way, can infrastructure be transformed through its intersection with the curatorial?

While it can be made visible, infrastructural meaning is complex and political. To work on this meaning is to engage the dynamic between imagining and instituting meaning. Can this infrastructural meaning making and publicing be re-worked? This is a question that can begin in infrastructural theory: where, despite its conventional accounts of technical systems, which are understood to determine and convoke human activities and meaning, infrastructure can also be seen as a site of meaning-making and forming.

This conceptualization of infrastructure necessitates a clarification of how the shift from technical substrate/sub-system to a practicing, convergence and configuration of material and meaning-making can be articulated. These difficulties and the scene from which they emerge is indicative of a wider conceptual and methodological gap between infrastructural and curatorial theories and practices.

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## 1. Infrastructural meaning and making public

At the heart of much discussion on infrastructure is a focus on what it is and does. First used in English in 1927, the word 'infrastructure' came from the French "where it referred to the substrate material below railway tracks" (Carse 2012, 542). Structure has been conceptualised

in many ways, but can for Ashley Carse "be defined as the relation of the constituent parts of a whole that determines its character" (*OED*, 1991). This definition can be seen as the root of the contemporary use of the prefix *infra-* a form that conceptually situates infrastructure below, beneath or within (Carse 2012, 542). Entwined between these two basic concepts infrastructure begins with a definition of something that is out of sight and dependably and repeatably functional (Thrift 2004; Parks and Starosielski 2015).

Constituted as being "behind the scenes, boring and background processes," (Bowker and Star, 1998, 234), we often can't, or don't need to, see infrastructure; that is until it breaks. Making infrastructure appear through "infrastructural inversions" reveals the hidden ways it organizes social worlds, becoming uncomfortably present. (Bowker and Star, 1998, 234; Larkin 2013 in Johnson, 2018, 72–73; Tollmann and Levin, 2017). Likewise, in failure, all of its material, organisational and historical baggage and how much it conditions its users, 'juts out' (Vishmidt, 2017a, 266). Drawing on the work of Michel Foucault, where the material reality of infrastructure "does not exist independently of or prior to representational practices" infrastructure can be subject to questions of the politics of its distribution, design and control (Anand. Et al., 2018, 9); as well as the material and mediating conditions that make its outcomes possible (Rossiter, 2017; Parks and Starosielski, 2015; Sterne, 2015; Dourish, 2015; Doctorow, 2019; and Harris, 2015). In infrastructure theory, to truly understand how life is conditioned by extant infrastructures, it is necessary to make these effects and relations knowable. Developed through studies of the large-scale technical systems that facilitate the movement, circulation and provision of people, energy, water, waste, information, etc., (Hughes, 1987), the study and representation of infrastructure, its objects and effects is seen, therefore, to be a useful conceptual bridge (Carse, 2012, 543) between the experience of individual actors, societies and how the distribution of access to services operates in the geopolitical production of territory through them (Sassen, 2000; Mitropoulos, 2012; Harney and Moten, 2013; Rossiter, 2017, 142).

This shift in infrastructure theory from understanding its systems and construction, to showing how these features condition the social sphere depending on it, has re-defined the task of much of the study of infrastructure. We need to interrupt the ways infrastructure becomes habituated (non-visible) and recover what those metaphors and images hide. Yet, where the intersection of these registers in the problem above and the consequence for the worlds or reality the different infrastructural promises and plans construct, a key question for this thesis is if, and how, the value, imaginaries and concepts in such infrastructural promises, metaphors

and discourses can be seen as what I will call a *more than technical* form of meaning making and making public?

### Infrastructural work; Infrastructural form

As Berlant writes (2016), following the compositional quality of infrastructure "an infrastructural analysis helps us see that what we commonly call ''structure'' is not what we usually call it, an intractable principle of continuity across time and space, but is really a convergence of force and value in patterns of movement that's only solid when seen from a distance" (Berlant 2016, 394). On the one hand this creation of meaning begins as a function of its compositional, contextual nature. As Carse suggests, as that which is constructed through the relationships it forms, the concept of infrastructure does not delimit *a priori* which, or what kinds of, components are necessary to achieve a desired infrastructural objective (Carse 2012, 540). More simply, they only need to be integrated through what Geoffrey Bowker has called "'infrastructural work,' a set of organizational techniques (technical, governmental and administrative) that create the conditions of possibility for a particular higher-order objective" (Carse 2012, 540; Rossiter 2017, xvii). Infrastructure is moreover never fully determinable in its entirety. Rather for Susan Leigh Star and Karen Ruhleder, "infrastructure appears only as a relational property, not as a thing stripped of use" (Star and Ruhleder 1996, 113). It must be thought of *ecologically*: to "come into being, persist and fail in relation to the practices of the diverse communities that accrete around them" (Star and Ruhleder 1996). On the other hand, therefore, this compositional, accretive character can be used to indicate how infrastructure are used to manifest a political address towards the communities, environments and practices in which they are embedded, through what parts and promises a brought together and how.

Read as a discursive structure, Brian Larkin, drawing on literary and affect studies, argues that the formal arrangement of infrastructure sets in motion promises and political rationalities that are "made palpable and disseminated through concrete semiotic and aesthetic vehicles" (Larkin 2018, 175; 184) through the aesthetic experience of infrastructure. As Larkin has argued to re-prioritize the discursive or formal aspect of infrastructure recognises "the range of ways in which infrastructures address, order and constitute political relations" as it shapes formal, aesthetic or discursive environments and experience (Larkin 2018, 178). By rejecting the split "between the technical and the symbolic," the question of infrastructural form ("the imposition of conventional meaning through the formal arrangement of signs") allows a

navigation of the relation between the political aesthetic of an infrastructural promise and the material, social and ecological conditions of its realization (Larkin 2018, 178).

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## 2. Curatorial approaches to infrastructure

The problem with which this thesis opened concerns more than just what is and what can be imagined in and through, infrastructure. At stake is how this expanded definition clarifies how infrastructures give particular meaningful shape and experience to those worlds and their spatial, formal, relational and temporal qualities. Setting this in a curatorial context is not just about the specificity of the problem of curating. It also asks how the curatorial as a field or event of knowledge production, mediation and staging can offer an intervention into the processes by which infrastructural imaginaries, forms and practice are composed, activated and repeated.

As is now well elaborated, 'the curatorial' refers to both a sphere of activity and practice associated with curating, and as a theoretical and critical conceptualisation of the objects, artefacts and discourses produced by and through the practice of curating such as (but not limited to) the exhibition, public programme or commissioning. This is seen as a sphere of meaningful activity in and of itself, with contestation and dissent as much as affirmation, akin to the political (Lind 2009; 2012).

On the one hand, 'the curatorial' emerges out of a discursive shift set in contrast to previous focus on curator as author (including Harald Szeemann, Lucy Lippard et al.,). For instance, in the development of self-reflective discourses about how and what to teach in proliferating postgraduate teaching of curating (von Bismark 2012, 8; Hansen and Vandeputte 2015; Scott 2011) — including questions about how to re-incorporate institutional critique into the formation and operation of the institution with so-called 'New Institutionalism' (see: Möntman 2007). On the other, these accounts reflect a characterisation of the curatorial as specifically relational and connective. As such, the curatorial "implies a genuine mode for generating, mediating and reflecting experience and knowledge" that "encompasses a whole field of knowledge relating to the conditions and relations of the appearance of art and culture and different contexts by which they are defined" (von Bismark 2013, 8). Moreover, the curatorial has emerged as a discourse which sought to consolidate an expanded notion of 'making public', increasingly

attempting to move beyond its relationship to the exhibition, curating as a creative authorial practice (O'Neill, 2019, 500) and the exhibitionary complex from which it emerges (Rito 2021). Its focus on the dynamic event is resistant to the privileging of the exhibition, the authorial narrative mode of the curator and the institution; instead giving parity to the production, conditions of production and dialogic situatedness of the object (O'Neill 2019, 501). From this conceptualisation of the field, the curatorial also builds a methodological approach to sustaining this dynamic form of meaning-making through how it makes (and makes claims on making) that meaning public.

Importantly, for von Bismark, while curating encompassing "all the activities taking place in order to allow an exhibition to come into the world" (von Bismark 2012, 24), the curatorial is also a combination of "things that haven't been connected before — artworks, artefacts information, people, sites, context's, resources, etc.," (von Bismark 2012, 24). Primarily this refers to a constellatory mode of meaning-making. That is, curatorial artefacts are set in relation to dynamic process-oriented meaning production that localises curatorial propositions in relation to their conditions of production (von Bismark 2012, 34). They are generated by being dispersed and distributed in and by that context or composition (von Bismark 2013, 9). This of course, refers to Okwui Enwezor's seminal essay "The Postcolonial Constellation: Contemporary Art in a State of Permanent Transition" (2003) in which he says that in the aftermath of a movement of peoples, a colonization of lands and a reclamation of territory and identity, art cannot be seen from a specific site of culture or history, but from the "complex geopolitical configuration that defines all systems of production and relations of exchange as a consequence of Globalization after Imperialism," (2003, 58) in a dynamic matrix of histories, positions and identifications.[13] Of crucial importance here, is how Enwezor frames his writing through the work of Glissant, for whom the relationship between repetition and art "may provide" an alternative to what might become a "dispirited grumbling" about this common place — a factor of course taken up by Enwezor and others. However, it is also a generator of "another form" in that repetition: "an acknowledged form of consciousness both here and elsewhere. Relentlessly resuming something you have already said" (1997, 45). Within the

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[13] The cultural and curatorial form by which the matrices form post-colonial subjectivities is for Enwezor, the constellation: "a set of arrangements of deeply entangled relations and forces that are founded by discourses of power … that produces the content of all modern subjectivities-that is all subjectivities that emerge directly from the convergences and proximities wrought by imperialism and that today direct us to the postcolonial" (2003, 58–59). The essay begins with a quote from Edouard Glissant's *Poetics of Relation* that is especially relevant to the relationship between infrastructure and the curatorial: "This flood of convergences, publishing itself in the guise of the commonplace. No longer is the latter an accepted generality, suitable and dull-no longer is it deceptively obvious, exploiting common sense-it is, rather, all that is relentlessly and endlessly reiterated by these encounters" (1997, 45).

constellation, is then the possibility of difference in repetition through that multi-perspectival quality of art after infrastructure — in this case those of colony and the aftermath of decolonization. This creation of difference in the repetition of the constellation of convergence of conditions for infrastructure is taken up later on in the thesis.

The constellatory concept of meaning production invoked in the curatorial also brings into focus the actuality of a second key approach: what Rogoff and Martinon have described as an "event of knowledge" (Rogoff in von Bismark 2013, 23). For Rogoff, the curatorial describes an epistemic structure that (in addition to its accretive and constellatory production) rests on a proposition — a thematic, a mode of display, a constellation — where the "emphasis is on the trajectory on the ongoing, active work," that such an event makes possible by putting "different knowledges" and objects into the world and registering its perhaps un-expected effects (Rogoff in von Bismark 2012, 23). This creates, Rogoff writes, an "enormous tension… set up between the knowledge and the ways we [are] supposed to access it" (in von Bismark 2012, 32). As a curatorial conceit, the event does this by placing emphasis on the process, constraints and contingencies of meaning making through making that knowledge public, whereby the knowledge is developed in the uncertainty of its reception. This is knowledge whose quality lies in being enacted in the *send-off* of being placed into the world places emphasis on the questions they generate and on how this stops that knowledge from hardening (in von Bismark 2012, 23). The curatorial is in this sense the discursive combination of this constellation driven not just by representation, but a need for its relational composition "to become public" (von Bismark 2012, 24) in such assemblages. In this sense, the constellation re-centres the becoming of an "object, or thing, or in whatever form it manifests itself" (in this case art), as "part of an exploratory process of transformation through a process of being in motion, moving from one state to another, transforming art to become exhibition as part of 'the curatorial' process" (O'Neill 2019, 501). This transformation acts on the object itself, which is changed by becoming public. For O'Neill, this transformation allows a concept of escape (O'Neill 2019, 503) "where art gets to escape from being 'just' itself through being exhibited" (O'Neill 2019, 503); as this thesis will show, this escape and transformation is, in an infrastructural setting, possible by becoming, to echo Glissant, another kind of form possible through and within forms, convergences or scenes of repetition.

**Thinking about infrastructure in the curatorial**

While beginning as a gap, such methodological approaches are also, then, key to how infrastructure might be approached critically as a site of meaning making. To begin with infrastructure is indelibly one part of this constellation. One the one hand, this is in how infrastructure expresses a control, repetition, determination or inscription of what it is possible to say, do or think. In curatorial theory and practice, this is self-reflexively figured into an attention on the constraints, lacks and accessibility of its conditions of display. Where the constellation grounds itself in the tensions and contingencies of infrastructure, the emphasis on the curatorial *send-off* critiques the closure of that grounding (see Freethought, Rogoff et. al., 2016). This question of conditions and imagining mean that the entry of infrastructure in the curatorial intersects with (but also extends) the legacy of institutional critique (Vishmidt 2017), through a critique of past exclusions, violences or aberrations of fundamental practices. These sediment in the institution and emerge in the practice of varying degrees of what Marina Vishmidt calls "infrastructural critique" (Vishmidt 2017) and in the creation of alternative platforms and practices that seek to remove, revoke, account for and/or re-balance racist representations, colonial-era collections and positions and representational imbalances (Vishmidt 2017; Reilly 2018).[14]

In these cases, the institution is put to work as an actor or resource to achieve infrastructure-like effects in the conditions of appearance of curatorial artefacts, actors and audiences. However, as Vishmidt has argued (2017a; 2017 b), while a concern with the enabling conditions of the institution has opened out to a wider infrastructural condition of what allows art, its actors, views propositions and histories to appear, the institution remains the representational form through which these claims are staged and understood. One way this is already productively addressed is by working on the conditions of emergence, representation, access and distribution of resources in the field itself, including attempting to shift how processes, practices and resources such as funding metrics, exhibition management and administration or fabrication or rehearsal studios, are distributed (Rito 2021; Smith 2012; Kassa and Bingham Hall 2017). Another way is in terms of what this makes possible, what can be shown or developed in the field (Dekker 2021, Vickers et. al., 2020) and how this can, in turn,

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[14] For instance, see the work of: Decolonise this place, https://decolonizethisplace.org. Last accessed: 30-6-2022.; Southern Summer School, BAK, Utrecht, https://www.bakonline.org/program-item/the-southern-summer-school/. Last accessed: 30-6-2022.; "TALKING ABOUT OUR COLLECTION, Tate, https://www.tate.org.uk/art/talking-about-our-collection. Last accessed: 30-6-2022. Other examples include The Constituent Museum (Byrne et al.), The Useful Museum, MIMA, https://www.museumsassociation.org/campaigns/museums-change-lives/creating-better-places-to-live-and-work/mima/#. Last accessed: 30-6-2022.; and Arte Util projects, https://www.arte-util.org. Last accessed: 30-6-2022.

break the repetition of historical legacies of institutional norms (Reilly 2018; Gule and Sibiya 2017).

Another is where the curatorial seeks to imagine alternative infrastructures. Expanding the field of realisation and recognition of critique infrastructural critique in this way also allows and requires projects that are both interested in, and, alternatively, are altogether "indifferent to pressing questions that pose themselves in and through the field of art" (Vishmidt 2017a, 266). This includes for instance, the shared, but differentiated "common ground of the planetary" which opens up a cosmopolitical perspective that, in the works of Maja and Reuben Fowkes, recognizes, "the desirability of an ambitions reframing of politics that reaches beyond settled categories, borders and territories" (Fowkes and Fowkes 2018, 93). Within this frame questions of subjectivity and, with it, representation and world-making move from the global to the planetary (Spivak 2013) as a site of locally grounded, but ecologically expansive and connective worlding. Here infrastructure constitutes a conceptual framework or imaginary through which the planetary can be understood and addressed (Tsing et al., 2020). As El Baroni writes, it is for this reason that the infrastructure-imagining projects such as those of Bratton (2015) or Easterling (2016) offer planetary-dimensioned projects and scalable designs to reconfigure the conditions of a planet Earth "fighting to escape an inevitable collision course with climate change" (El Baroni 2022, 32). These have "become ubiquitous" in the field of art "as aesthetical, theoretical, analytical and organisational qualities blur into each other" (El Baroni 2022, 32).

Infrastructure has, therefore, also become a particular space for interrogating an expanded account of materiality in the arts and humanities (Larkin 2018). This reflects an interest in the systemic agency of more than human aspects (reflected in Latour and Weibel's focus on the things that 'convene themselves' in the vast project *Making Things Public*, 'in the matters that matter, in the res that creates a public around it" (Latour and Weibel 2005, 1)). Infrastructure occupies an interesting part in this meeting of new materiality and public-making practices such as the curatorial. Despite being an object or imaginary to be negotiated or reimagined, by eschewing the institution's place in the broader symbolic and functional context as a proxy for the infrastructural stabilisation and repetition, the intersection of infrastructure and the curatorial nonetheless raises a familiar problem of how to sustain this difference in an organised, durable, reproducible or repeatable form (Vishmidt 2017).[15] That is, where the curatorial has been

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[15] This is a distinction between the concept of reproduction (often associated with the institution) which refers to the reproduction of a category or a place within it, which turns on being characteristic *enough*;

couched as an open-ended, deliberately uncertain mode of possibility, often (and generally deliberately) at the expense of the long term durability of any proposition its makes.

Curatorial approaches, thus, offer a way to think about and re-imagine speculative/idealised platforms or models of infrastructure and of the problem of realising them critically and speculatively. In sum, however, where the institution of art (in general as a discursive frame and in the specific sense of a platform for making public) remains its primary frame of reference, the curatorial can't realise these speculations in infrastructural form and practice, particular not in terms described in infrastructural theory. Its imagined forms never meet the situation of *form-making*, that is, at least beyond its own existing rules of display

### A conceptual and methodological gap

In this context, at stake in the opening example is not that infrastructure can't be imagined; rather it is the question is of how to move from *imagining* to *instituting* (that is, realising something imagined in a durable form). As is elaborated above, there is no rigorous or consolidated connection between these two discursive spaces. Broadly speaking, the curatorial approach to infrastructure, even when it focuses on mitigating or modifying its enabling conditions, retains a distance between what can be imagined and the realisation or institution of infrastructure in itself — i.e., generating a tension with infrastructure, but not within it. The terms and conditions of the *Transformer* project can be seen to have been determined by the convergence of political address and ways of doing of EU and local conditions. Moreover, these were also built into the various infrastructural layers intersecting the project (such as the network and actual capacity). Yet the forms of world-making and more than technical meaning determining the project were not a means to changing the imaginaries defining those conditions; less addressed still, is how these interventions might be realised as a difference in an infrastructural scene, in practice. Furthermore, whilst there are similarities between infrastructural and curatorial theory — each discursive space has methodological frames within which their objects are contingent, constellatory and performatively realized. There is, moreover, a lack of a recognition and interoperation of their modes of staging in each approach. On one hand is a recovery of systemic and recursively performative compositions, on another are constellations composed to be singular. The curatorial asks what can be imagined through and by infrastructure? But, more often than not, it cannot and does not

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and repetition which refers to the sustaining of a systemic form and structure, which can have more instances within its same whole. These define different kinds of expansion: growth vs. scalability.

institute infrastructure. And while infrastructure theory asks: what does infrastructure institute? It resists speculating on how it could be re-imagined as its mode of intervention.

Within this setting the key methodological questions for this thesis, therefore, include:

- Can the aspects that defined the emergence of the *Transformer* project be re-aligned (and as part of an expanded curatorial practice?
- How does this connect to an expansion and problematisation of artistic practice after infrastructure?
- Can meso-scalar curatorial imaginaries be instituted as infrastructure?
- Can this change the object which this instituting creates and mediates, namely the realties infrastructure constructs?

How to institute such speculations in the systemic and recursive forms of infrastructure is a complex challenge. However, drawing on the accounts of Thrift (2004) and Gilbert Simondon (1980), I will claim it is possible to reconcile these discursive frames. Addressing and figuring infrastructure in the curatorial means that a methodological question is also implicated by this conceptual gap. That is: how can we register the outcome of the looping creation and performance of infrastructural meaning and how to intervene within that loop? This requires a differently constructed theoretical and methodological frame.

## 3. Setting the stakes

The opening case study opened up the conceptual and methodological challenges described above: that is, where local cultural infrastructures and projects attempted at the moment of the ECoC were defined by the scope and dimensions of infrastructural meaning which both preceded and exceeded the reach of the project. This thesis is, then, an attempt to bring the infrastructural and curatorial together in a specific set of ways. It is both a conceptual and methodological intervention, addressing how the infrastructural can be figured into the curatorial. Bringing together these discursive approaches also aims to address how the forms of meaning-making and making-public through which infrastructure appears and mediates the assemblages it creates can be understood and worked on in the critical and practical approaches of the curatorial. What is at stake in this challenge?

First is the inability for the curatorial to intervene on the infrastructural. For instance, in its side-stepping the straight jacket of instrumentality and governance (see Anand et. al. 2018, 11–12) of solutionism of design thinking (often associated with infrastructure as a professional or political field (El Baroni 2020, 32; see Bratton 2015, Easterling, 2016), or in avoiding the real risk of incorporation by systemic collaborations between art and technology corporations such as RAND, as in historical (and perhaps ill-fated) experiment by the American Neo-Avant Garde (Beck and Bishop 2020). Where the language of difference mobilised by the curatorial framing of infrastructural possibility remains at odds with scalability necessary to the epistemological and ontological shifts of instituting infrastructure, large scale infrastructural imagining, appears as a kind of "heresy" within the understanding of infra-politics mobilised in the field of art as limited to revealing a concept of infrastructure as "under, beneath and out of site" (El Baroni 2022, 32). (Or, in a Foucauldian reading, what is framed around forms of counter-narrative or resistant practice that are conceptualised as existing even further below the discursive surface of infrastructural intention (see Simone 2004, in Anand et. al., 2018, 12; Mbembe and Roitman 1999; Barry 2018).) This theoretical and methodological disjunction will remain so long as current approaches apply.

Moreover, where infrastructural models increasingly become the world (Rossiter 2017, 101; xiii), the seemingly practical problem of how to navigate the intersecting local and regional, economic and cultural infrastructure, in what *Transformer* scales up, is transposable to, and indicative of, a wider epistemological and critical problem. Infrastructural forms increasingly create imaginaries delaminated from traditional political and critical forms such as individual and national sovereignty (Bratton 2015, 152; 295) — becoming able to move between intimate and planetary scales, mediating, articulating and instituting those meanings in the world. For example, as discussed in Chapter four climate models create a heuristic image which can then also mediate action, politics and meaning in the lived world at multiple levels of activity, but which are seemingly far beyond the capacities of the fields of art and curating and its public fora.

I will argue that, the curatorial cannot currently address such multi-scale problems which it aspires to address (doing so only as content or thematic). This prevents the models that it can imagine and invent from actually being systematically instituted. In addition, infrastructural theory, will remain only an expository device. That is, while the accounts of infrastructure above use form, infrastructural work and performativity to recover existing practices from the disparate traces and practices of infrastructural assemblage; there remains an open question of how to differentiate the dynamics, artefacts and modes of making infrastructure public (imagining and

instituting it), that could position it as a mode of critical world making proposed above. As I argue, how to address this turns on both conceptual models and methodological approach to how that is staged. If the example above revealed a conceptual gap, and the literature a methodological problem, another example offers aspects of a way forward.

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## 4. Towards a critical methodology

In their essay in the edited volume on documentary after the diffusion of so-called 'post-truth' *When Fact is Fiction* (2020), Rutgeerts and Scholts reflect on a different layer of European policy and infrastructure. They situate the problem of infrastructure as one of the imaginaries it institutes and how these hold in them the terms of possible speculation (Rutgeerts and Scholts 2020, 182). The implications of this entwining and interleaving of infrastructural meaning and form can for Rutgeerts and Scholts be unfolded in the 2016 performance *Talos* by artist Arkadi Zaides at Ufer in Berlin.[16]

The performance took its cue from TALOS, or Transportable Autonomous Patrol for Land bOrder Surveillance, an ultimately failed ground drone for detecting and preventing border crossings funded by a European research and development fund and developed by a consortium of 14 research institutions, universities and companies (Rutgeerts and Scholts 2020, 183). While the artist had intended to try and recreate the robot, in the end documents around its creation were incorporated into a performative lecture incorporating its roots in a mythical past and its potential shaping of the future. Research by the artist showed "TALOS's goal was not confined to the construction of a robotic surveillance vehicle. Instead, the project had also attempted to shape our vision on the future of Europe's protection by aligning this future with Europe's mythical past" (Rutgeerts and Scholts 2020, 182). In Greek Myth, Talos was a giant bronze automaton figure. A gift from Zeus to his lover Europa, it protected Europa against potential threats. As such, the performance by Zaides explores how the European Union sustains itself as a project through the instituting of infrastructural imaginaries of protection and automation in the various infrastructures at and as its border, how it seeks to

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[16] *Talos* (2016) was a collaboration between Zarkadi Aides who initiated the project, Claire Buisson. Nienke Scholts, Jonas Rutgeerts, Youness Anzane, Effi & Amir, Gabriel Braga, Culture Crew, Amit Epstein and Dyane Nieman, as well as experts from relevant fields. See: https://arkadizaides.com/talos. Last accessed:  30-6-2022.

render non-visible the conditions of its existence through the exclusion of migrants, rather than as an instituted, public (or active self-creating) process. The performance, as Rutgeerts and Scholts make clear, also "intervenes in our imagination of the future, suggesting that the development of robotic systems is an inevitable and logical progression," (Rutgeerts and Scholts 2020, 184. To begin with, then, *Talos* is indicative of the multi-layer imaginaries that layer culture and infrastructure together in an accretive space of what I am calling *more than technical* meaning

### Inventing infrastructure

At stake here is how this performance not only reveals infrastructural forms and imaginaries hidden or embedded into the operational consistency of a political entity and community, but that it shows it is possible to invent and re-imagine how that imaginary appears. As Rutgeerts and Scholts describe, the spectators of the *Talos* performance lecture "do not know if [the] information [in the lecture] is true, as it is clear that Zaides [the artist] does not always follow the original project by mixing information that is distilled from the actual TALOS project" (Rutgeerts and Scholts 2020, 186). However, "real or invented: what matters is the document's creative potential. As the Greek philosopher Cornelius Castoriadis argued, essential to creation is not a 'discovery' of pre-existing truths or aesthetic ideals but an active constitution of the 'new'. Everything is first invented/imagined and then perhaps realized, constituted, within a context (can be society, art or others) that forms a particular reality." (Rutgeerts and Scholts 2020, 186). Here, the 'real' and the 'invented' are not opposites, but two states of the imaginary. In other words, imagination comes before the definition of both fiction and reality and is essential in the shaping of both. In the case of the *Talos* performance, then, this invention is how Zaides re-stages the performance as a kind of difference in the construction of that infrastructural form — intersecting the both fictional and real domains of this object as an imaginary of protect and entity within a larger surveillance infrastructure.

As a mode of articulation, this performance or simulation, in their words "crystallised the encounter between the human and machine that *would* take place at the border" (Rutgeerts and Scholts, 2020, 191). If these parts were hidden in its far away operations (in the embedded repetition of processes, decisions, expectations and actions) this re-composition in a different form of (artistic and curatorial) making public re-composes the outcome of its realisation according to *what* it anticipated in that infrastructure. Drawing on the inventive quality of the image, and staging it into the imagined repetition, automation and address of the border

infrastructure the robot mediated also meant a switch could be made from re-enactment to the possibility of *pre-enactment*: staging operational logics of the TALOS system and supporting "documents towards speculation" (Rutgeerts and Scholts 2020, 187). This recomposing of an existing composite object allows a re-imagining of what appears from those parts and pre-'animates', the repetition that conceptually and actually automates the exclusion at the border and which are written into the fabric and imaginaries at the core of European life.

Using this proposition, the opening problem can be thought about differently. While imagining infrastructure is not the problem, *Talos* shows that infrastructure could be imagined inventively. This is not simply a representation, but following Castoriadis' sense invention, an image that can make a world realised in its staging. More specifically, using the conceptual device of pre-enactment, this re-poses the problem as one of how to stage critique and/or a difference into the performative looping of infrastructural anticipation and connection to that which activates its form. As Rutgeerts and Scholts argue, Zaides's work can be used to generate the possibility of an alternative image — one in which that robot must be understood as a much more distributed and actively collective imagining and instituting. No longer somewhere else, to pre-enact the proposal of infrastructure as performance, it asks the audience to consider the agency they have in that, and therefore, other futures (Rutgeerts and Scholts 2020, 191-192). For Thrift and Simondon (2004; 1980); however, this loop and repetition is fundamentally more than merely a performative model, that loop can also be understood as systemic, a repetition that makes practices cohere to the model and parameters of that system. To imagine infrastructure, can therefore, be both a performative gesture (as in *Talos,* a single repetition) and potentially systemic invention (in the constant, iterative and extensive forms discussed by Thrift et al.). This provides a model for thinking about what Thrift, echoing Judith Butler (2007), calls the systemic and iterative repetitions, making form and what can be seen as generative, socially performative practices that are activated in making infrastructure public.

This inventive imagining and looping create the opening within which my thesis explores in more detail the following questions: how the curatorial can be used as a venue and vehicle through which to work on the multi-dimensional, meso-scalar and multi-actor imaginaries that are constructed and manifest through infrastructure? And how the curatorial must be refigured, conceptually and practically in order to undertake the necessary to work on these imaginaries. More specifically, by opening into this loop, where escape and *send-off* are dependent on the performatively, or practically temporary and fluid constellations of the curatorial, an important question can be asked. That is: can the notion of escape in transformation or of 'another form' be folded back into the composition and activation of the infrastructural and the repetitions that

make it? Something not possible when the infrastructure is performatively critiqued (by being only a model, or platform, not systemic).

**Critical methodological approach infrastructural imaginaries**

How to address infrastructural meaning and how to re-pose the curatorial to work on these problems? Drawing on the work of Castoriadis, Rutgeerts and Scholts also saw that the inventive, but real quality of a primary image could be used to both ask and stage questions in infrastructural terms (Rutgeerts and Scholts 2019, 191). Wanting to understand how and why, as well as show that institutions (beginning with, but not limited to, language) were first and foremost *created* (rather than determinable from pre-existing, essential philosophical categories or concepts, or determined by external forces such as history), Castoriadis argued that societies were fundamentally imagined and therefore self-created (1994). As Castoriadis elaborated at length (2005, 1994, 1997, 1992, 1987), those primary images out of which worlds are made coherent, or built, are generated when individuals attempt to give meaning to their place in a world of stimuli, and crucially, in worlds shared with others (1994). The thesis explores how this instituting imaginary can be used to both recover the traces, practices and systemic forms that make up an infrastructure, and to show that infrastructural convergences are not only technical, but points at which multi-dimensional, meso-scalar and multi-actor imaginaries are constructed and manifest. The thesis also goes on to suggest that they can be invented through the curatorial. That is to re-set the pre-conditions of structural circularity of an infrastructural present and the future built on it.

By using a version of the instituting imaginary as a device — as both an image and also an image that invents a world — both reproducing and critiquing what already exists — the instituting imaginary is first used as a heuristic to register the infrastructural outcome and conceptual frames of meaning making (e.g. connectivity as an image and a thing). It is, then, used to recover traces practices and connection, outcomes, practices and meanings that are shaped and prompted by the meaning promised and enacted by infrastructure — for instance, as is discussed in Chapter one, as '*provision*' and in Chapter four, as '*futurity*'. It also explores the social-historical consequences of infrastructure. To some extent the social-historical dimension of infrastructure, and its articulation of particular imaginaries or master narratives has been articulated by Susan Leigh Star in her essay "the ethnography of infrastructure" which draws out master-narratives or imaginaries from their traces, or the specific, distributed, instances of an infrastructural whole that becomes key to registering its "invisible work" (Star

1999, 385). However, where the imaginaries discussed in Star's work relate to a relatively narrowly constrained technical achievement of an infrastructural promise at stake (computer programmes, bridges, phone books and so on (Star 1999)), the instituting imaginary is also used here as a frame through which it is possible to invent and pre-enact new worlds through that imaginary.

By joining together the inventive imaginary and the concept of 'pre-enacting' into the looping modes of infrastructural form, Rutgeerts and Scholts use of pre-enacting allows for a speculative images to be invented and performed as if already realised (conjuring it in Butler's words (2007 xv)). But there is an unanswered question as to how this pre-enactment can move from the specific conditions and creations of that performance and that audience, to the systemic conditions in which that question is both necessary and in which it is realised. As a curatorial methodological intervention, the instituting imaginary can also be used to generate/stage a series of speculative curatorial forms in this/my writing. This speculative writing can be understood as a form of curatorial practice specifically centred on posing the following test cases and made possible by the analytical and theoretical work done elsewhere in the thesis. This draws on existing examples which occurred within the multiple intersections and attending material infrastructural shifts, and the extension and promises of emerging organisational imaginaries, allowing them to be modelled, tested and problematized as infrastructural practices in and through the thesis as an infrastructural proposition itself.

This framing enables an exploration and definition of how the instituting imaginary can be developed as a tool for recovering the dynamic artefacts through which infrastructure is instituted — which Castoriadis did not develop.[17] Moreover, by staging the following test cases, I will reframe and re-figure the instituting imaginary as a tool that can be staged within infrastructural repetition (or loop) which is elaborated in Chapter three. The performative, anticipatory nature of infrastructure also suggests a *beyond* and *before* of infrastructure, something which escapes its closure, but is nonetheless still *infrastructural*. As staged evocatively by Fred Moten and Stefano Harney in *The Undercommons,* (2013), this might be set determinedly against the enclosure and virtualization of life by infrastructure in policy, and countered by "planning," (Harney and Moten, 2013, 70–83). Asserting a practice that

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[17] More often seeing infrastructure and economic rationalisation as serving only to be conducive to autonomous creations (Castoriadis 2005, 86), or else consistently critiquing cybernetics (Adams 2007, 77), perhaps the closest Castoriadis gets to the recursive, repetitious infrastructural imaginaries discussed here is his later work on auto-poiesis and ecology notwithstanding (see: Adams 2007; Castoriadis [1980] 1997a).

performatively stages infrastructure I, therefore, begin by asserting this institutional imaginary this potentially disruptive and non-containable concept of pre-enacting in a/the loop of curatorial-infrastructural process. The thesis also poses and extend this position in a series of dynamic cura-infrastructural artefacts — speculative objects performatively instituted to hold the reality constructed by infrastructure together in a recursive relationship to the converge from which they are enacted. Specifically, as we will see, in forms of positioning, patterning, configuration and narrative. The thesis itself constitutes an experimental working out of this approach, in which the thesis is the performance of it.

**Transforming an object by making it public: A critical methodological proposition**

The wider methodological point made here is not simply that infrastructure is created; but that it can compose a seemingly inevitable and given reality, enacted through this created, inventive status. Moreover, that to change infrastructure, it is not just necessary to imagine an outcome that realises the achievement of an imaginary. Rather that it is necessary to imagine the very terms of that imaginary *into* the active form, disposition and performative practice through which that imaginary is instituted; and to institute this imaginary in relation to the conditions in which it is possible.

While this 'cura-infrastructural' intersection provides a scene and problem, the instituting imaginary provides a framework for how to think about infrastructure. It can also show what effects, difference and transformation is possible when infrastructural meaning is worked on, addressed by different forms of making-public. This will also mean exploring how the breaks and ruptures through which new forms can be generated and instituted appear in the continuity and repetition of infrastructure; how to balance the intent and effects of staging such systemic artefacts; and the systemic scope of the difference staged. The instituting imaginary, as a model of self-creation,
allows for analysing and speculating how images invent worlds. It also suggests it is possible to invent new ones. How is discussed and extended in each chapter, moving through different levels and scenes of complexity and transformation each chapter explores.

Reposing the curatorial. By using this frame, I can also look more expansively at other non-curatorial examples of making-public and at multiple constituent parts or practices as part of this making-public as the generation of such dynamic cura-infrastructural artefacts. This can be used to change the curatorial and how it sees itself, i.e., in what can be understood as more a

relational / cross practice / intersectional mode of meaning making or knowledge event. This means asking how the constellations enacted by the curatorial can be extended to, and folded back into, the meso-scales of infrastructural meaning. If it can be thought infrastructurally, not just a way of thinking about *infrastructure*, the curatorial can be worked as the creation and instituting of critical forms as well as a venue for re-imagining

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## 5. Aims

Rather than asking whether infrastructure can be imagined, this thesis turns more specifically on the question of how infrastructure can be transformatively re-imagined *and* instituted. It attempts to show how infrastructure can be re-imagined and re-instituted through modes of meaning making and making public that include its being figured into the curatorial. It will also aim to repose the curatorial at the site of composite practices of infrastructural meaning making and making public — not just as an analytical approach to how it is determined, or to alleviate problems of access or capacity to maintain its own terms. By reading through an expanded curatorial frame, of how infrastructure is made public, and how infrastructure composes that making-public, it seeks to establish a conceptual and procedural framework for this practice of *critical self-infrastructuring.*

A first task of this thesis will be to show that infrastructure can be understood as a changeable, vehicle and venue for the creation of embodied and embedded meaning-construction, materialisation and mediation.

This determination of meaning is a key critical stake in how infrastructure is addressed by the critical discursive and practical framing of the curatorial. The question of how to imagine as well as institute infrastructure, is specifically related to one of: how can infrastructure be approached from the curatorial and how can infrastructural imaginaries be figured into the curatorial? By engaging curatorial literature as an enabling but limited starting point from which to engage the problem above, means understanding and defining the gaps in curatorial knowledge vis-à-vis how infrastructure is and can be made public, and translating process and artefacts between the two forms of making public.

A second task for this thesis is how to develop vocabularies, procedures and artefacts that allow the curatorial to approach infrastructure. Through an exploration of the limits and possibilities in this the literature — this includes the practical problem outlined at the outset of how infrastructural meaning can be critically imagined and instituted — the thesis develops the terms of a more wide-ranging infrastructural critique and analysis. This is used to develop a model of speculative self-infrastructuring. Where engaging these literatures and artefacts in combination offers a point of both problematic and potential confluence, this thesis will address a second set of issues.

That is, how can infrastructure and infrastructural scenes or what I will call 'infrastructural reality constructions' can be analysed as instituting imaginaries and their realisation in form and practice, that can, given the right conditions, be speculatively re-made and self-created, with the conditions for this self-composed. By reposing the curatorial into this compositional convergence, the curatorial is explored as a mediator of both these condition and activator of these speculative images;

As such the process and tensions of the curatorial, define the central curatorial questions of thesis:

- How can the curatorial approach infrastructural reality construction critically and generatively?
- How can the infrastructural be figured into the curatorial as part of a practice of world making?

Addressing this more specifically:

- how can the constellatory and uncertain approaches of curatorial practice and research be used to establish productive, generative, critical and potentially transformative tensions in the layers that make up the realities infrastructure constructs?

Furthermore,

- how can this transformation be worked through infrastructure as an embodied and embedded meaning construction, materialisation and mediation?

**Outline**

To address these questions, the thesis attempts to develop a conceptual vocabulary and procedures; a framework for analysis of how infrastructure is figured into critical forms of meaning making and making public; an analysis of practices of infrastructural inventions; and as a series of particular case studies in critical-staging, that re-pose the curatorial at the convergence of meaning, materialisation, mediation and practice through which infrastructure is instituted. Each respective chapter demonstrates how this happens differently for/by different practices. The thesis also stages a series of speculative test cases in self-infrastructuring where the curatorial is reposed into the realisation of that imaginary. To develop and explore this framework and approach, each chapter will use these test cases to repose the curatorial at the intersection of curatorial approaches to making public and those of infrastructural convergences as a different scene and scale of instituting and complexity. Each practice generates a specific kind of difference, transformation and effect on the dimensions and conditions of continuity and rupture in that infrastructure and the context, claims, assemblages and futurities promised.

**The first two chapters** will explore how infrastructure can be understood as vehicle of embodied and embedded meaning construction, materialisation and mediation via putative/emergent practices of reality construction; and how from a curatorial perspective, how, that by posing as analytical /speculative curatorial-infrastructural artefacts, infrastructure-generating practices can tune, reconfigure and shift infrastructural reality constructions.

**Chapter one** outlines a contextual, practical and discursive setting. It uses the work of architect collective Assemble, in particular in the Granby Four Streets Project (2013–), to explore how art is figured into different infrastructural forms of making public. At stake is also how that difference is created, by whom, and in alignment between which actors, and how it determines the kind of difference it institutes into forms of positioning. Using what Larkin describes as the poiesis and aisthesis of infrastructural form (2018) the chapter shows how the instituting of infrastructural meaning is a problem that exceeds the institutional framing of meaning, as articulated in the art field, and in its presentation as a curatorial object concerned with detaching meaning-making from infrastructural constraint. The chapter explores how reality construction can be seen as a more useful frame to re-think the convergence of meaning, mediation and material infrastructure. The question of whether these differences in framing can

be brought into a similarly productive alignment through the curatorial is taken up as a critical lens in Chapter two.

In **Chapter two** a practical method of intervention is outlined at the intersection of curatorial, juridical and technical frames established by the work of Forensic Architecture in cases of state violence. It uses this work to explore how infrastructural convergences of meaning, mediation and material infrastructure are not only technical, but points at which multi-dimensional, meso-scalar and multi-actor imaginaries can be meaningfully and critically constructed and materialised in the alignments between different infrastructural and institutional capacities and forms. Forensic Architecture claim to institute an 'investigative commons' expanding Fuller and Weizman's (2021) terms of 'detectability' and 'sensing'; as well as the forums in which a truth is adjudicated (Forensic Architecture 2014a). Using Berlant's concept of 'patterning' (2016) the chapter explores how the pre-conditions of infrastructural imaginaries set the structural circularity of an infrastructural present and a future or promise are built on it through the dynamic artefacts that mediate the reality infrastructure constructs. This chapter evaluates how the interaction of rupture and continuity can be understood as the basis for closure of transformation and how infrastructural artefacts mediate and practice the worlds they make possible or define. But while Forensic Architecture can expand the terms of what can be achieved through infrastructure, they remain necessarily fixed to existing imaginaries of 'truth' and 'coherence'; this can mean that these infrastructural approaches 'cover over' (Robinson 2019) the complexity they seek to address. The question of whether the tensions in these alignments and compositions can be configured as a critical difference in how and what is imagined in and through infrastructure guide Chapter three.

At the core of Chapter three and four is the question of how the critical tensions and alignments used to test the forms discussed in chapters one and two can be used as a mode of imagining and configuring infrastructural promises in or as practice.

To achieve this rearticulation, **Chapter three** articulates a theoretical re-elaboration of the problem. It first uses Suchman's conceptualisation of 'configuration' (2012) to compare how the work of artist and architects FRAUD and curators and researchers Primer each develop different kinds critical systemic proposition by making infrastructural parts and practices work together. By examining how each configuration of that promise *bodies forth* meaning (Suchman 2012), the chapter argues how cura-infrastructural artefacts can generate transformative propositions through the layers of material infrastructures and infrastructural images this staging brings together and into repetition. While FRAUD use these cura-infrastructural

artefacts to represent the constellation of conditions of speculative infrastructural imaginaries through forms of formal closure, Primer are used to indicate transformative differences and effect in the partiality of configuration. As such the chapter sets out a framework for re-focusing the break or rupture of difference established by Castoriadis in the form of instituting within the configuration and repetition of infrastructure. As such **Chapter three** also consolidates the imagining and instituting of infrastructure through these alignments and tensions as a methodology for infrastructural transformation. It shows how the critical possibilities and parameters of this speculative approach to imagining *and* instituting infrastructure can be achieved through curatorial staging. This is used to *re-pose the curatorial at this composite practice of meaning making.* This suggests how this enacts a critical movement from formal or figurative breaks, to distributed assemblages in which systemic rupture is nonetheless figured into a disruptive continuity.

**Chapter four** explores how the distributed forms, figures and practices of difference explored in previous chapters might institute transformative effects into active infrastructural forms of meaning. It uses Bal's framing of the cementing force of narrative (Bal 1999) to explore how infrastructural narratives of expansion are used to frame the achievement of infrastructural and planetary futures. To do this, it takes up the question of how partial configuration allows for transformation through the integration of complexity and uncertainty into how infrastructural reality construction mediates the worlds it creates. To compare these differences and their systemic effect, the chapter uses Tsing's concept of scalability to compare the promises of changeable and non-changeable transformation through expansion embedded in different kinds of infrastructural narratives in two differing instances of what I pose analytically and speculatively as cura-infrastructural artefacts: *The More-Than-Human Anthropocene* (Tsing et. al. 2020) and *Protocols for Phase Transition* (Alliance of the Southern Triangle) (2020). Each offer models of planetary promise and transformation though forms of infrastructural futurity. The differences in configuration of these narratives are posed as means of establishing productive, generative, critical and potentially transformative tensions in the layers that make up what I am calling an infrastructural reality construction or scene such as, here, how a concept of futurity is embedded into and embodied in practice. However, the chapter argues that the critical difference for developing modes of self-infrastructure is based on how it can stage difference within its promised transformation — how that difference can respond to the systemic effect of being instituted as infrastructure and how an infrastructural configuration responds in turn.

Across the thesis I explore these practices and scenes as test cases in the emergence of particular kinds of infrastructural reality construction. This allows an exploration of the layers and scenes of complexity of each — developing possibilities and problems. Like this, each practice and scene can be used to analytically and speculatively rearticulate and examine the curatorial as a descriptive, analytical, critical and speculative (as well as layered) practice and site for critical (self-) infrastructuring. This also suggests how the object constructed by the curatorial (including art, the exhibition and platform of display) is articulated as model of functional and relational, rather than a consolidated representational — i.e., one that can be compared through the juxtaposition of two signs — difference in the meso-scalar infrastructural practice and speculative/manifest reality construction — this requires, as will be shown, the comparison and creation of differences in relational composition and the effect such relations have in mediating a setting, information, action and so on.

**Some terms**

A series of terms are developed and used throughout this thesis to articulate a both analytical and speculative model for the two-fold nature of infrastructure (as imaginary and instituted form) at stake in this thesis. Each element is analytically self-contained, but in comes together in particular infrastructural scenes to be useable and meaningful as infrastructure. They can, therefore, be roughly thought of in a stack that organises an arrangement of models that moves progressively from abstraction or diagrammatic understandings of infrastructure to its more concrete outcomes and practices. This lexicon of terms will include:

- Reality construction. The reality constructed by infrastructure, this is both an imagined and instituted reality. It is experienced within the actual and pre-emptive proximity and address of infrastructure. While reality is of course a contested term, the conjunction with construction emphasises the performative nature of the reality achieved or demanded within the operational protocols and purview of an infrastructural scene.
- Convergence. Following Berlant, for whom structure and thus, more specifically, the transitional structure of infrastructure is "not what we usually call it, an intractable principle of continuity across time and space, but is really [only] a convergence of force and value in patterns of movement that's only solid when seen from a distance," (Berlant 2016, 394), the use of convergence here frames the wider array of practices, forces and meanings that come together in and for infrastructure to

exist. In short, it collects the temporally-specific and contingent aspects that comprise what goes beyond the concrete and conceptual elements making up the form of infrastructure.

- Assemblage. In relation to the above, the infrastructural assemblage refers to the designed and accidental entities, systems and environmental aspects to make an infrastructural scene possible. It is, here, at least for the purposes of analytical clarity, differentiated from the convergence by the temporal and change nature of convergence; the assemblage is the more reliable, 'fixed' aspects of an infrastructure.

- Artefacts. The term artefact will be used to refer to a particular infrastructural instance, model or sub-element made in order to create or effect the above. It is more narrowly defined as the result of an action in the above frameworks.

Each chapter explores a particular scene of convergence in infrastructural parts, systems, practices and force as well as the imaginaries that sustain them. The motor of each chapter rests on breaking down the constituent assemblages and artefacts at play in these scenes, analysing the realities constructed through this composition. Sequentially the thesis aims to rearticulate these convergences as critical or speculative test-cases in order to pose the possibility of alternative infrastructuring developed in and through the intersection of infrastructure and the curatorial.

# Chapter 1 – Provisioning Position

Modelling tensions between provisioning position and positioning provision.

## 0.  Introduction

Threading through this thesis is the two-fold question:

- What are the forms, practices and meanings that infrastructure institutes?
- And can these forms be changed through the curatorial?

As discussed in the introduction, infrastructure is understood as a more-than social-historical form that not only promises transitional forms of mediation through materialised systems and structures, but also manifests meaning experienced in the outcome of the intra-relational processes of the structures and systems. This meaning and mediation is embodied and achieved through a convergence of performative practices, the anticipation of a form and apparatus that steer that practice.

This framing allows a critical understanding of infrastructure as a particular means of imagining as well as for making collective worlds possible, sustainable and repeatable. The critical point of entry into this proposed definition of infrastructure is how the imaginaries which hold together these convergences and make them knowable can be tuned, reconfigured and re-composed by curatorial discourse and practice. That is, as a self-reflexive field of knowledge concerned with the event of synthesising, activating and making these compositions public.

To begin answering the questions for the thesis, the following chapter explores how the forms, practices and meanings that infrastructure institutes can be understood, composed and performatively activated through curatorial artefacts enacted in relation to its capacities, affordances and discourses. This lays a ground from which a curatorial approach to critical infrastructural transformation can emerge in later chapters. This means first exploring the ways in which infrastructural meaning is formed and how it operates as a mode of making public. Secondly, the chapter elaborates the institution of meaning in infrastructural form through an exploration of assumptions and conceptualisations of infrastructural meaning; of how it can be critically re-articulated; have political-aesthetic qualities; and be open to possibility in the closure of infrastructural repetition are constructed in the curatorial field.

This also means acknowledging the infrastructural role and scope of curatorial practice itself. These two strands are developed through a close reading of the relationship between

*infrastructuring* and making public in the work and reception of the architecture collective Assemble, around which many critical claims have been made. This offers a case study for how infrastructure operates as a mode of making public, and how the objects and artefacts the curatorial composes are enmeshed in infrastructural convergences as part of, or in order to stage, such claims. The case study is an indicative example and sets the ground for the critical, discursive and practical tensions of a broader shift towards critical practices that enfold artistic and curatorial work — both as part of interventions into infrastructural conditions and the imaginaries infrastructure institute.

A key claim outlined in this chapter, however, is that existing discourses of making public, composition, mediation and staging in the curatorial and art do not adequately account for such interventions. Similarly, it is also the case that infrastructural studies are limited with respect to the meaning created by a social-material artefact (such as art) in these assemblages. As Chapter one argues, while situating infrastructure in a curatorial frame foregrounds how infrastructure constitutes a specific kind of instituting imaginary, to be able to analyse how art functions as part of an infrastructural approach and how it might change infrastructural functions, imaginaries and contexts, it is first necessary to address the limits as well as the potential of existing discursive models and practices in the curatorial (and , connected to this, how this relates to the objects it stages, in this first case, an expanded practice of art. This claim is enumerated through four parts that explore: how infrastructure realities form in practices of repetition whose composition defines felt and anticipated modes of experience and promise, enacting meaning in this process; that while art practices and staging can be composed as part of this form, its presence alone cannot transform an infrastructural scene; that, moreover, where claims made for the transformation of infrastructure *are* made in art, this relies on forestalling the repetition necessary to infrastructural form; that these factors nonetheless belie conditions of alignment in the imaginaries and practices of art and the curatorial that can ultimately bridge these limitations.

### Position

position
/pəˈzɪʃ(ə)n/

noun
a place where someone or something is located or has been put.
a particular way in which someone or something is placed or arranged.

a situation, especially as it affects one's power to act.
a person's point of view or attitude towards something.
verb
put or arrange (someone or something) in a particular place or way.

provision
/prəˈvɪʒ(ə)n/

the action of providing or supplying something for use.
an amount or thing supplied or provided.

The settler's town is a strongly built town, all made of stone and steel. It is a brightly lit town; the streets are covered with asphalt, and the garbage cans swallow all the leavings, unseen, unknown and hardly thought about.… His feet are protected by strong shoes although the streets of his town are clean and even, with no holes or stones.… The town belonging to the colonized people … is a world without spaciousness; men live there on top of each other, and their huts are built one on top of the other. The native town is a hungry town, starved of bread, of meat, of coal, of light. (Frantz Fanon (1961) 39)[18]

In this passage from *The Wretched of the Earth* Fanon describes (well before much infrastructure theory) how infrastructure differentiates experience through the forms of infrastructure that create, stage and mediate that experience: in this case between the settler and colonised peoples by how they are positioned into the racial imaginaries of empire. Streets with no holes and stones, offered for feet more than adequately shod, are part of and compose what Larkin describes as the political and "aesthetic address" of infrastructure (Larkin 2018, 175). That is, a means of signalling and embedding into the reality constructed by that infrastructure how the settler's part of the world is valued over, but also specifically in relation to and as what is held beyond, that part which is addressed and made *without spaciousness*.

As a particular infrastructural composition and repetition, *positioning*, as I develop it in this chapter, can be seen as an infrastructural artefact that distributes and layers value and meaning, reflecting what is provided for and how that provision is repeated as a differentiated imaginary in infrastructural form. It is a means of inscribing a political aesthetics that makes and divides a public through the meaning invested in it and which mediates the world assembled

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[18] Quotation drawn from Anand et. al., (2018): 1.

around and materialised through that artefact according to the different layers and levels of infrastructure that have been constructed to ground lives of those constituencies.

Infrastructure is also, as Fanon makes clear, a definition of a form that is not yet realised. It is, in the conjuring and repetition of that infrastructural possibility as the surround of daily life, that which shapes the affective experience of being embedded in the expectation set by this infrastructure. This infrastructural reality is constructed by the imaginary and promise of provision, of what is to be provided. The positioning of these infrastructures, and how one is positioned by them constitutes how that reality is constructed through the practice and repetition that enacts that promise as a stabilisation of what can happen, can be done or can be changed, or not.

A preliminary definition of infrastructure, therefore, is in this sense a distributed and systemic meaning realised in a recursive form which creates, stages and mediates experience. A material basis for creating hegemony, it is the living experience of that closure of infrastructural meaning. Yet, where nothing is *a priori* infrastructural (Carse 2012, 540), and must be constructed as such, often from pre-existing layers of accumulated functionality (Easterling 2016, 97; Rossiter 2017, 119) and expectation (Thrift 2004; Berlant 2001). Infrastructure is also a space for generating practices, forms and mediations that imagine, operationalize and mediate activities and meaning. It does this by putting and holding in place resources, capacities and platforms for visibility, within, against and because of pre-existing conditions (Mbembe and Roitman 1995).

This chapter, therefore, explores the role of *positioning* in this two-fold sense: as an artefact or form of a particular imaginary, promise or address embedded in the making and re-making of imaginaries of *provisioning*; and as a performative practice which embodies and generates this form in the realised practices of anticipation and integration of this imaginary or genre of infrastructural outcome into the worlds it supports.

Specifically, position offers a first layer in the concept and methodology of infrastructural reality construction through which to examine how an imaginary like provision is instituted as a curatorial artefact in the field of art as a venue and vehicle for the creation and staging of infrastructural meaning and form. Accordingly, this chapter analyses the extent to which current discourses frame and mediate infrastructural possibility, and thus tests the critical potential of these frames through three different layers and approaches to infrastructural position in the critique, development and distribution of provision of civic and cultural infrastructures. These

layers are drawn from a close reading of the convergence of actors, infrastructural pre-conditions and histories, cultural, legal and civic infrastructures, as well as exhibitionary and curatorial claims and critique around the work of the UK architectural collective, Assemble, specifically in the projects *Granby Four Streets* (2013–) and the exhibition *Wohnungsfrage* [*Housing Problem*] at the Haus der Kulturen der Welt (HKW) in Berlin (2015).[19] This convergence provides a case study in the reality construction of provision — an infrastructural imaginary composed, staged and mediated through the practices, forms and modalities of positioning — and the basis for speculating on the effect of this convergence on the closure of infrastructural meaning and the repetition of power embedded and embodied in different kinds of infrastructural form. This closure refers to the performative repetition of infrastructural forms through practices that both set and transform their conditions of possibility and mediate the world they create within the limiting definition of the promise of that form (literally what an infrastructure promises) as it is realised and repeated.

### Context

The infrastructural provision and position examined in this chapter arise from a condition of disinvestment. In 2010, the UK Coalition Government Spending Review announced a wide-ranging and deep cuts to public spending, in what became known as 'austerity'. Rationalized as an "unavoidable deficit reduction plan" because of the huge public borrowing required to prop up failing banks in the aftermath of the 2007–2008 credit crisis, austerity measures brought drastic reductions to welfare, arts, communities and local government budgets (Chancellor of the Exchequer 2010). In this context, curator Alistair Hudson described (then director of MIMA, Middlesbrough Institute of Modern Art and 2015 judge of the Turner Prize for Contemporary Art), art institutions increasingly responded to the pressure brought by post-2008 financial austerity by attempting to define the social value of art generally. With real financial needs of their own to reconsider how this discourse on value could help serve their requirement for funds specifically (Axisweb and Hudson 2015), often by recomposing and privileging the particular use-value of art (Byrne et. al. 2018; Wright 2013; Phillips 2019). Provision of resources became an important theme, especially in terms of and articulated through cultural infrastructure. This recognises a shift in the field of design itself (Menu 2018), which has increasingly sought to come to terms with its public-making role (DiSalvo 2009) and in its

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[19] See:
https://www.hkw.de/en/programm/projekte/2015/wohnungsfrage/ausstellung_wohnungsfrage/wohnungsfrage_ausstellung.php. Last accessed:  30-6-2022.

entanglement in power (Heindl et. al., 2019; Murphy 2018) and is marked by a number of points in which critical design overlaps with critical artistic practices (Heindl et. al., 2019).

A second, connected context for this convergence is the work of Assemble, a collective of architects, in the generation of cultural and civic infrastructure and its entry into the art field as a critical, generative practice of infrastructuring. In addition, the infrastructures of cultural production, as well as the cultural infrastructure of museums, art schools, magazines and so on, are incorporated into a wider set of emerging questions about the broad need for infrastructure and infrastructural investment in existing and new settings (Byrne et. al. 2018; Kassa and Bingham-Hall 2017; Rito 2021) (not least because of decades of dis-investment caused by neoliberal de-prioritisation of public infrastructure, sharpened drastically by austerity). As such infrastructure generating and designing practices such as architecture offer both an expansion of possible routes for artistic critique and challenge to these shifting conditions, but also a practical means and modules for reconfiguring them. This means putting this infrastructural capacity of the field to work. This establishes a closer relationship to other infrastructures in a critique of previous distributions of the provision and address of these institutions, including art's own platforms and procedures. It also means greater attention is put onto how cultural production is possible at all (Kassa and Bingham-Hall 2017). The development of cultural infrastructures and platforms are tied into the critical modes of both institutional critique and the curatorial (Rogoff 2013) in establishing cultural infrastructure as a proposition that can change the conditions in which curatorial, as well as political, ethical and critical claims can be staged and take effect.

In the following sections, the following questions are explored through how the work of the architects Assemble converges in the Granby Four Street Community Land Trust, financing and contemporary art exhibitions.

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## 1. Positioning provision


In 2011, a group of residents in Toxteth, Liverpool instituted the Granby Four Streets Community Land Trust (GCLT) with local housing campaigner and resident Ronnie Hughes (Wainwright 2014). In forming the Community Land Trust (CLT), an organisational model used

to purchase land for community benefit, the residents became eligible to buy 13 terraced houses in the Granby Four Streets Triangle from Liverpool City Council.[20] The series of four streets in Toxteth, south Liverpool were mostly derelict.[21] Despite the area having long been left "tinned up" by the local council, the residents had over several years begun to maintain, renew and replant the street furniture, gardens and margins (Assemble and Riordan, 2015; Peterkin-Walker 2021).

In 2014 and with the help of Steinbeck Studios the CLT worked with the London-based collective of architects, Assemble. The group, who focus on involving users and the public in its design processes (Murphy 2018, 16), were commissioned to design the renovation of 10 of the houses on Cairns Street and help reverse the decades of impoverishment of the local experience and environment (Tilley in Chakrabortty 2018). These transformations intervened in a long history of deprivation and political promise that had itself become an infrastructural condition or repetition, but which had also been contested by the residents' work to change the experience of that area.

### Pre-histories and pre-conditions

Prior to Assemble's involvement, the residents of Toxteth had lived with the effects of almost forty years of disinvestment turning on the intersection of several infrastructural dynamics. Having been effectively zoned or ghettoised by the city council after the 1981 Toxteth Riots — or "uprisings" depending on whether you were in the media or a local resident (Tilley in Chakrabortty 2018) — there was little to no maintenance in the area. Years of deliberate degeneration that reproduced racial discrimination and reduced employment prospects were compounded by the ill-fated and badly implemented 2002–2011 government policy, the Housing Market Renewal Pathfinder Initiative (HMRPI). Spearheaded by the New Labour MP, then Deputy Prime Minister, John Prescott, the £2 billion programme aimed to renew "failing housing markets… to reconnect them to regional markets." The intention was that restocking — in effect by razing and rebuilding houses — would raise the price of housing in the target areas, to, it was hoped, make them more attractive, "[improving] neighbourhoods and [encouraging] people to live and work" (Wilson 2013, 1) in nine areas of the North of England and the

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[20] The houses were bought for £1 each. Five were subsequently sold under a shared equity scheme per the conditions of the trust pay for loans, with the other five to be rented to local people at an affordable rate (Wood 2019; Pritchard 2016).
[21] The triangle is formed by four streets running east-west across Granby Street and a north-south route in the south of the city, close to the centre. The area has 150 houses in total.

Midlands, including Toxteth.[22] This would be implemented at the regional level with funding from central government.[23]

There was, however, little done to address the structural reasons of why certain target areas had such poor housing and housing markets (moneyweek 2007; Wilson 2013). In other cases, scattered attempts at compulsory purchase around remaining residents — who either didn't want to move from their communities (Wilson 2013) or who simply couldn't afford to (Tilley in Chakrabortty 2018) — came up against the fact that it would generally be more cost-effective to renovate what was increasingly considered to be Victorian heritage (moneyweek 2007; Wilson 2013; Chakrabortty 2018; Save Britain's Heritage). As such, the policy left threadbare, de-serviced neighbourhoods like the Granby Four Streets area to fall through the gaps of these policies and to be "effectively managed into decline" by local councils (Wilson 2013, 5). This entrenched the houses as systemically redundant components in the logic of a wider economy and infrastructural dynamics that could for the councils remain stable and unchanging: they didn't need to do anything. After decades of sporadic demolitions, the licence to erase the whole of the Granby Triangle given by the HMRPI,[24] (Wilson 2013) meant further residents often chose to leave. This left the few remaining residents surrounded by derelict or empty, rat and feral-cat infested houses and ever-further-decreasing care or services by a local council that had apparently "forgotten" its job was to provide them (Tilley in Chakrabortty 2018).

### A turning point

The Granby Triangle residents are part of a long history of resisting the various deleterious effects of local authority and government policy (Pritchard 2020). Instituted in 1993, the Granby Residents Association (GRA) was a campaign group whose main aim was "to stop the demolition of the remaining streets of Victorian houses in the Granby Triangle…" and to "recommend other ways to tackle the empties and involve the community."[25] While there were some successes for the GRA — including lobbying the council to save the neighbourhood that would become the "Four Streets," — the group disbanded in 2010 as it seemed the rest of the

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[22] See: http://researchbriefings.parliament.uk/ResearchBriefing/Summary/SN05953. Last accessed:  30-6-2022.
[23] See: https://webarchive.nationalarchives.gov.uk/ukgwa/20170207053613/https://www.nao.org.uk/wp-content/uploads/2007/11/070820.pdf. Last accessed:  30-6-2022; https://webarchive.nationalarchives.gov.uk/ukgwa/20100709095206/http://www.communities.gov.uk/housing/housingsupply/housingmarketrenewal/. Last accessed:  30-6-2022.
[24] See: https://www.granby4streetsclt.co.uk/history-of-the-four-streets. Last accessed:  30-6-2022.
[25] Ibid.

area would be cleared under the HMRPI initiative. An unexpected turning point came, however, with the Conservative-Liberal Democrat coalition's programme of post-2008 austerity. One of the primary targets of the austerity roadmap, the 2010 Spending Review, was the Communities and Local Government spending,[26] which provided funding to the HMRPI programme and meant the end of the initiative (Wilson, 2013 5).[27] Couched within the rhetoric of "Big Society, where everyone plays their part," (Chancellor of the Exchequer 2010a, 6), this defunding was part of a central aim of the spending review to shift responsibility for regional and capital funding away from central government to local authorities (Chancellor of the Exchequer 2010a).[28] Under the Localism Act (Pickles et. al., 2011), the legislative partner to the Big Society agenda, councils could bid for funding to meet demands such as that the HMRPI programme aimed to cover (Wilson 2013, 6), but who, with "more modest" budgets would, nonetheless be faced with "tough choices on how services are delivered within reduced allocations" (Chancellor of the Exchequer 2010a, 8).

Another change brought about under the de-tooling of state provision in the 2011 act was a greater emphasis on community-led housing and development. The CLT model for communities for holding land in trust emerged during the US civil rights movements (Davis 2013; 2014), with the first urban CLT, the "Community Land Cooperative of Cincinnati formed

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[26] See:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/203826/Spending_review_2010.pdf.  Last accessed:  30-6-2022.
[27] See:
http://webarchive.nationalarchives.gov.uk/20090413215817/http://www.communities.gov.uk/housing/housingsupply/housingmarketrenewal/. Last accessed:  30-6-2022.
[28] The Big Society agenda was the conceptual counterpart to the Coalition government's 2011 Localism Act which sought to decentralise and devolve decision making power in the UK, away from central government to communities and "establish a greater role in public services for voluntary and community organisations" (Lowndes and Pratchett 2012, 30). Where the act comprised changes that put more emphasis on individual democratic participation on local issues, including: 1) the enhanced use of local referendums, 2) the implementation of directly elected regional mayors, 3) local bodies being increasingly disciplined through local elections (such as Police and Crime Commissioners, coving existing constabulary boundaries) and 4) increasing bureaucratic transparency through databases on local government spending (Lowndes and Pratchett 2012, 27), the Big Society was aimed at provoking a more collective and cultural shift. Then Prime Minister David Cameron's "core intellectual idea" (Ibid.), was proposing ideas "'from devolving budgets to street-level, to developing local transport services, taking over local assets such as a pub, piloting open-source planning, delivering broadband to local communities, generating their own energy. . .' (Cameron 2010)" (Ibid)". Moreover, its key philosophy turned on a vision of society "where people don't always turn to officials, local authorities or central government for answers to the problems they face', by developing active and sustainable communities (Cameron, 2010)" (Ibid). The actual realisation, effect, critique of these claims notwithstanding, this narrative component to a legislative transformation to the infrastructures of local government and funding represents a key component of that transformation. That is, drawing on Thrift (2004), as part of the conceptual and actual apparatus that allow for other kinds of infrastructural forms to circulate (here devolution and local provision), to repeat and to be anticipated as a new infrastructural settlement, reality and condition.

by an ecumenical association in 1981 to counter gentrification and displacement in the inner city," and the first rural CLT, "New Communities Inc." formed in Leesburg, Georgia in 1969 by civil rights figures to give African American farmers greater land security (Davis 2013). Despite now being set up worldwide,[29] CLTs only made it into law in Britain in 2008 (Chakrabortty 2018),[30] and they have been continued to be supported in the aftermath of austerity, with for instance the *Localism Act 2011* entrenching the right to build on CLTs, bypassing normal planning permissions (Wilson 2013, 3).[31] This created the opening for conjuring new kinds of performative practice,

Alongside a continuing government drive to "diversify" (or fragment/privatise) the provision of public services (Chancellor of the Exchequer 2010a, 8), in terms of funding and providing support for "communities, citizens and volunteers to play a bigger role in shaping and providing services," and placing emphasis on the social enterprise model (The Conservative Party 2010, 37–38), the context of austerity meant that the cancellation of the HMRPI initiative set in motion many of the particular conditions of the Granby Triangle residents' opportunity to turn around the decline of their area through the formation of the CLT.

### Cultural infrastructuring: Assemble

In response to the invitation to renovate the houses in the Granby Triangle, Assemble sought to develop a response that not only reflected the aesthetic texture of the houses and streets, but also engaged a new generation in the residents' "long history of working creatively in their streets," something which "had tended to predominantly be initiated by older generations" and in particular, women (Assemble in Tucker 2015). The collaboration included working with residents to design house-by-house renovation schemes that were sensitive to residents' concerns about the state of the houses (for example keeping double-height rooms where rotting floors had fallen in) and costing all of the plans, allowing the GCLT to do the necessary work and maintain a budget which would keep the homes and rent "affordable" (Tilley in Chakrabortty 2018). These conditions of decline and the response to them can be examined as infrastructural meaning given form.

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[29] See: https://www.communitylandtrusts.org.uk/about-clts/what-is-a-community-land-trust-clt/. Last accessed:  30-6-2022.

[30] Made into law by the then Labour Government, in the Housing and Regeneration Act 2008 (Wilson, 2017).

[31] Subsequent Coalition and Conservative governments established various funds in support of CLTs (Wilson 2013, 3; Chakrabortty 2018; see for instance: https://www.communitylandtrusts.org.uk/who-we-are/#funding. Last accessed:  30-6-2022.).

The work was centred on the construction of a two-phase master plan or vision for the area (Lee in Hughes 2014) that translated previous work by the residents. First was a design scheme for the refurbishment of housing. The second phase was about public space, cultural infrastructure and "the provision of new work and enterprise opportunities" that would initiate an ongoing business and could encourage participation in those processes and integrate training for young residents.[32] One part of this latter phase of cultural infrastructuring took the form of the Granby Workshop, a pottery and materials reclamation workshop, with public provision in the form of cultural infrastructure of the Winter Garden.[33] Built in the shell of two of the houses whose two stories had collapsed and which could not be used for housing, trees and ferns grow under a fully-glazed roof. As well as a publicly available garden, it is a community arts hub. The garden has accommodation for an artist in residence (rented out via Airbnb (Wainwright 2019)) and is used as a free venue for community workshops and meetings (Peterkin-Walker 2021). Community gardening and creative action had been the foundation of change in the area and the Winter Garden serves as an ongoing resource in the area (see Betteridge 2019).

The other was a small-scale pilot social enterprise run by the group with local young volunteers and artists, called the Granby Workshop. A ceramics workshop and shop initiated by Assemble to make fittings for the houses using detritus from the part-demolished homes, the workshop provided training and was intended to become a long-term part of Granby's local economy (Assemble and Riordan 2015, 78). The workshop was launched during the Turner Prize exhibition (Rosamond 2016, 119), with Assemble using the £25,000 prize money as funding to supplement the crowd-funded pilot (Wainwright 2019). Though the workshop has moved further east in Toxteth to Aspen Yard Studios,[34] it continues to design, manufacture and sell ceramic

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[32] See: https://assemblestudio.co.uk/projects/granby-four-streets-2.  Last accessed:  30-6-2022.
[33] Two hundred and fifty thousand pounds, funded by Arts Council England Capital grant scheme (Pritchard 2016). The CLT partnered with and received financial support from Nationwide Foundation, Power To Change, The Homes and Communities Agency, National Lottery, National CLT Network, Steve Biko Housing and registered social housing provider Plus Dane Group; as well as receiving loans from millionaire stockbroker John Davey that were mediated by the so-called social investor Steinbeck Studios (set up as a social investment vehicle to invest in the CLT (https://www.linkedin.com/in/xanthe-hamilton-b0bb6b4a/?originalSubdomain=uk.  Last accessed:  30-6-2022.)). Funding for the Winter Garden Project was from the Arts Council England, The Trusthouse Charitable Foundation, P.H. Holt Foundation, Granada Foundation, the People's Health Trust, Veolia Environmental Trust, Elizabeth Rathbone Charitable Trust and the Co-operative Foundation. Other houses in the Four Streets are being developed by Plus Dane, Liverpool Mutual Homes (LMH) and Northern Alliance Housing Co-operative and Terrace 21 housing co-op. (https://www.granby4streetsclt.co.uk/funders-partners. Last accessed: 30-6-2022.; Hughes 2014; https://www.granby4streetsclt.co.uk/history-of-the-four-streets.  Last accessed:  30-6-2022).
[34] Managed by Granby Workshop. See: https://www.aspenyard.co.uk/info. Last accessed:  30-6-2022.

fixtures from Toxteth, as well as participating in The Granby Street Market run by the CLT. Now a community interest company (Graham 2022), profits were put back into the community (Rosamond 2016, 119) through training offering young people the chance to learn building and construction skills through refurbishing the houses (Lee in Hughes 2014).

By incorporating community-led and collaborative artistic and craft practices into the design processes and a cultural infrastructure masterplan to support the residents' vision for the area, *Granby Four Streets* (2013–2017), Granby Workshop and the Winter Garden projects were widely recognised for both enabling and making claims about the role of art and community-led regeneration in creating public space (Gayford 2015; Pritchard 2016; Rosamond 2016). In 2015, Assemble was awarded the Turner Prize for the project; held up by the judges as a model for infrastructural interventions in the intersection between the institution of art and other infrastructural fields (Tate 2015). The inclusion of the work of Assemble and the CLT into the field of art poses interesting curatorial questions for modes and forms of making meaning public and critical or speculative approaches developed through it.

At stake in this analysis is how this recognition turns on the pre-conditions of deprivation, disinvestment and privatisation of state provision and socialisation of risk can be read as more than just a setting or scene in which an infrastructural story unfolds. That is how these pre-conditions also provide a vehicle and opening in the seeming inevitability of that backdrop in which new infrastructural conditions and forms are established.

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## 2. Granby Four Streets CLT: A case study in infrastructural form

The definition of infrastructure I am arguing for here is not just an outcome or the technical means of achieving it, distributed by the arrangement of parts and the manifestation of processes. It also embeds meaning into the forms it generates and is generated by, with that meaning also being embodied in use, affect and transition and in the address or being addressed by or into that infrastructural form.

As GCLT member Michelle Peterkin-Walker has described (2021),[35] pre-figurative infrastructuring and ways of doing were already latent in the area, generated by the groups of mostly women community activists and gardeners (Vicky Evans-Hubbard, Eleanor Lee, Helen Hebden and Hazel Tilley of that blooming triangle were key) who had developed the vibrancy of the area by initiating wide-scale planting, community markets and re-painting abandoned houses, first on Cairns Street and then following this with residents from Beaconsfield Street (Rand 2019). The work by community groups interleaved claims to services and housing by resident associations that had been made through activism to save the area by the Granby Residents Association. It was these groups that morphed into Granby CLT. Though this was an intuitive decision about what seemed in the situation to be the best model — even if they didn't know too much about it (Tilley in Chakrabortty 2018) — the CLT marked a shift from previous campaigns the Granby Resident's Association (1993–2010) that had lobbied against various stages in the deprivation of the area by the local and national government.

The CLT model gave the residents a non-profit, community-based organisation that could hold land in trust and impose covenants to secure its use for affordable housing, while structural improvements could be fed back into the community. The covenants meant that the land would be preserved by, and as a benefit for, the community in perpetuity. This set-in play the durable possibility of housing as a community infrastructure and asset: both creating ways of doing and experience, but also allowing for other modes to be built into it. As Eleanor Lee, CLT board member and campaigner described, "this is a new kind of organisational structure developed to bring about the long-term social and economic regeneration of our neighbourhood, through the acquisition of community-owned assets. Any profits will be fed back into the community to create new projects or expand existing ones.… the physical act of rebuilding to help boost the local economy and also offer residents and supporters a direct hand in shaping the area's development" (in Hughes 2014). Seeking to generate a different kind of imaginary for provision in the area, the gardening, the market and housing activism and later organisation through the CLT offered a pre-figurative form of infrastructural '*poiesis*' through which the residents could begin to consolidate, shape, expand and multiply their investments in the area.

The activities of the groups and the role of artistic and creative work in mediating and manifesting this infrastructural work were then further consolidated by the cultural infrastructures integrated by Assemble. Together these interventions set into play an alternative dynamic in how the value of local infrastructure was realised and experienced in the form of

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[35] Peterkin-Walker also works with the Granby Winter Garden programme.

that housing, the streets, area and resources. However, in the intersection of infrastructuring and the curatorial field in this convergence, key differences between forms, practices and modes of infrastructural public-making arise. These differences are key to the critical and speculative capacity of reposing the curatorial at this convergence. Here, a return to infrastructure theory can help.

### Generating infrastructural form

As well as a gathering of parts towards a specific intention and imaginary, infrastructural form, "also create phenomenal experience … what we can take from these ideas is that form has a concrete thingness that is in complex reciprocal interaction with the material properties from which infrastructures are made. Second, these forms impose sensory conditions of experience" (Larkin 2018, 184–185). Form, Larkin argues, offers a way of describing how infrastructures "represent and are represented in their built forms; the protests that congeal around them; the sets of numbers, graphs and tables by which they are administered; the budgets that undergird them. These depend on various material and formal devices or apparatus, each of which invokes specific modes of address, draws together specific sets of actors, involves differing uses of secrecy and transparency, and constitutes the political in distinct ways" (Larkin 2018, 186). Infrastructural form can, for Larkin, be read as generating in this form of address, or address in form, a combination of what Jacques Rancière calls *poiesis*, "the act of bringing something into the world by creating a way of doing," (Larkin 2018, 176) and *aesthesis*, "how it is those things produce modes of felt experience" (Larkin 2018, 176). In the case of positioning, to undertake what Carse describes as the "infrastructural work" (2012) involves a putting in place of parts by setting preconditions, operations, connections and processes that create in form ways of doing in the positioning of practice and the experience of that form, an imaginary address: provision. To trace infrastructural form is to register how infrastructure orients its addressees to a form of political action that is linked to but separate from its material operation (Larkin 2018, 175). It also shows how such an address can be re-composed.

As form, the infrastructural convergence discussed above can be analysed as produced by and producing in response to different kinds of infrastructural address and with this, political aesthetics. At one level, this creation of infrastructural form was achieved in long-running horticultural practices which started in 2005, with the work to rebuild community infrastructures, including a market since 2010 (Wood 2019) and artists' projects in the area. The expectation of the transformation of the area through this master plan was for "the streets to come back to life,

the shops to fill up, the horticulture [to] continue and the artistic element […] to blossom" (Hughes in Genova 2015). Alongside this, then, Assemble's designs for the new homes, amenities and cultural infrastructures in the area focused the shift in infrastructural provision as a mode of felt experience (aisthesis) of what had been put in place to realise it.

The interventions made here can be seen to have generated a basic infrastructural form in and through creating ways of doing: outcomes and provisions could be met, according to legal frameworks (the CLT and its covenants). Not only this, but this form also cohered as a consolidated regeneration project, under the banner of community-led participation, gardening and creative and cultural organisation and practice. This infrastructuring also constitutes a particular kind of meaning and 'publicing', an infrastructural address achieved by making that form public. Each layer of this convergence puts in place and draws together different actors and factors of infrastructural form, in the re-positioning of cultural and civic infrastructure and value around the houses in the Granby Triangle. In each layer is a distinct, but entangled mode of positioning that makes public an imaginary address of infrastructural provision through the generation of infrastructural form: bringing an alternative image of the area to those posed by the HMRPI or council disinvestment. The infrastructural forms developed by these groups develops and initiates a counter-model to existing conditions of "managed decline" by creating new ways of doing in that locality. Somewhat counter-intuitively, it was the gap between the promise and outcome of the Big Society agenda between a reimagined and revitalised public realm and drastic defunding of the infrastructures to support this transition, that meant that the group could exploit the devolution of powers that accompanied the 2011 localism bill.

### Re-making infrastructural pre-conditions

While Assemble and CLT generate a basic infrastructure that puts in place infrastructural outcomes in that locality, it is also a political address via and as that positioning. As Lee describes, the regeneration of the underlying housing infrastructure consolidated other possibilities, including the Winter Garden "… one thing has led to another – the whole area has got so much potential. The houses are good – but they are just the start, it's all the creativity that has come from it" (Lee in Genova 2015). To bring into being forms of provision that counter the disinvestment the area had been subject to, or addressed by, the intervention by Assemble positioned new ways of distributing and accessing resources and capacity. Where CLT can be seen as having brought into the world a particular infrastructural imaginary through the

covenants and organisational frame it offered, this was consolidated and solidified as cultural and civic infrastructure by Assemble in the particular modes of address and public making made possible by the Winter Garden, Granby Workshop, as well as investment in the refurbishment of the houses.

Beyond developing a visual and structural approach to the design work — which was of course in keeping with a contingency-led aesthetic particular to Assemble as an architecture practice — the collaboration also had the effect of further investing care in an area that Hazel Tilley, chair of the CLT, explained was not just economically deprived after years, but suffering from a "poverty of experience and a poverty of environment" (Tilley in Chakrabortty 2018). The pre-conditions for this renewal were an infrastructural intervention into an infrastructural scene that addressed the residents through a managed decline that could be summed up by the labels attached by the council to the tinned-up doors of stripped-out houses: "nothing of value" (in Betteridge 2019). It was also about architectural texture built into the infrastructure Assemble proposed. As architectural historian, Esther Choi describes in *Art Forum*, "among the solutions the collective suggested were the rebuilding of crumbling housing stock — using affordable materials and uncomplicated construction techniques — and the erecting of public and commercial spaces" (Choi 2015). The materials and forms of labour used to fit-out the houses aimed to make the history of Granby and its residents the condition of that reannotation, with "houses [featuring] fireplaces cast from demolition waste and fixtures made on the premises" (Choi 2015). Where form is, as Larkin writes, the composition of actors and material operations with distinctive, felt effects that converge to constitute its political aesthetic and effect, the political action of generating infrastructural form in positioning is where that form allows infrastructure (and those who commission it) to distribute, position and create experiences of "particular sorts of political rationalities" of such redistributed provision.

Form allows infrastructure to address people according to representational models, as well as into its materialization of a particular image or meaning (and, therefore, how access to that outcome is *located* and *localised* by the experience of its operation, the form of position). Like this, infrastructural form puts parts in place, and positions them based on how its enabling parts and actors are *addressed*, "whereby, for instance, the state can seek to impose its sense of the world and citizens accept or contest that ordering" (Larkin 2018, 184). Specifically, this comprised putting value back into the houses through refurbishment, entangling and extending the local economy into this refurbishment through the Granby Workshop and training, and centring the possibility of participation, representation, meetings and events in the development through the cultural infrastructure and community resource of the Winter Garden. Represented

in and by these built and procedural forms are embodied and embedded imaginaries and experiences of the liveability, affordability and centrality of cultural and civic infrastructure, that contrast both the aims and realities of HMRPI.

The address of this infrastructural provision constitutes the construction of form as an experience of meaning in and of position, a relational meaning — being in relation to or connected by infrastructure. Moreover, through this, the cultural infrastructure addressed a different kind of actor and indeed subject. If local and national government policy had used its housing policy as a formal device to position the deprivation of area under an imagined failure of the market for Victorian terraces — doing this in the hope of drawing together the economic actors who might transform the fortunes — the convergence of the instituting and practices of the CLT and what this allowed the residents to achieve; the proposal developed by Assemble for the use and renovation of housing stock and local amenities; and the exhibitions and public platforms of the Turner Prize and the Winter Garden, suggests a distinct series of layers of alternative form and modes for experience could be re-positioned from out of that failure.

What happens when this work is seen as more than a new, local mode of provision, but also explicitly as a particular mode of making public through the pre-enacting of a different arrangement of its infrastructural pre-conditions? How does the instituting of the meaning embedded in that form shape the possibilities of a critical understanding and indeed practising of such work? This is key to understanding the role the curatorial might have in remaking an infrastructural address and form.

### Differentiating the infra-political

Through the traces and standards of meaning and form as they are generated by infrastructural practices described in Star (1999), and consolidated as a practice and layer by Easterling (2016), the political aesthetics of infrastructure, establishes and maintains infrastructural power through the positioning of that meaning as a reality that can be realised in infrastructure. Through these traces, power leaches through and between the layers of meaning, materialisation and intermediation out of, and into, the worlds infrastructure makes. How infrastructural form is nested within and can be used to both articulate paradigmatic chains of "aesthetic histories and the epistemic worlds that come with them" (Larkin 2018, 175) can be seen to come together in how Angela Mitropoulos articulates the concept of "infra-politics" (Mitropoulos 2012, 115) — as that which exists between these entities. Here, she deploys

Arendt's insistence that politics is not dependent on the subject, but on "the *infra*, the unassimilable plurality of that which lies between" (Arendt 1998 in Mitropoulos 2012, 115). Infra-politics brings a focus to how infrastructure works with and against different aspects of its composition and context to hold in place socially instituted forms, boundaries and subjectivities such as sovereignty, race, class, nation, identity and so on (Rossiter 2017 175; Bratton 2015; Nakamura 2017; Anand et. al., 2018; Mitropoulos 2012; Harney and Moten 2013). The creation and arrangement of meaning in and between these layers is key to re-making these relations, standards and practices, but also raises the problem of outsourcing and automating accountability and decision in a case such as Granby Four Streets, through the repetition of infrastructural practices on and into which such meaning is made public, embodied and embedded.

Accordingly, how Assemble rearticulated and re-aligned the work of the CLT as infrastructure, and how this made a certain kind of meaning embedded in and mediated through those practices, offers a case study in the differences between how infrastructural meaning creates and operationalizes different forms of social address or 'infra-politics'. This articulates and balances the relationship between the experience of infrastructural lack and provision as well as how this is felt in practice and as being embedded into infrastructural form and meaning. This also constitutes a different kind of form (a systemic object and effect, here position) and figure to realise this 'public', for instance, the user.[36] How this alignment is experienced in discrete speculative and critical proposals depending on how that meaning is composed and made public turns on the composition of that infrastructural form; however, the meaning of this form turns on its repetition of ways of doing and use. While indicative of how infrastructural meaning is imagined and instituted, *position* (in the sense established here) also provides a fundamental basis for the anticipation, repetition and shaping of transition between infrastructural imaginaries and their instituted forms. Specifically, this positioning allows for negotiating the expectation that infrastructural will, as geographer Nigel Thrift argues (2004), repeat and show up as expected, and for changing that expectation and how it is generated.

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[36] The concept of *making public* composes an object into a more than social context. Addressing and constructing a more-than-social public by way of this object or artefact are the outcomes of both curatorial and infrastructural work. Specifically, and relevant to this case study, this action of *making public* includes: putting objects into the public sphere as active or relevant parts of it (Latour and Weibel, 2005), making it "go public" (Lind 2011) and bringing together constituencies around these artefacts, addressing that public or constituency through the form of staging and the object or artefact staged (Rogoff, 2017; Sheikh 2007; Larkin, 2018). In terms of the latter, context and frame include the work of curating (as well as providing a performative frame for the reading of symbolic objects as having meaning) and can be applied in an infrastructural sense in a more overt closure and circularity of that which is staged and the context in which it is relevant. This also constitutes a different kind of form (a systemic object and effect, here position) and figure to realise this 'public', for instance, the user.

**Social performativity and the conditions of closure and creation**

In infrastructure, address is not simply akin to a political speech act but comes to be expressed in the dispersed yet relational conventions "of what will show up where and what will show up next" (Thrift 2004, 177). These conventions indicate how core knowledges of position and juxtaposition are embodied and embedded as meaning core to the experience of a social collective. Drawing on the work of Lauren Berlant on the production of normative affect (2001), if infrastructures are to be reliable and predictable, they must come to be read and used as an "organized inevitability" (Berlant 2001, 46). In this sense, "infrastructure has precisely to be *performative*" if it is to become reliably repetitive, that is, repetition must be both an achievement and the means of that achievement (Thrift 2004, 117). As already discussed, infrastructure must, therefore, generate and sustain a "technological unconsciousness" — that is, an embodied and anticipatory knowledge and expectation of known or already used infrastructures. This must be learnt through and embedded into the practices of repetition that enact the imaginaries of infrastructure, allowing them to be simultaneously "inevitable," and maintained without "the benefit of any cognitive inputs," or instruction (Thrift 2004, 177). The latter upholds the former, while the former drives the latter.

Reading infrastructural repetition through Butler's conceptualisation of performativity (2007), Thrift sees the creation of infrastructural practices as both the performative repetition of a precise arrangement of parts and of forms that conjure that precision. That is, forms of positioning and juxtaposition (such as address, standards, relationship and tracking) which combine to ensure that infrastructure is internally coherent and externally addressable. Through this legibility, infrastructure can be standardised, integrated, repeated and naturalised through this as inevitable and predictable. As well as ascribing to actors and parts certain infrastructural imaginaries, forms of positioning can, therefore, be seen to act to *address* actors and parts *into* the precision of repetition that allows things to turn up each day "more or less as expected" (Thrift 2004, 175). By literally enfolding performative practice into an image of organisation (such as provision) through the stipulation of positionings and juxtaposition necessary to its operations, infrastructure ensures that what is promised or imagined in infrastructure "arrive and become known" as planned (Thrift 2004, 175). This engages an infra-politics of closure in form and practice that must repeat precisely the parameters of its promise. That is, both make infrastructure possible, but also define the limits of what *is* possible.

The modes of felt experience within the rejuvenated neighbourhood and cultural infrastructure are, as such, the distributed and dispersed traces of how these models of provision were positioned into and as new ways of doing and repeating. Form is also, therefore, a tracer by which to recover the imaginary performed in these parts as they join together ways of doing, with the experience of their effect. More specifically, the critical claims of this convergence, are not only in forming this infrastructure but also lodged in the practices made possible by that infrastructural form.

These practices of self-creation of housing conditions (by the CLT), community value and economy (the Granby Workshop, training and market), cultural participation (Winter Garden) and horticulture (as entwined into the maintenance of the streets and general environment), also sustain the promise of the claim instituted in those infrastructures. By generating new modes of practice in relation to the forming of infrastructure, this convergence also pre-enacted alternative promises, expectations and anticipations into those pre-conditions of disinvestment. The promise is that *through these practices* or ways of doing, infrastructure will bring something into the world and that this can maintain ways of doing and produce modes of experience that show up where and as expected.

These alternatives hold a different experience of repetition, conjured by a different infrastructural form: cultural infrastructures that could generate community value in that locality, rather than see it simply as a repository of land value (HMRPI) or of socially-driven replacement of the welfare state (Big Society). This had to be generated out of practices that would enact that difference and hold it in place and this was itself a function of changes in the pre-conditions for what would become that housing infrastructure.

Generating practices of repetition out of preconditions cements an infrastructural imaginary into the form. This allows multiple infrastructural layers and "accumulated functionality (Rossiter 2017, 119) to sediment, interoperate and integrate standards and expectations into one another. It also generates a closure, whereby the position necessary to achieving repetition becomes a practised condition of entry, use, participation or provision. How practices of repetition that hold an infrastructural form together and in repetition are generated; how these repetitions are staged in advance; and what they, therefore, bring with them are key to an analysis of how the composition of an assembled form becomes infrastructural. It is also key to understanding how that practising of form bakes in particular kinds of closure and infra-political dynamics in this creation of form and address as different pre-histories, capacities, discourses and entry points that pre-existed this infrastructural converge cohere.

This understanding is also key to how modes and affordances of critical art and curatorial claims can be staged into infrastructural form and practice. In the following sections, two approaches to how meaning is composed into infrastructure are explored: the first is an infrastructural artefact and the second is a curatorial artefact.

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## 3. Art as an infrastructural artefact

Many of the claims made by and about the involvement of Assemble in the *Granby Four Streets* project (indeed repeated by the Turner Prize judges) centred on the consolidation and transformative role of pre-existing community-led creative and pre-figurative infrastructural practices of the Blooming Triangle, the GRA and the CLT.  Yet, another story emerges from the longer duration of the project. The development of the houses and Winter Garden has taken over five years because of delays to builders, funding and gaps in the knowledge of the CLT and the council (Tilley in Wainwright 2019). Where the project breaks the standard approaches to housing infrastructure in the city, this duration can be thought through the construction of the apparatus Thrift describes as necessary for any infrastructure to be conjured and repeated. As Thrift describes, the generation of repetition also draws attention to the specific conditions for the creation of alternative practices in each formal layer of this infrastructural shift and speculation.

### Recovering the composition of imaginaries of provision: Steinbeck studios

As arts researcher Stephen Pritchard recounts in a deeply-researched blog (2016), though Assemble translated and addressed these practices into an infrastructural vision or imaginary for the area, it is in fact Steinbeck Studios who were instrumental in both instigating the infrastructural forms and practices of repetition that shifted the pre-conditions in the area. This is key to the kind of public or collective imaginary this intervention institutes. For Pritchard, it is this work which can be seen to set the conditions for knowledge of cultural practice and the practising of value in that area. Focusing on how Steinbeck Studios compose the forms and practices of this infrastructural convergence shifts the role of art in this transformation (both community-led and that which was activated by Assemble). By looking at these infrastructures

as also layered into or on top of the work done by the CLT to make the houses again infrastructural, the imaginary of cultural provision can be viewed more carefully.

As Pritchard describes (2016), the specific the context of austerity, budget reduction and previously-stalled local development provided the terms in which the CLT were able to pitch to tender the redevelopment contract — if they could attract funding (G4SCLT website/history) — and which brought first the private Jersey-based social investor Steinbeck Studios to work with the CLT. Steinbeck Studios were set up by its initial director Xanthe Hamilton a Jersey-based filmmaker and social arts project manager, to mediate an interest-free loan of £500,000 from a private social investment company run by a previously mystery millionaire libertarian stockbroker John Davey (Hughes 2016, in Pritchard 2016).[37] The loan enabled the group to apply for the match funding necessary for renovation work to begin. While this funding both unlocked the grant writing ability of the CLT, it also provides a vehicle for so-called social investment keen to find a safe asset in the aftermath of 2008.[38] It was also in this context that Steinbeck Studios introduced the residents to Assemble (Tilley in Chakrabortty 2018; Hamilton 2016).[39]

In a presentation given at the London Festival of Architecture 2016 entitled *Granby 4 Streets: The Ideals of Specificity and Scalability in a Social and Architectural Endeavor*, Pritchard notes how Hamilton described how "a global savings gluts and safe asset scarcity" conspire to create a vast pool of money seeking investment safety and a modest return. Hamilton identified the "enormous gap between supply and demand of quality social housing in the U.K" (in Pritchard 2016, 1) as an "100% safe" investment opportunity. Moreover, she described how "community-led" regeneration, such as Granby Four Streets, combined "the prospect of a safe unit of investment (bricks and mortar)" with an opportunity to multiply the quality of this investment. Davey had invested interest-free for the first five years,[40] accepting a "4% return" on his investment in the CLT, thereafter.  The Granby residents' work in the area increased the

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[37] The company is now directed by Davey, according to the STEINBECK STUDIO LIMITED company filing, 26 October 2017. (Company number 08803803). See: https://find-and-update.company-information.service.gov.uk/company/08803803/filing-history?page=1 Last accessed: 30-6-2022..

[38] Social investment being the use of repayable finance to help organisations achieve social purposes. See: https://www.goodfinance.org.uk/understanding-social-investment

[39] See: https://www.ft.com/content/7e56c182-abdf-11e6-ba7d-76378e4fef24 Last accessed:  30-6-2022.; https://beta.companieshouse.gov.uk/company/08803803/officers Last accessed:  30-6-2022.; https://jerseyeveningpost.com/news/2015/12/12/saturday-interview-the-woman-who-commissions-the-artists-designers-and-builders-involved-in-the-project-that-won-this-years-turner-prize/. Last accessed: 30-6-2022. Hamilton herself had been introduced to the CLT through Save Britain's Heritage (SAVE) (Save Britain's Heritage, 2015).

[40] See: https://cooperativecity.org/2017/10/25/granby-four-streets-clt/. Last accessed:  30-6-2022.

investment by acting as "multiplier effect" on the quality of the housing stock and thus the asset value. Davey viewed the Granby residents "as the most crucial ingredient of quality" (Pritchard 2016, 2). Woven into this financial assemblage the residents' activities, as well as their desire and need for better local infrastructure, made for an investment that paid back more than the sum of its parts, at least for Davey. Not unconnectedly, it should be noted that historically low interest rates also contributed, as Davey described, "It has not cost me a lot of money. I wouldn't get much return from saving" (Davey in Bounds 2016).

By commissioning a design scheme from Assemble alongside securing funding contingent on the community work being structured into the infrastructural forms and address of the area, Steinbeck Studios also became a lynchpin in what Hamilton would describe as a soupy matrix of interests coming from five different "models of Social Developer" to Granby Four Streets. These included Housing Associations and Registered Providers (well capitalised, but an expensive approach); a programme for buying the houses for £1 each (cost-effective for the residents, but not the council); the community land trust (a welcoming committee for other models but lacking in capacity); a local co-op (which had run into financial troubles); and Steinbeck Studios (with ready cash, but unable to apply for grants) (Hamilton 2016, 2–3 in Pritchard 2016). Each was 'attempting to exploit [the] swampy ecology of funding, law, insurance and so forth' (Ibid.). But when the project ran into 12 months of difficulty, with investors and the council getting cold feet, the project's key financial backers Steinbeck Studio and John Davey (alongside CLT member Eleanor Lee flagging the needs of the community) played key roles in maintaining the vision of the project during lengthy negotiations with the city council.

Additionally, it was, as Hamilton claimed, the loan, cost-reducing adaptations to the masterplan by Assemble, and a (pre-figurative) "trick of the leverage unique to [CLTs]" — launching the project with a "big [community] event in the streets and all over the press, as if we were in possession of properties" — which forced the council to "complete the deal and transfer the property" (Ibid.) that ultimately made the project possible.[41] The approach of Assemble to work with the changing needs and conditions for cohering the plan, offered a link and transition between ideal and scalable models; but this plan needed to be staged into a practice that appeared to be already repeating, already anticipated and expected. Accordingly, by enacting a series of key events that allowed a break in one set of conditions to be remodelled-enacting the model within the nascent form for its repetition offered by the matrix of funders and cohesive

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[41] See: https://asenseofplace.com/2014/10/10/wondrous-day/. Last accessed: 30-6-2022.

model provided by Assemble, Steinbeck Studios made possible the further infrastructural re-formation of the area.

Policies like the ill-fated 2002–2011 government policy, HMRPI saw the Granby Triangle houses as merely potential value that had escaped the market or the Big Society in which the energy and connections of the communities could stand-in for the massive cuts to the welfare state. However, solidifying different conditions of interoperation between the residents, the local housing, economic and cultural amenities, Assemble's work with the CLT can, on the surface, be seen as an example of the creation of specific conditions for new knowledge and practice of use to be conjured, repeated and anticipated. For many, this collaboration between Assemble, Steinbeck Studios and the CLT is a prime example "of artists using socially-engaged practice for their collaborative work improving local areas" (Tate 2015). For some, including Thompson, the Granby Four Streets project reflects the "positive power of art to resist destructive urban policies and enact transformative urban change … through resistance to state and market logics" (Thompson 2016, 225), such as the reliance on private capital and the uncertainty of philanthropic capital.

However, as Pritchard argues, despite the claims for community-led rejuvenation, with art centred in this vision, where Steinbeck Studios were instrumental in enacting these infrastructural shifts, the financial interests represented by Steinbeck Studios are dragged further into that form. Art risks being overstated when the role of behind-the-scenes, well-connected financial backers and social entrepreneurs Steinbeck studios remains under-articulated. The role of art in the Granby Four Streets / Steinbeck Studios / Assemble partnership can be better seen as a culture-led approach in which culture serves to lever additional credibility and media attention, cemented by a well-connected team at Steinbeck Studios and on the board of the CLT (Pritchard 2016), not to mention the value created by the resident's activities to improve the area, the housing stock and its environmental conditions. This is a complex multi-faceted convergence in which community-led and artistic imaginaries can also be seen as a "façade" behind which this approach could be established (Pritchard 2016).

### Conjuring new knowledge

The differences between these forms, and where and how they are staged generate distinct affective, political and procedural effects. This is its pre-enactment: generating new practices

into repetition of existing conditions. On the one hand, by creating distinct uses for those resources an alternative infrastructural plan could be *realised* and performed as the inevitability offered. On the other, the means of claiming control over the future of those assets and through organisational forms that replace local government organisation and policy (Hiller et. al. 2015, 24) shows how alternative expectations for those locally relevant infrastructures are possible when conditions or convergences shift.

In this respect, the cultural infrastructure of the CLT/local gardening did not alone represent a new apparatus for the infrastructural practice developed from the ground up. Rather it was a shift in the conditions of financing and ownership that provided the pre-conditions for what was more akin to culture-led regeneration whilst also making a new public (or constituency of infrastructural users) through the aisthesis and poiesis of infrastructural form making. The GCLT's actions held both "progressive and regressive potential":

> Their creative and pioneering endeavour to take back streets left to decay by austerity politics is both a crack in the ownership model, prefiguring an actually existing commons, and simultaneously an unwitting agent of austerity urbanism, taking up the slack in the paralysed development model and filling the gap left by the retreating state to productively reuse derelict housing when all else has failed (Thompson 2015, 1034)

As such, this convergence and how it holds together other arrangements of practice, use and form, creates meaning in different configurations of the infra-political depending on the point of entry to it. This convergence is in an infrastructural sense, more than technical; it also generates and manifests meaning. And while Assemble multiplied capacity and forms, it also multiplied the entanglement of the CLT in external stakes not accounted for in the infrastructure it proposed. As a means of making public, this infrastructure convergence was not simply generated by cultural, horticultural or community-led practices and agency; instead, through the interoperation of Assemble, Steinbeck Studios, its backers and other stakeholders, some capacity was instead outsourced. Assemble's focus on creativity acted as a surface beneath which Steinbeck Studio's intervention could be couched. Moreover, as a convergence of infrastructural practices these relations are effectively automated in the performative repetition from which the imaginaries of housing and cultural provision are realised (and which Assemble designed). In effect, agency, politics, activation possibilities can, through the incorporation into an infrastructure, be automated out as the constitutive outside of an *already-designed and determined* infrastructural operation (cf. Rossiter 2017 xvii).

If the repetition of one infra-political configuration enacts a certain closure in the achievement of what is expected — e.g., in the social value captured in a particular investment model — the form conjuring/sustaining that knowledge is key to the extent and kind of change possible (this includes those structural changes eased in under the Big Society, but more accurately associated with the Coalition Government's austerity programme). This puts the role of art in this instance in a complex position, since the financial situation and Steinbeck studio was key to this shift. But as the chinks of possibility in the project above shows, not all repetition is the same. Without the claim for community-led art practice, which Assemble engaged and focused through the cultural and civic infrastructure it generated, such a shift in infrastructural form and practice (which transformed the value of that housing infrastructure) would not have been possible. Art in its expanded form here (as a part of the wider infrastructural texture instituted by these activities) serves as a factor in both the emergence of this infrastructural convergence of form and practice and shows how the conceptual particularity of infrastructural meaning being developed here is caught or held between a form that generates practices (of provision) and practice that enacts that form (through position). But, as was made clear by the role of Steinbeck Studios in composing this infrastructural convergence, art alone cannot change infrastructure: it can be wrapped into other practices, forms and modes of address.

While art provided an imaginary around which infrastructural form could cohere; the address developed by this emphasis on art was also layered into and covered for by an imaginary of social investment and culture-led regeneration. Art's role could be minimised and instrumentalised in part because it is not seen as an infrastructural actor or form, but a means of differentiation within instances of provision. This differentiation with and within infrastructural provision is both key to how infrastructure can be taken up in the field of art and curatorial practices; and to the limits that the discursive and critical frames of art and curatorial practices can place on what infrastructure can mean. While Pritchard argues that art is a facade for other work — a less ground-up, more culture-led regeneration or institutional closure — the work of Assemble nonetheless offered a model that was taken up by the institution of art (2016) including how it might change that institution too. A final analysis of this particular infrastructural convergence, and how it might be useful test case in the remaking of infrastructure as critical meaningful site, concerns how the institution of art also made speculative claims through the infrastructural forms generated in this project. This focuses on how the project was recontextualised as model or an image of social transformation and impact that is generated by being positioned in and out of that field. This, however, engaged with a more complex set of infrastructural modes of making public than first appeared. That is, in the particular ways that the field of art participates in infrastructural imagining.

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## 4. Infrastructure as a curatorial artefact

The generation of meaning through the convergence of more than technical forms and practices constitutes the central issue for this chapter, indeed for this thesis as a whole. That is, meaning is generated by, and articulated through, infrastructural artefacts that also mediate their context be recomposing their context according to, or as part of, that same meaning. Or in other words, by making an assemblage *infrastructural*. This in turn provides the mechanism for the key claim of this thesis: that the curatorial can be reposed at the convergences from which infrastructural forms, practices and experiential effects of infrastructural meaning compose, stage and mediate this meaning — to act as and in this convergence. How the *Granby Four Streets* project is transposed into the exhibition can be seen as an alternative mode of staging and making infrastructural meaning public. This situates the project as part of a critical claim on infrastructural transformation and this becomes key to registering a different kind of claim to the systemic entangling of art, finance and impact registered in the infrastructural positioning and provision by Assemble, Steinbeck Studios or the GCLT. This means different questions can be asked about how infrastructural meaning is generated, repeated or transformed in *this* convergence. These concern how the role of art is staged in relation to Assemble as a model of cultural infrastructure within the institutional positioning and setting for cultural provision.

This raises important questions about and differences between forms, practices and modes of infrastructural public-making. Specifically, this concerns how art can be composed as part of infrastructure as a curatorial artefact — defining one aspect of its imaginary, practice and experienced form — yet not constitute its political address. That is to say, the critical stakes of artistic and curatorial work can be instituted as part of the imaginary of provision, the meaning that infrastructure makes public, but not its forms of positioning, which in this case include the leveraging of this work for financial interest. At stake here is how the critical claims made through art and the curatorial rest on breaking apart and keeping open the relational practices — or infra-politics — that consolidate infrastructural form, doing this to reflect on, critique or re-imagine those practices and forms.

While the previous sections arrive at this convergence through an account of the conditions for local housing and community cultural infrastructure through infrastructural theory, in the rest of this chapter, art takes a role in how meaning shifts through these infrastructures. Where the conception of infrastructural meaning, materialisation and mediation discussed above is a key factor in re-posing curatorial discourse and practice around this convergence, the following sections re-position claims made earlier through the institutional and discursive infrastructures of that work: that is, to figure infrastructure as a curatorial artefact. This will mean examining how infrastructural forms in which art makes a compositional and mediating difference are staged into practices of repetition in order to foreground and emphasise the capacity of art in that infrastructure, even as this misaligns with how that infrastructure is imagined with how it is instituted. Refiguring how this convergence is understood through the institutional staging at work in the Turner Prize makes it possible to approach this problem as an artefact of the curatorial; this can include the discursive and practical preconditions for the framing of art as both conditional on, but also separate from, the manifestation of infrastructural meaning.

Moreover, re-articulating this convergence as a curatorial artefact indicates the first key problem for the possibility of reposing curatorial practice and discourse in the convergences that institute infrastructure. How does one foreground the critical stakes of artistic and curatorial work in the realisation of infrastructural forms, address and practices (in this case of positioning). This will also mean asking how existing models and practices establish that difference and how this operates in or as what has been described above as infrastructural forms and practices. On the one hand, this will reveal a basic but fundamental difference between the realisation of infrastructure as a curatorial artefact and the infrastructural form discussed here. On the other, this limit creates a problem that nonetheless uncovers a different, more productive kind of composition.

**Reposing the curatorial**

As was reported in *The Guardian*, when the 2015 Turner Prize was awarded to Assemble, the judges praised what they called "a ground-up approach to regeneration, city planning and development in opposition to corporate gentrification" (in Brown 2015). Moreover, in their citation of the group, the jury stated that Assemble "[drew] on long traditions of artistic and collective initiatives that experiment in art, design and architecture. In doing so they offer[ed] alternative models to how societies can work. The long-term collaboration between Granby Four Streets and Assemble show[ed] the importance of artistic practices being able to drive

and shape urgent issues" (Tate 2015; Taylor-Foster 2015) such as housing, public space and local economies.

As has been repeated in subsequent years of the prize (see: 2021), what was shown in 2015 was not the project itself, nor was it documentation. Rather, the exhibition was both a model or formal claim for making a kind of practice possible and an operative claim made by the institution of its importance. For the exhibition, Assemble produced a 1:1 plywood model of one of the internal voids of the renovated houses for the Turner Prize exhibition at Tramway in Glasgow. The exhibition also served to launch the Granby Workshop, selling ceramic fixtures designed by artists and with profits supporting the workshop's youth programme (Assemble and Riordan 2015).

As a mode of making-public in the exhibition, this is an approach familiar to staging architectural projects in institutional spaces or museums as well as for Assemble. For instance, as a part of the *Wohnungsfrage* [*Housing Problem*] at HKW in Berlin (2015) an exhibition of architectural models,[42] art works, public programmes and publishing was staged around challenging the problems of exploitative, unfit or extractive housing. There, Assemble also used a 1:1 mock-up of a speculative project with the German community group, Stille Strasse 10,[43] to pose questions and claims about the possibility of community-led cultural and housing infrastructures. In the terms described above, the exhibition allowed visitors to both *imagine* how an infrastructural form might be brought into the work through the practices modelled here and to garner something of the modes of felt experience the *Granby Four Streets* project generated.

This creation of difference through familiar modes of exhibition display is both key to how the role of art could be overstated (showing it to retreat from being infrastructural), and in doing so creating its own problems (reducing agency or outsourcing it or facilitating the *instrumentalization* it rejects). Where Hudson noted that the award was part of a wider response to the consequences of the 2008 financial crisis (2015), this convergence can also be seen to both image and model a kind of curatorial-infrastructural artefact similar to that exploited by Steinbeck Studios. That is, where a shift in conditioning forms — such as the

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[42] See: https://www.hkw.de/en/programm/projekte/2015/wohnungsfrage/ausstellung_wohnungsfrage/wohnungsfrage_ausstellung.php. Last accessed: 30-6-2022.
[43] See: https://stillestrasse.de. Last accessed: 30-6-2022.

rupture in long-term disinvestment and direct state oversight of its preconditions — it both prompts and allows the creation of new infrastructural approaches and meaning.

However, composing new infrastructural approaches and meaning where art is foregrounded also means enacting constructions of the infra-political. These infra-politics are defined by how the address and practical contexts of The Granby Four Streets project are figured, performed and repeated in the discursive practices of the art field. Any infrastructural artefacts that might be composed in the field must also be first seen in the context of how these discourses and practices are pre-enacted into that critical positioning to frame the relations of infrastructure and how its critical approaches seek to stage infrastructure as an artefact of its own relational claims and practices. In the previous sections, these claims can be seen as subordinate to the infrastructural whole. In the following section, the implications for realising such an infrastructural whole through an approach to critical contemporary representation in art are inflected by an increasing focus on the infrastructural conditions and shifts for representation. Though this shift in focus allows an interface between infrastructure and its critical claims positioned through the institution of art — an interface staged by the curatorial — it will also be seen to place limits on how those critical claims can be realised in the infra-political, infrastructural relations, forms and political address they seek to re-imagine.

### Contemporary art history, curating and infrastructure

The institutionalised discourses of contemporary art offer an indicative example of how infrastructure features in artistic and curatorial practice (Ivanova 2015). Contemporary art has however established a particular *kind* of approach to making, content and the types of critical stances that are available. While infrastructure increasingly enters the discursive field of art and curating through concerns about the conditions of representation of the contemporary, the concept of 'the contemporary' as it has been established in contemporary art and philosophy associated with it, nonetheless foregrounds how difference can be established within infrastructural meaning in curatorial artefacts, even if the question of how this is performed in infrastructural artefacts remains open. Framing the image, exhibition and model of Assemble as a curatorial artefact across the threshold of these two approaches creates a generative tension between them.

At the core of contemporary art's claims to define what it means to be contemporary has been the particular ways it represents the shared yet differentiated experiences of globalisation

through an emphasis on the *con-* (being with) of *temporary* (time). Contemporary art and curating (which is as Terry Smith (2012) argues, are built around staging these claims and reflecting on its own conditions) in this sense can be seen as an attempt to make visible how we share the present and the conditions for it. By figuring the contemporary as a form of being out of joint (Agamben 2009, 41) it argues for a difference that represents the non-homogeneity of a nonetheless shared world created by globalisation. Discursively, contemporary art — and indeed much contemporary curating — achieves this by interrupting the flow of an imaginary, figuring that interruption in its form and in the experience of that work and by imaging difference within what is presented in the broader visual landscape as the unified space of *the global*.

Assemble's contribution to the *Wohnungsfrage* [*Housing Problem*] programme at HKW, Berlin can be seen as is indicative of how claims about infrastructure are made in the field of art and the consequences of this approach for those infrastructures. Assemble's proposal for *Wohnungsfrage* focused on making visible alternative perspectives, uses and stakeholders in the design of housing and local infrastructure. As with the representation of the Granby Four Street project for the Turner Prize, Assemble's contribution included a 1:1 wooden model of the community-led design. The Stille Strasse 10 pensioners had squatted their local seniors' centre after the local government had tried to sell it in 2011. And while they had managed to hold onto the space until 2015, Assemble's proposal had combined ground-level communal spaces and infrastructure for transforming the building above into homes, with an ownership model that could be controlled by the collective to balance the group's desire for autonomy and communality. As part of the *Wohnungsfrage* exhibition, this is mobilised as both a specific instance of contemporary critique and in relation to the others as part of the exhibition where Assemble's work for *Wohnungsfrage* is positioned within the collection of exhibits. This is not as part of a programme of architectural typologies, but an indication of the necessary diversity of approaches, within which each exhibit would show one possibility.

Already it is possible to argue how contemporary art could present Assemble as configurations of contemporary conditions in housing, civic and cultural infrastructure in order to allow multiple perspectives or readings on how these define the various settings they refer to. For instance, crucial to the ability of Assemble's proposal to change the kinds of conversation possible around housing was its highlighting of the particular physical and intangible infrastructural conditions that would shape the lifespan of the project. Giving form to and connecting situated local and intimate effects and resistances to wider macro-scale infrastructural systems, the contemporary configures infrastructure in such a way to pull the infra-politics described by Mitropoulos out joint with its everyday, habitual, use or distant effects or components. As

described in the catalogue for the exhibition, *Wohhnungsfrage* was explicit in its positioning of groups like Assemble within the critical dimensions of contemporary art and its approach to housing "from below" (Hiller et. al., 2015, 1). As a critically and historically defined rather than intuitive definition of time and space, the contemporary as a definition for art and curating serves as a critical recognition of the tensions between, on the one hand, the concept of a global world produced by new technologies, and, on the other, shifts in the physical, conceptual, cultural and organisational infrastructures of globalised capitalism and the ways this is experienced (Ahmed 2000; Povinelli 2016; Rogoff 2013; Larkin 2018; Johnson 2018). This separation of repetition opens a new imaginary even as it intersects the forms which institute that context.

Returning Granby Four Streets project, while the Turner Prize was awarded for Assemble's work in Toxteth, the exhibition is of course its own mode of felt experience and practice. It is an infrastructure for a certain kind of visibility (Smith 2012, 58) whose objects and actors must engage certain forms of meaning. This includes embodying and embedding the repetition of certain kinds of aesthetic, ethical and political claims related to being an object which is recognised by that institutional setting. As the work acted as a stand-in for the *Granby Four Streets* project — whose claim was premised on the making-possible modes of experience within a practice positioned outside the scope of the exhibition, not to mention a project in which an artwork was not the principle form for this claim — many argued the awarded project should simply not be called art. For some, the functionality of the groups' core activities, architecture and design, stretched the designation of art too far. By this audience, Assemble was described as the first "non-artists" to win the prize (Brown 2015).  For others, including architectural practice in the Turner Prize represented a mistake or an "apparent category error" (Morton 2019) and Assemble may have been better thought of as "a kind of socially-engaged design practice" (Searle 2015). Indeed, as Gayford (2015) points out, the characterisation of the project *as* art did not come from Assemble themselves nor from the community (Pritchard 2016). Rather it was "re-described by a curator, Alistair Hudson, director of Middlesbrough Institute of Modern Art" (Gayford 2015).

In this shift, however, the key curatorial gesture is missed by questions of whether Assemble were artists or not. It is not a question about *what is art?* which is foregrounded in the award. Rather, it is a putting forward of questions about how the institution, in its specific sense, and more broadly the institution of art, negotiates the implications and scope of its practices in relation to the conditions and operations outside of it through art and how curatorial forms such as the exhibition can mediate this relationship. The claim of this thesis is that these

negotiations take place infrastructurally. How then does the discursive threshold in curatorial and artistic critique described above shape the critical and speculative claim staged by this aspect of the convergence?

The following section explores how Assemble is positioned in the field of art in form and in practice and asks whether the curatorial terms of this positioning affect its claims on the infra-politics of provision. This is, in turn, a function of how art positions its claims for forms of provision into the infrastructural conditions that produce these curatorial-infrastructural artefacts. At stake are the tensions in the speculative and critical composition of its claims with infrastructure; how these shape claims made on the infra-political through curatorial frames; and in relation to the foundational repetition of infrastructure, how these claims pre-enact certain discursive limits into the forms of infrastructure they address. In these two accounts, the image, exhibition and model of Assemble treats position and provision differently.

### Practices of positioning (how contemporary art makes critical claims)

The specific issue in this chapter is how such claims on infrastructure are positioned by the different critical stances of contemporary art and infrastructural theory. That is, how this positioning of curatorial artefacts by the discourse that conjures practices in the field of art and the curatorial already defines how the curatorial is posed in relation to the convergences of infrastructural practice, meaning and materialisation. As Peter Osborne has argued (2014a; 2014b; 2013; 2018), it is not simply that contemporary art makes and images claims about how the contemporary is differentiated that is central to its critical claim and potential (political, aesthetic or cultural) efficacy. Rather, at stake is how the forms and figures of its claims are positioned in relation to, and circulating within, the institutional and historical field and context of the institutions of art. In addition, how this generates further difference and partiality in its particular instances of presentation. Contemporary art becomes historical by being partial, radically disjunctive and plural as an experience, model and form. As Osborne describes, the contemporary refers to a distinct historical temporality that co-emerges with globalisation as the imagined 'worlding' of the planet as the globe. Globalisation is in this way imagined as the conjunctive temporal logic created by the "interplay of communications technologies and new forms of spatial relation that constitute the cultural and political medium of "its economic processes" (2014). A dense and fiendishly complicated "interlocking mesh of disjunctive temporalities forced together by institutional synchronicities and political forms that carry with

them — as 'culture' — myriad unresolved histories" (2018, 35), the world made by globalisation is, however, inherently fragmented and radically disjunctive.

As an imaginary the contemporary offers its own critique, including of its instituted form — globalisation — into which enabling infrastructures are pulled. If the experience of contemporaneity is one of a moment of difference between the concept of the globe and the various "geopolitically differentiated" (Osborne 2018, 35) time-spaces of multiple individual and collective worlds (which are not limited to globalisation), to mobilise critical difference, each instance of contemporary art must itself be radically disparate and heterogeneous. Critical contemporary art does this, for Osborne, not just in its content, but also in its form.[44] It achieves this heterogeneity by being "post-conceptual" — building on art historical precedents to take on any formal characteristic, so long as it displays enough characteristics of art (Osborne 2014).[45] However, because contemporary art can therefore be anything or exist anywhere, to be recognised as art, contemporary art is especially dependent on being read and recognised by institutions. Further, it must be constructed in the present of each time it is viewed with the uncertainty, contingency and partiality that this reconstruction brings. As such it is also in this sense that the relation between the unity of the artwork and its circulation within the of the art field — that enables both its recognition as art and fragmentation — is key to how contemporary art can be critical. By circulating in the field of art, an object can have any aesthetic quality that can be retrospectively reconstructed in the present. In this sense contemporary art therefore reproduces its own temporal and ontological partiality and translates the contradiction of *the contemporary* into its critical orbit. The multiple readings and positions of the contemporary artwork, in each instance in which it is seen and reconstructed as art, are themselves a disjunction. Therefore, for Osborne, contemporary art can make a *critical* claim to represent the contemporary by holding open the possibility of difference because it can only ever be realised as an incomplete instance, of *both* art and the contemporary (2014).

Presented as particular configurations of the contemporary conditions of housing infrastructure within the institutional context of contemporary art (via HKW and the Turner Prize) the work of Assemble et. al. can be read in that context using Osborne's critical framework. Performed and read within the conceptual frameworks and institutions of the critical contemporary (unified as what can be presented as an artwork) their work can be seen to construct the possibility of multiple, different and aesthetically experienced contemporaries. As a model — whose claim is

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[44] Specifically mobilising this formally, aesthetically and stylistically. See Malik (2013).
[45] A contested question in Assemble's case, but possible nonetheless.

in part contextualised by the exhibition — it can stage the possibility of disjunction within the norms of the infrastructures it reflects and produces. Reading this work within the frame of contemporary art means that while addressing real infrastructural scenarios the models presented by Assemble at the Tate Modern and HKW are ultimately only *proposals* (Hiller et al., 2015, 2–37; 38), that is, an image of the models they relate to. This allows the curators to use Assemble to generate claims that move away from the infrastructural determination of their settings.

In this reading, set alongside models for staging uncertain social experiments with artworks that investigate the past and the present, the 1:1 models built by Assemble and Stille Strasse 10 represent the continuously open question of contemporary housing. This is set within the dynamics of gentrification, reducing social-provision, commercial property markets in metropolitan centres and self-determination (Hiller et. al., 2015, 5–6). Similar to descriptions of contemporary art's prioritisation of a temporality defined by a spatially-striated coexistence, this inquiry sought to unearth and diversify the dynamics that had led to the exclusion of the most vulnerable and precarious stakeholders in housing projects. This framing of the exhibition shaped the issues at stake in each model around the questions: Who participates, funds, designs and builds housing? What norms guide the design, rental costs and the awarding of contracts? In short, while architecture might be the medium for materialising answers to these questions, the mode of interrogation presented here performed just enough to be recognised in the field of art and curating in the expanded sense developed here; just enough to undermine the unification of its form and, therefore, just enough to register a critical claim on the contemporary.

### An infrastructure-focused critical contemporary

The critical contemporary would define how infrastructure could be framed as a means of standardisation, but also as a scene of potential disjunction. There is a risk, however, that contemporary art based on a critique of globalisation is already a redundant framing. Specifically, the conditions for such aesthetic claims, or non-instrumentalised forms of meaning, have drastically changed. These changes include: the effects of globalised neoliberalism through the privatisation, disinvestment and dispossession of public infrastructure (Sheikh 2019) as well as its glitching in austerity and quantitative easing (Berlant 2016); the waning of the global through processes of decolonisation and the fall of the Berlin Wall (Sheikh and Hlavajova 2017); infrastructurally-defined political shifts in the formation of subjectivity and

an imagined communities and futurity of users, multiple agencies and political agents defined in relation to lack and extraction (Wright 2013; Athanasiou 2017; Butler 2018); and the embedding of fragmented, layered and meso-scale planetary knowledges and effects, such as ecology and climate change (Reed 2021; Spivak 2013). These all shift the conditions for both institutional existence and the conditions and pressures of representation, mediation and speculation that are staged within them.

This shift can nonetheless, be seen as an (at least) infrastructurally-generative moment; a potential tipping point between practices and forms defined by two sets of pre-condition and imaginary, with meaning generated and given form across it. As a curatorial artefact, this convergence, and the role of art and the exhibition within it can also be articulated across this shift. As Sheikh notes in the introduction to *CURATING AFTER THE GLOBAL: Road Maps for the Present* (O'Neill et al. 2019), though contemporary art and the contemporary remain key frames out of which contemporary curating (and art) works, attention has also shifted to the conditions for that circulation as it has been changed by the above shifts in grounding, as well as staging representation and locating art's claims as they are staged by curating practices and the debates of the curatorial. If this can be seen as curating "after the global", i.e., after the decentring of a homogeneously stratified economic space, this includes a focus on orientation, movement and fracturing, rather than the collective belonging of political subjects and forms that are generated by the various technological and infrastructural agents that emplace them in space and time (Sheikh 2019, 26; Cox and Lund 2016). And where this is an effect of a lack of publics outside of those that were defined by new infrastructural alignments in the aftermath of globalisation, attention is also given to the creation of new and subverted platforms, networks, models, formats and institutions, to make possible the claims of these new political subjects and forms (see Reilly 2018; Vishmidt 2017 a, 2017b; Rogoff in von Bismark 2012; Dekker 2021).

Here, the speculative-critical horizon of the critical contemporary — the pluralisation of representation in relation to the hegemony of the globalised concept of the artwork — meets the conditions that stratify that pluralisation (Cox and Lund 2016) as well as the conditions of visibility necessary for such representational and alternative claims to be made. Moreover, curatorially, this approach to specificity and fragmentation can be seen to incorporate claims to plurality and specificity (in the face of the global) into another fundamental condition of curating: the bind of institutional critique. Where attention to the conditions for representation is extended here — in what Vishmidt describes as "infrastructural critique" (2017b) — this questioning is manifest in making platforms. Through the form, practice, use and distribution of institutional

resources these platforms expand beyond and put pressure on, the institution, through collaborative and transversal relationships and formats (2017b).

As described above, and as with the turning point exploited by the GCLT, the shift in context for the curatorial layers of this convergence (disinvestment and new political subjectivities and forms) provides both an opening in the repetition of previous forms of infrastructure, but also requires the remaking of the ground that repetition nonetheless provided.

Where the contemporaneity of the artwork (in the sense developed by Osborne) draws attention to the differences within an infrastructurally-standardised or flattened global contemporary,[46] it becomes increasingly apparent that the conditions of appearance or entry into art's infrastructures (exhibitions, funding, education, interpretation, curatorial protocols, to name just a few (see Rito 2021)) and the public spheres it creates and addresses, are differentially situated and mediated too. For instance, anti-racist, decolonial and representational activism, as well as the politics of austerity and Occupy are increasingly used to highlight the conditions of appearance and representation (Reilly 2018; McKee 2016). Moreover, at the institutional and curatorial level, this attention to conditions is set alongside practices of infrastructural critique to fold that questioning of the role of art and the institution in multiplying and instrumentalizing cultural infrastructure, back into the critical contemporary and its staging of localised, disjunctive gestures. Indeed, in the curatorial field, as Terry Smith wrote (2012), it is by acknowledging the infrastructural role and scope of curating practice that it can claim to generate such contemporariness. That is to say, pinpoint the difference it can create. Across this threshold operates practices of infrastructure-focused critical contemporary that is established in ways in the art field, but especially in the curatorial. This marks an important re-arrangement of the dynamics of contemporary art and curating.

As such, I propose to read the role and curatorial staging of art in this convergence as a curatorial artefact of the crossover between the discourses and practices of critical contemporary art and in the nascent shift in attention to conditions of fragmentation and

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[46] It is not only that economic and communications technologies enabled a sense of shared time by *worlding* a networked whole (and this is really only the case if one ignores the network heterogeneity (see: great firewall of China (Bratton 2015), Facebook has access across much of SE Asia, major connection aporia in many African countries — following instead colonial trade routes (Easterling 2016), Turkish, Russian, Belarusian internets or shut downs and so on; not to mention the practical economic blackspots and refusals and a position totally possible and expected from the West), but that through supply chains, financial markets, international travel the substrates of globalisation came to act as an infrastructure for certain kinds of activity and promise, including contemporary art as both a market affect (Lee 2012), and tied to it in its inverse as its object of critique.

platforming of infrastructurally-defined subjectivities and forms. The key point here, is that by using infrastructural outcomes, approaches, qualities or attitudes where art's claims can be foregrounded, these curatorial and institutional projects re-purpose art as an infrastructural effect or mediator of social participation and transformation (seeing art objects, making, dissemination and discourse as a conceptual infrastructure). This offers a bridge from Contemporary Art to infrastructure where the institution or exhibition acts as a multiplier of these claims and effects. Examining this multiplication will allow a comparison of the creation of infrastructural and artistic meaning and speculative-critical claims and forms made through them as they intersect parallel infrastructural shifts.

**A curatorial artefact: Assemble as image, exhibition and model**

By stepping back and viewing the artwork as an engagement with the broader institutional scope of practices which inform the staging and mediation of art, the work of Assemble can also be seen to be producing the textures, modalities and sensibilities deployed on a wider field of practices, collectivities and infrastructures; positioning these as contested sites of meaning-making and instituting. For instance, as Esther Choi describes, the blurry status of Assemble's "materialist approach" (Choi 2015) ties Assemble into a "legacy of social practice, community participation and institutional critique in art since the late 1960s," (Choi 2015) and arguably complicates "the dichotomy between aesthetics and ethics" that features in much socially-engaged art (Choi 2015).

Incorporating such infrastructurally-defined scenarios of participation into the legacy of participatory art opens Assemble's work to Claire Bishop's critique of participatory art as a lubricant for the Creative and Cultural Policy-led imposition of individual responsibility from the 1990s onwards (Bishop 2012, 14). At the same time, the work challenges what Bishop laid out as its core problematic: the emphasis of general and ethical rather than aesthetic accountability (Bishop 2012, 13; 23). By necessarily making-apparent the formal supports or organisational principle, infrastructural interventions such as those by Assemble are unavoidably both material *and* utilitarian. Without having to efface its own singularity in order to blend with life, the efficacy of these projects can be judged as at once ethically impactful and capable of materialising this in ways that are formally legible and readable to the aesthetic criteria of art. Moreover, from a methodologically or functionally determined concept of art — what the work achieves, rather than how it is defined by its ability to accommodate the documentational forms legible for the gallery — it is possible to situate the collective ethos of Assemble within the history of collective

practices and self-institutional work that has come to define much artistic institutional critique (Basciano 2019).

Indeed, for Adrian Searle, Assemble's activities mirror in some ways Theaster Gates' efforts to regenerate a corner of South Chicago or the utopian 19th-century projects of William Morris (Searle 2015). Both use art and design, its circulation and display, as well as its economies to embed new kinds of images into new scenarios, also generating new economic and political relations between the actors and inside the ecologies established by this work. Viewed from this perspective, the project as a whole comes to define ways of doing that seek to bring about particular possibilities in the institution itself. Without repeating a general claim about the value of art, positioning the *Granby Four Streets* project in this frame puts forward an institutional model for the implementation of particularities, effects and qualities of modes of participation.

To some, therefore, the decision to award Assemble with the prize is less surprising given that the judging panel included Hudson (Searle 2015), the then director of the Middlesbrough Institute of Modern Art (MIMA). In 2014, Hudson led a new direction for the gallery, serving the local community with 'useful art' and displays led by and relevant to its constituents. This deliberately "anti-market" (Searle 2015) course began with its *Localism* programme and then its 2015–2018 Museum 3.0 strategy.[47] This also helps to frame an alignment between the work of Assemble and curatorial projects and propositions, such as *The Constituent Museum*, a publication consolidating the five-year project "The Uses of Art: The legacy of 1848 and 1989" by the L'Internationale museum confederation on the evolution of the relationship between museums and their publics. Another example is *Arte Útil* or *Useful Art*, a collaboration between Tania Bruguera and curators at the Queens Museum, New York, Van Abbemuseum, Eindhoven and Grizedale Arts, Coniston that explored and situated user-generated content as a itself a historical trajectory shaping the contemporary world.[48] By exploring how art might be used widely by users rather than viewers, to address and transform the urgencies of society at a 1:1 scale through systematic aesthetic means,[49] these approaches also respond in various ways to Stephen Wright's concept of usership (2013). That is, they centre the specific qualities of community or participant-led use and creative misuse of emergent and existing infrastructural forms as approaches also respond in various ways to Stephen Wright's concept of Usership (2013). [50] Or finally, exhibitions using the gallery as a laboratory for generating and

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47 See: https://www.youtube.com/watch?v=d9URRUEJ7Tg. Last accessed:  30-6-2022.
48 See: https://www.arte-util.org/about/colophon/.  Last accessed:  30-6-2022.
49 See: https://www.arte-util.org/about/colophon/. Last accessed:  30-6-2022.
50 Additionally, as Thrift writes (drawing on Berlant, 2001), a user is performatively conjured through the

testing self-constructed public structures such as *Affection as Subversion Architecture* by architecture collective Recetas Urbanas at the Showroom, London (2020).[51]

As the editors of *The Constituent Museum* describe, a focus on the use and utility of art through the institution as a kind of infrastructural mediator in society not only repurposes the institution's "nineteenth-century civic roles as active sites for the co-production of new civic identities" (Byrne et. al., 2018, 11) by giving visitors-cum-users the opportunity to shape their own versions of representation[52] but can be used to change the institution too. At the heart of framing the model offered by Assemble in this context is, it seems, also an argument that institutions should "open themselves up to the reciprocal possibility of change" (Assemble in Taylor Foster 2015) by placing their constituency of users at the core of their operations (Byrne et. al., 2018, 11). It is a model in which the institution should bring into being a user-driven representation, an imaginary of provision in which the institution is positioned as a resource which can be experienced as a transformation of the social field that the institution holds up. In terms of a curatorial framing of usership, therefore, Assemble provides a model which also positions the institution as a means of provisioning, staging or validating or as an actor and mediator in the critique and construction of infrastructure. However, more consequentially for the argument of this thesis, is how the configurations of provision in the work of Assemble are staged in the exhibition is indicative of a wider critical problem for how critical claims are articulated in order to be positioned within the institutional modes described above.

### *As if* it were possible

Matching the glitch and patch of austerity (where the narrative imaginary of the Big Society covers over gaps deliberately created in social provision through disinvestment) and the turn to social-engaged or community-led projects, an infrastructure-focused critical contemporary

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anticipation of an infrastructure being there and the form of use that is expected by the user to access and be addressed by it (2004). It is in this sense that the agency of the user is relational and contextually defined by movement, transition, use and access, etc., from *within* an infrastructural system and in relation to its other actors; or as Bratton describes it, infrastructural agency, "is not given in advance and must be construed by interfaces and constructed by platforms" (Bratton 2015, 252).

[51] See: https://www.theshowroom.org/events/recetas-urbanas-data-sheets. Last accessed: 30-6-2022.

[52] A position, as discussed in the introduction that is threaded through with the legacy of New Institutionalism and which the Foucauldian, Tony Bennett might recognise (1994). In his now canonical account of the invention of the exhibitionary address with the invention of museums in the 19th century, Bennett describes how exhibitions train national subjects in Europe according to class and (as Benedict Anderson echoed (2016)) difference with the foreign or colonial other beyond its borders by asking viewers to register their own place in the order of objects, species and 'races' on display (1994). The exhibition was an opportunity for citizens to look at and learn about themselves or their 'proper' place in this order.

allows, and even extends, the possibility of disjunctive figurations; providing the ground that makes representation in a fragmented world possible. Like the critical contemporary, an infrastructure-focused critical contemporary keeps open the possibility of difference and disjunction through its staging of representational and conditional claims against dominant infrastructures. It can in this sense be seen to pre-enact its speculative claim on the infra-political — *as if it were possible* in Athena Athanasiou's terms — that is by speculatively claiming the space that infrastructure would otherwise create. At the core of Athanasiou's thinking is Derrida's concept of the *as if* which is derived through a rejection of what has already been made possible (Derrida 2006, 90 in, Athanasiou 2017, 688). As Derrida writes, for the possible to be new it must be unexpected and unanticipated; therefore, for the event of what is yet-to-come ("*l'avenir*") to be possible, it must not be predetermined by the teleological accomplishment of a capacity or the process of a dynamic.

To offer a counter-image to this infra-politics, to *pre-enact* it into the expectations and images of infrastructure that are staged with the institution, contemporary art must dis-articulate infrastructure from its received systemic and material structures and the promises bound into them. It must materialise the objects, relations and outcomes of infrastructure within its own critical framework and operational parameters. In the Turner Prize and in Assemble are models of an imaginary of social engagement; in HKW, there is a localised plurality of housing strategies; lastly, with Hudson et al. there is an expansion to a wider tendency towards the role of art and institution of constituency-led participation and production. In each case, they only need to indicate the potential of these imaginaries *as if* it were possible. How these imaginaries might be possible is presented more generally through models in the gallery but only as 'proof' that it is possible to stand against the systemic realisation of the conditions that provoked them. In the context of this shift to the infrastructural as a site of engagement as well as a critical object, the contemporary nonetheless remains as a kind of pre-condition or sub-layer.

As such, this model of an infrastructure-focused critical contemporary nonetheless retains a form of pre-enacting that is determined by an imaginative horizon — one defined through the creation of meaning *despite* the broader conditions that also define it. Though the infrastructure and constituency at stake has been fragmented but also made more relational, the critical operation remains, as Thrift would argue (2004), *addressable* to that conjured by the critical contemporary. That is to say, by separating out the image from the model it generates a simultaneous tensioning and extension of that model. In the process, speculation is opened out. This represents an attempted counterclaim to the hegemony of extant infrastructural forms. In Assemble, an image of social engagement through infrastructures can be expanded, whilst

also holding open a claim to representing the plurality of possible (and necessary) forms of infrastructuring, constituency and self-representation. Indeed, while the shift claimed by Sheikh et al., for curating *after the global* puts added emphasis on the platforms or model shaping the realisation of subjectively and form, this is only insofar as it is a ground for the image that in the context of an interregnum of the contemporary without transformation is able to "plot new ways out of into the new" (Sheikh 2019, 29).

Here Assemble's work on this project can be seen as a key model in both opening up what constitutes a cultural infrastructure, redressing the "disconnection between the public and the process by which places are made" (Assemble in Taylor-Foster 2015) through collaborative production with and in response to local users, but also for implementing these ways of doing as an infrastructural resource and relation. Recognisable in the turn to usership, and in particular to the proposal made in the *Constituent Museum*, the *Granby Four Streets* project describes as a means of changing conditions in order that according to a different disjunctive, positional form: the constituency rather than the market; i.e., the relationships that produce a disjunction. This is not simply a disjunction possible between the artwork and viewer, but between constituents and institution specifically and speculatively defined through a particular infrastructural setting. This is in part because the contemporary can, after neoliberal practices of disinvestment no longer be understood as the imposition of a shared global time of circulation experienced by individuals. Rather it is also a shared condition of temporal extraction, of the running down of possibility and futurity witnessed in the specific infrastructural conditions of provision (but one) around which a constituency is positioned.

At one level an infrastructure-determined contemporary can therefore be countered by partially detaching and reimagining the images produced by a particular model; that is as Bassam El Baroni describes, "a renewed emphasis on worldmaking all somewhat attest to a shift in perspective within the field towards," (2021) speculation. This is because of what artist Jonas Staal posits as a radical political imaginary for speculation in which "speculation is as much part of the answer to the manifold crises impacting the world as it is a contributor to them" (Staal 2017). This turn to the fragmentary conditions of representation and making public certainly indicates an adaptation of core critical claims in parts of the curatorial field that were once pre-occupied by the contemporary to what are essentially infrastructural politics, imaginaries and pressures. It also shows how, rather than shutting down the possibility of the aesthetic (im)possibility and 'irresolvability' of art (Holert 2018), recognising models such as Assemble's aims to re-establish the possibility of establishing critical imaginaries in socially-engaged practice that can be set against the terms of a shared contemporary. Indeed, the image of

Assemble is in this sense deployed by Hudson et al. as a model that might be replicated in relation to other situations. At the same time, however, the institution or curatorial frame is also used to separate that image from the models and infrastructure that realise it — i.e., staging it in a temporary and speculative form within its own terms, parameters and infrastructures — doing this in order to critique the contingencies, closures and complicities of such a model with other aspects of the infrastructural assemblages which generate that infrastructural issue.

### The separation of image and model

The exhibition of Assemble's work and its inclusion into a model of socially-engaged, infrastructure driven curatorial practices performatively enacts a repetition of a different kind of public-making, form and experience. This is distinct to that of the CLT and Steinbeck studios as they were mediated into the cultural infrastructure by Assemble. But what does it mean to recognise Assemble's work in this way? As an alternative mode of staging the exhibition becomes key to registering a different kind of claim to that presented by Assemble, Steinbeck Studios or the CLT in the *Granby Four Streets* project itself. It instead provides a *model* for making-public claims or pre-enactments within the field of art. At a basic level the framing of 'useful art' is a form of infrastructural provision so that this model can be positioned within the institutional frame. But it operates at a critical and speculative level too, as an *image*, defining the terms under which the practice is to be read.

As with previous section, there are two forms at play: an institutional model that generates ways of doing and felt experiences in form (Larkin 2018), practices of repetition (Thrift 2004) and the image (or imaginary) of social engagement that informs and makes a claim for that institutional model — acting as a prompt for practice beyond it (each with curatorial implications). These are also performative, co-producing one another. At an infrastructural level the art institution produces the conditions for visibility and meaning-making by performatively repeating certain practices, discourse and gestures; at an institutional level, the institution produces and is used to contest norms in representation and meaning. The relationship between these is the systemic extent of the art field, when the institution remains the site of meaning generation, contestation and staging — something which is amplified, not diminished, by the turn to models such as usership (Hudson 2015; Wright 2013; Byrne et. al. 2018). At stake in this claim, then, is an imaginary about the role and effect of socially-engaged practice in generating social transformation, as well as a form through which that imaginary can be achieved and experienced. The latter is the institution and institutionally validated form as

quasi-infrastructure. Here an imaginary of a kind of critical-cultural provision is positioned in the institution, with its address enacted, embodied and embedded by way of this form too.

Of central importance here is where the exhibition performatively enacts a repetition of a different kind of public-making, form and experience, it also marks a distinct mode of pre-enactment: speculation *as if* it were possible. This difference will be key to a critically transformative infrastructure. While the image, exhibition and model of Assemble generate specific forms and claims in relation to its work in practice, these are also inflected by and positioned within curatorial and artistic debates and infrastructures — both literally and figuratively. That is, the staging of a speculative image into the constrained repetition and critical self-reflexivity of the institution or sent out as the critical possibility of the self-creation in the subjectivity of the viewer — or users of other platforms and situations, but not realised in practices of repetition. Where the claims made above rest on a separation that actively forestalls without instrumentalizing its infrastructural repetition, this results in a *provisioning without position*, creating another kind of closure and repetition of untransformed infrastructures. That claim is a repetition of both its own discursive modes, despite an increased awareness of infrastructural condition for that and by using these modes in place of infrastructural forming and performativity, ultimately therefore preenacts a dis-alignment of the conditions it seeks to address and re-make. This is an inheritance that draws account of infrastructure from the critical contemporary and determines how an expanded attention to infrastructural form is staged into infrastructural practice. This already creates a physical distinction between the manifestations and infrastructural conditions that are at stake.

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## 5. Curatorial staging as an infrastructural problem

Reading across these discursive positions, between contemporary art and an infrastructure-focused critical contemporary belies an alignment between these parts that can ultimately bridge these limitations. Yet in attempts to draw attention to the conditions for representing and staging, the critical contemporary nonetheless positions the exhibition and the image it stages in a more complex relationship with the infrastructures that contextualised it. What is the status of this claim in infrastructure? What happens to the potential of this image or claim outside of its being staged in the institution? The final analysis of limits and potential possibilities turn on how

this relationship between the models and images by which art is composed into infrastructural form and how this relationship is staged into the repetitive practices of infrastructural form. If this is achieved by Assemble and Steinbeck Studios as an infrastructural form, how can the limitations of separation between image and model in contemporary art which are nonetheless the rules at stake in a turn to infrastructure be both understood as a reaction and articulation of an infrastructural possibility? In the following chapter, this sets up the reconfiguration of a problem of breaking practices as a potential source of critical instituting.

Turning back to Pritchard's account of Assemble's involvement in the Granby Four Streets project offers the ground for an infrastructural analysis of what many critical accounts have already implied about bridging Assemble with the art field: that it was a category error to insist that this infrastructuring could be understood through the critical agencies, capacities and practices of art. Yet bringing this work into the art field nonetheless highlights and intensifies a difference that art can make in mediating that form. That is, while that difference is limited as an infrastructural practice by the critical parameters of curatorial and artistic critiques of the contemporary, infrastructure is in these accounts, a form to be broken with, rather than an infra-politics to be configured. In an attempt to foreground the mediating critical potential of art in the infra-political assemblage represented by Assemble, the curatorial repeats its critical features as the ground for those claims. They are not only practically but conceptually discrete within the work created by Assemble and Steinbeck Studios.

In the final section, the relationality of positioning — of what an artefact or convergence is seen as positioned in relation to or by — is used finally to think through the infrastructural meaning in this image and enacted by this positioning as a different kind of speculative artefact: that is an alignment that can bring together the different parts that pre-enact and differentiate particular infrastructural forms to offer a more generative proposal. A consideration of Emily Rosamond's 2016 account of the *Granby Four Streets* project, as being held in an abstract diagram that allows different images, forms and agencies to be aligned in relation as well as in tension, offers an alternative framing of the relationship between these infrastructural and curatorial artefacts. This makes it possible to think through the relationships made and changed by infrastructure and which the art field attempts to hold open and connected.

**Splitting infrastructural images and model**

For Rosamond, the use of Assemble's work to generate and promote an imaginary of social benefit and stage this as a surface over other infrastructural layers or stakes is not an accident; nor is it a straightforward capture of art. Rather, as she writes in "Shared Stakes, distributed investment: Socially-engaged art and the financialisation of social impact" (2016), it is indicative of how relationships are formed between those invested (literally and figuratively) in social change and investees who are mediated by an image (a metric, imaginary or cultural production) that is both the outcome and object of those relations — an image by which its effect is achieved. While Rosamond's accounts begin with the increasing financialisation of social impact in the form of speculative-structural vehicles such as Social Impact Bonds (SIBs), the SIB model is also useful in an analysis of the circulation of metrics, imaginaries or images of cultural production of social engagement, beyond the boundaries of respective projects (Rosamond 2016, 120). That is, where institutions can both capitalise on infrastructural assemblages they need not author but from which they can also outsource responsibility, agency or control.

Broadly, SIBs allow for investments in social impact metrics such as prisoner rehabilitation or schemes for helping rough sleepers (Rosamond 2016, 111). While these interventions can have a strong evidence base, they are also scenarios which require high up-front capital in which governments are unwilling to assume risk (Rosamond 2016, 114). Investors provide start-up capital for charity-run social programs which are managed through intermediary companies who then transfer a fixed rate of return to investors paid by governments, if agreed social impact targets are met (Rosamond 2016, 112). Concretely, SIBs constitute contracts between investors and the public sector. At the same time, they instrumentalize or financialise social impact by "encouraging private investment in social impact metrics," by attempting to realise a "mutuality of interest between investors, government and non-profits seeking to make a difference to at-risk groups" (Rosamond 2016, 112).[53]

Though the relationship between Assemble, Steinbeck Studios and the GCLT is not mediated by a SIB, it is for Rosamond useful for examining the abstract but operative alignments between "governments', investors', service providers' and beneficiaries' interests" (Rosamond 2016, 113) and how this might be replicated in the critical economies of the field of art. As Rosamond argues, beyond their contractual economics, SIBs create an abstract social diagram

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[53] The SIB claims to incentivise successful provision by weighing it against the potential risk/return, where investors "could experience a loss of principal, a return of principal or a return of principal plus interest" (Rizzolo and Carè 2016).

which holds actors, investors, investees, beneficiaries, operational parts, interests and stakes together and in alignment so that social impact is operationalised and measured in the image, diagrams or metrics created by it. This relationship makes and gains impact precisely by both generating and aligning shared stakes through an *image* of social impact (Rosamond 2016, 113). Importantly, this is an image that is both key to registering effect but can also be detached so that value is applied elsewhere in that convergence. (In SIBs, changes in metrics such as recidivism rates are measured against the terms and times scales of a particular project (Rosamond 2016, 114–115) so that those metrics can be translated into returns on investment).[54]

Outside of the specific terms of SIB, this abstraction indicates where the image of effect is key to generating that alignment whilst being different from its effects or experiences of it. Rosamond's claim is that a similar diagram of shared and aligned stakes is in place when a curator selects a project as an image to be re-circulated in the art field as with the *Granby Four Streets* project (or, it is possible to add where it intersects finance, as with Steinbeck Studios). In such diagrams, images of social impact are articulated by stakeholders such as curators in metrics that can be seen in the imaginaries of institutions to affect social change — through impact that has the look and feel of social engagement (Rosamond 2016, 119). But as in SIB, *images* of social impact can also come to be used as a currency in the return on a critical or curatorial investment that validates as well as articulates the critical claims of art. By making an abstract social diagram by which outcomes' metrics and actors can be brought into relation, whilst preserving different outcomes, the shared but different stakes and forms of realisation of socially-engaged art can be at the same time linked and kept separate. This might be applied to an account of infrastructure, wherein the promise of provision can be composed differently from different positions.

In the ability of these abstract images to re-align those same parts according to how, for what purpose and for whom it brings them together as in infrastructure, there is a possibility of both continuity and rupture preserving the necessary components of an infrastructural arrangement even while they change its outcome. For instance, as Gayford argues, a curator (or investor) can invest intention into a socially embedded project and use this, as Rosamond argues, to leverage social effect, such as Hudson with useful art (or the added value for Steinbeck Studio's investment). This is critical to how social-engaged projects strive to keep the meaning

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[54] Such metrics ultimately favour the invertor (not least where weighting is given to measurable and achievable outcomes) (Rosamond 2016, 117–118).

generated by participants open to change, as well as contingency to proposition and analysis (Bishop 2004). This is both positive and negative.

But where images of social engagement intersect other infrastructural layers, the value of this engagement can circulate separately from their actual impact and be extracted by other actors, such as Steinbeck Studios (seen as the 'quality' the residents added to the value of the houses, securing a return on the investment) or the institution. Moreover, like the workers for social NGOs, it is artists or communities on the ground who are making up the gap between investment and profit (as in the quality of the CLT resident); or the promise and relation of social benefit (as in the claims by Hudson). This is one reason why the alignment between an image that holds together infrastructural continuity and an image of rupture, is held apart in the institution of art so that the possibility of autonomy for artists within it can be preserved (Sheikh 2017, 130). As such, while this model has the potential to generate affirmative effects (Rosamond 2016, 120), potentially shifting the instituted repetition, composition and activation of an instituted infrastructural image, it also holds together seamless alignments (Rosamond 2016, 118) for the transfer of value from both the public sector and social transformation — all the while without disrupting power imbalances (Rosamond 2016, 117), nor financial hegemony more broadly.[55]

### Re-entering the convergence as a whole

The convergence of the work of Assemble with the institutions and infrastructures of art and curatorial strategy raises key questions as to its relationship with infrastructure more broadly. This includes the social role of art; what it means to make publics in relation to the provision of civic, cultural and housing infrastructure as a means of social engagement; and how the field and practices of art and the curatorial can be critically positioned and, indeed, how they can position themselves in relation to the instituting of other layers and assemblages of infrastructural meaning and practices of *infrastructuring*.

However, reading this convergence through the lens described by Rosamond — the alignment of shared stakes in abstract diagrams such as the SIB, or the models of the *Constituent Museum*, useful art and so on — shows how image and model are structurally interrelated

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[55] As several authors have suggested, SIBs represent a privatisation of welfare by stealth*,* with investors' stakes are embedded into the "everyday personal and social experiences of beneficiaries, whether the latter are aware of this or not" (Rosamond 2016, 114)*.*

through infrastructure, and distribute and position the effect, impact, accountability and value of provision in consequentially distinct ways. The image of the impact of creative practice and community-led cultural infrastructure is used to both generate infrastructural repetitions, forms and practices (for instance, in the gardening or the programme of the Winter Garden) and is also the product of it (such as 'quality' from which an investment can be made or the speculative platforms of an infrastructurally-focused critical contemporary). The role of the image of infrastructural effects in the implementation of its models (or how its form addresses its parts and actors into repetition through that form) can be seen in these projects to operate as a double imaginary that firstly allows infrastructural artefacts to interoperate and pull in different directions. It also sets the image defining these relationships into the imaginary addressed by the infrastructural conditions and form the instituted. Or in the terms here, *position* the outcome of provision through the tension of different configurations of the infra-political. This positioning is staged by Steinbeck Studios and Assemble in one way, by the CLT themselves, and by art and the curatorial in another.

The speculative claims of infrastructure in the field of art and curating remain articulated, however, by maintaining a split between an image and model — whereby the image must escape the realisation of its model as form (i.e., in this case, provision escapes its positioning in the field, cf. infrastructural critique), rather than entangling it systemically in the assemblage within which it operates. The problem of the closure of infrastructural repetition not only returns because of this split, but is exacerbated by each aspect of this image of impact in the actual setting and the modelling of social engagement in the conceptual space of the exhibition remaining deliberately apart. If curatorial and artistic staging keeps this image of infrastructure separate from its realisation, it can be applied to all sorts of infrastructures critically as well as uncritically. Though Assemble might provide a model for an infrastructure-*like* form in the exhibition or institution, to change the meaning performatively enacted through the closures of its systemic, requires the instrumental realisation *as* infrastructure — either by only being an image, or by being realised in the institution of art, itself performatively. In the alignment between Steinbeck Studios, Assemble and the CLT, this image circulates to different ends in each model layer. In the claims of contemporary art and an infrastructurally focused critical contemporary, it circulates without affecting the models to which it refers. They are in a conceptual tension (that represents without standing for its object), rather than a practical one.

By re-introducing this speculative mode back into relation with the infrastructural convergences of meaning materialisation, mediation and practice on which such curatorial models are based. That is to say, to ask how such claims *might* act infrastructurally and travel back into that

convergence (ultimately the critical and pedagogical hope of curatorial work) — whilst not actually doing it — the speculative model of splitting an image of infrastructure from its relation as a mode is more consequential. Where this model disavows the systemic, relationally indeterminate, but repetitive meaning of anticipating, expecting and performing infrastructural form, in re-modelling an image created by this form, it can nonetheless repeat it — or allow the closure of those conditions to also be repeated. Thus, the interoperating with modes of infrastructural closure and repetition or enabling the outsourcing of accountability is made possible by infrastructural automation and composition.

### Two critiques

At one level Rosamond's analysis of infrastructural alignments shows that with respect to the generation of infrastructural form and practice described by Larkin and Thrift, the split between infrastructural models and images core to art's critiques can in fact be productive for those infrastructural alignments. Nonetheless, a standard critique of Assemble's involvement in and narration of this story pivots around two problems.

The first is that what Assemble do is simply not art and that it is wrong to bring this level of instrumentality into an institution whose aesthetic and critical horizons are predicated on a certain aesthetic impossibility of completion (Holert 2018; Osborne 2014). The second is more specific: that the outsourcing of accountability, decision or change through the automation of practices and meaning in the necessary repetition and systemic integration of infrastructure must be resisted; as that is where infrastructure determines the possible because it is necessarily repetitive. (This also reframes the split between image and model as a relationship; art rejects, even if it enacts.) The first is a disciplinary distinction that holds onto and holds away practices of instrumentality and closure that enact the second. (They are in this sense as much a lack of imagination, as they are necessary to allow the good work of previous critical and ethical stances to continue to operate.)

However, the second also deals with the entanglement of layers of infrastructural repetition that are necessary to realise infrastructural practice and imaginary at the level of its content. One is based on the idea that the role of art is overstated in the construction and instituting of infrastructural form, that in fact, the creation of cultural infrastructure draws the imaginary of art into the infrastructural dynamics it was instrumentalised by. The other is that art is

overdetermined by infrastructural form, that is, it is mapped onto the infrastructural repetition of more powerful actors, instrumentalizing them in the process.

As indicated in Pritchard, in the case of Assemble, the latter issue often turns on how community-led art and creative input are used as an image, a narrative or façade of self-creation behind which other more powerful dynamics and layers are at play or are being aligned. Assemble's work generates the affective closure of the repetition that allows the cultural infrastructure it instituted to address the community according to the intentions of the investors as well as the community themselves. By leaving open the conditions of value and the objects addressed by them, the work generates symbolic value that is both detachable and dispersible beyond the community. Outside of the value of the houses under a covenant, other factors of this convergence are less predictable, controlled and community-owned.

The difference and separation in the shared stakes of social investment and its role in generating symbolic value through the so-called regeneration of cultural infrastructures can be seen to be enabled by the community-led as well as the institutional-curatorial staging of art. In each case this image acts as an imaginary without address or form in practice. This can be seen to enable an abdication of responsibility and accountability for the arrangement of that infrastructural address: proposing a speculation without instituting or negotiating the consequences of bringing that form into existence. Conversely, by making infrastructural form possible, this convergence also challenges institutional modes of making public and its images of social impact precisely by looping that image and claim into other interoperating stakes, actors and forms. That is, it makes an artefact that also exists outside of institutional, curatorial or artistic authorship (or reputation) and moves into a space of use, relational agency and a temporality of durability and interruption.

On the one hand, there is, in these problems, a tension between modes of making public (as a claim on or in the infra-political) in which cultural infrastructure generates an infrastructural image as its outcome and as a means of closure. To make a claim towards an alternative requires generating the relational form of infrastructure, using this to pre-enact a possible expectation; initiating its repetition. Crucial to the argument being established here, negotiating this tension is seen as a problem of being in alignment with infrastructural layers such as funding that shut down possible agency; but it can also mean creating openings in that alignment. On the other hand, therefore, maintaining a split between infrastructural images and the models that realise them is, as Rosamond argues, precisely what enables these images to

bridge between various infrastructural layers and actors, and to generate the terms of alignment in such convergences.

**Limits and meaning created in the activation of form**

Alongside a standard critique of the collusion with or resistance to infrastructural instrumentalizations (Rosamond 2016, 120), there is for Rosamond, following Michel Feher, another view of this tension that is offered by the difference in alignments. This final framing proposes that the alignment of the shared stakes and forms proposed by Rosamond are a means of setting the terms of the shared stakes; for shaping the mediation of that imaginary address and addressee, an image layer into infrastructure. That is, by taking on the position of the investee, there is an opportunity for a more active stake in the position of mediation, a becoming-image (Rosamond 2016, 124). Extending this to the compositional and mediating position of the curatorial, alternative reality constructions can be found in how parts and actors are aligned towards particular images. In the case study above this convergence is also a tension between maintaining a distinction between infrastructure and art, and resisting art being what holds infrastructure together. From an infrastructural point of view, this instrumentalization is a function of a mode, form or need to appear, use or interoperate with an infrastructure, rather than the quality or the content of what appears, uses or interoperates with an infrastructural alignment.

Through alignment, it is possible to show that infrastructure makes meaning that, in terms of its form and practice, escapes the critical discourse of art, and even this meaning is in part its object. Specifically, where infrastructural form cannot be understood as a singular, disjunctive instance, but as multi-dimensional, meso-scalar, multi-actor imaginaries realised in repetition, the limited scope and artificial/speculative separation between an image of infrastructural engagement and that infrastructure itself allows the meaning generated in the relationship between image and model to escape the critical claim and position of the curatorial. (Though it also allows for this to be incorporated by other mediating actors in that convergence.)

In the imaginary of infrastructure, any content can move and interoperate so long as it meets the parameters of instituted form. An image of social engagement can be utilised in multiple positions, that is, it can move and interoperate between them, so long as it can be positioned in each. That is to say that an imaginary can be abstracted in form and practice so that it moves or is expressible across the systemic scope of an infrastructural convergence and to be

addressed by that infrastructure requires that this image is performed. To change that form, its ways of doing and feeling requires changing the frames and forms in which its repetition is recognised as well as conjured. To affect what an image is aligned to, is to define how provision is positioned and how it is position*able*. This is not about collusion or resistance but about addressing a form and scope of relational and performative meaning that is imagined and established across infrastructure as a whole through the practices, trace-forms, connections and relationships it enacts but which escape the current discourses in art and curating.

Key then is how the curatorial constructs a critical stance towards infrastructural realities, based on centring its own infrastructural platforms and outcomes as a means of change for those beyond the field that it seeks to address. That is, it provides a model for making public or pre-enacting claims or tensions into infrastructural alignments and repetition through its discursive and critical stances toward making new practices possible outside of it. Yet at the same time, the institutional claims allow for images not yet incorporated into repetition to be generated. In these terms, while contemporary art, curating and an infrastructurally-focused critical contemporary in some ways reject the complicities of alignment and instrumentalization, these frames are not adequate for providing speculative, alternative infrastructures. This leads to difficulties in re-posing the curatorial at this convergence since it is precisely the kinds of image they produce and detach from infrastructure that allow infrastructural repetitions to be formed, perpetuated and instrumentalised.

However, there are seeds of possibility in this approach. Can an expanded practice of art be both more critically active and itself intervene on, or reconfigure other infrastructures? Moreover, can the curatorial, as a compositional, staging and mediating practice and field, central to the possibility of enacting other forms and experiences of infrastructural meaning through infrastructure? Is there another way to think difference in the relational *aisthesis* of infrastructural form that does not reject the closure of repetition critical contemporary art practice and theory can see as the closure of possibility? These questions, and the critical potential of tensioning those alignments instead of breaking with them, are taken up in the next chapter.

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## 6. Conclusion

This chapter began with a case study exploring the creation of infrastructural meaning, embodied and embedded in forms and practice, This meaning also served to create and layer certain modes of infrastructural address, design and decision. As has been shown in subsequent test-cases, by re-staging the various aspects of the convergences described above as a specifically cura-infrastructural artefact, it is possible to generate infrastructural form using the imaginaries, promise and indeed image of art, artistic practice and participation and cultural infrastructure. As a relational artefact staged by the GCLT, Assemble and in curatorial discourses framing this work, *position* highlights, through the different kinds of provision and critiques of the provision it enacts, how a curatorial object (in this case art) can operate as a particular infrastructural mediator, and indeed difference, within the reality it constructs, maintains and mediates.

The chapter compared two artefacts in which infrastructural form was produced and reproduced through, in part, an engagement in the imaginaries and practices of art. In the first instance, an image of art is made public as a function of a relatively unchanging cultural infrastructure. In the second, the critical proposition of Assemble as a model is tied to the discursive and practical infrastructures of the institution; it seeks to change the latter and not the realisation of the form or the infrastructural proposition. On the one hand, where contemporary art's political claim was seen to be based on its separation from infrastructure, on the other, the political claims of an infrastructural practice of art are connected or made immanent to the infrastructural conditions they seek to use, work on or reconfigure. Though this claim is recognised as a site for creative and critical modes of socially engaged art, the problem of the inability of contemporary art and curating to fully account for these practices is shown to, in fact, either not break the closure of infrastructural reality construction, or re-enclose the possibilities for generating the new meaning they claim. This makes it possible to set out and compare the differences and limits between contemporary art and how art functions theoretically in a practice situated by the infrastructural work of its assembly more precisely.

In relation to both these shifts and to the question of the infrastructural imaginaries by which such shifts take place, this chapter has explored different speculative approaches to infrastructure in the discourse of art and curating and of infrastructure in the context of such shifts. It has shown how infrastructure is not only technical but can be understood as a vehicle

of embodied and embedded meaning composition, materialisation and mediation — specifically in the experience of different sites as functions of infrastructural context. How the curatorial can be seen as both an artefact of and a means of composing meaning is also used to analyse different approaches to provision and its effect in cultural infrastructure that intervene in the lack of accessibility of civic infrastructure. This also means assessing the critical possibilities and limits the curatorial faces in its position as an *infrastructural mode of public-making and staging*. This provides the basis for the wider question of how to re-pose the curatorial as a critical approach to composing, generating and mediating infrastructural meaning in infrastructural reality constructions.

In the final sections of this chapter, it was, however, shown to be theoretically possible to generate a different kind of approach to the alignments that can create that closure, using active forms of positioning to stage such compositions. This exacerbates the outsourcing of agency, of responsibility and of decision by automating the terms of relation and connection in that form, by generating the terms of anticipation and therefore repetition: Assemble set up an ostensibly generative cultural infrastructure, but also multiplied value extraction in this. The differences between these approaches more clearly outline the limits and differences of the conceptualisation of infrastructural meaning and application of these speculative claims on infra-politics through different approaches to pre-enactment. On a more conceptual level, it also differentiates *position* as a means of instituting imaginaries and the promises of provision and provision as a way of performatively staging the repetition of actual instituted conditions of position.

Existing models of artistic and curatorial critique further exacerbate this two-fold closure of possibility by holding apart a split between the image and model of infrastructure. This can resist the systemic relationships in infrastructural form: but in also bridging that split with their own infrastructural conditions, i.e., in exhibitions it can allow that free-floating image to be incorporated by other infrastructural actors. As such, to achieve an infrastructural effect, imaginary or object without an infrastructural frame, the curatorial repeats what can already be expected of it: namely a flight from the specific constraints of closure of an event of knowledge (Rogoff, 2013) — in this case, the terms of a socially-engaged practice and how the institutional infrastructures of art support this. In such cases it can be argued that art and curating does make changes to its infrastructural role. This remain within its broad operating parameters: namely adjusting or providing more of the same supporting infrastructures and protocols that enable that critical attitude to the staging of curatorially-mediated forms and knowledge (Rito 2021; Kassa and Bingham-Hall, 2017; and Reilly, 2018).

Running through the core of this thesis is a different question to that of freeing participants from the closure of knowledge and the provision or adaptation of infrastructure for this. That is, if it is possible — and if so, how — to create speculative and critical meaning that is activated into and within infrastructure through the curatorial. This means challenging the assumptions and conceptualisations within the curatorial field about how infrastructural meaning is formed, how it can be critically re-articulated, have political-aesthetic qualities and be open to possibility in the closure of infrastructural repetition. As these comparative case studies and test cases have shown, to institute infrastructural change the curatorial must compose infrastructural imaginaries *into* alignments that repeat as infrastructural closure and constraint. Crucially, however, they also show that difference and speculation can also be registered in how infrastructure repeats, as well as what. (For instance, compare the restoration of community value over the extraction of financial value.) This means re-thinking how interventions or critiques of infrastructure imagine, compose and stage infrastructure into the recursive and performative forms and pre-conditions of infrastructure as it is already/actively realised.

A focus on form allows an analysis of that practice as to how that expectation of provision is conjured by a dispersed infrastructural apparatus (Thrift 2004). This is in turn key to the role of art and the curatorial in these claims. The existence of an imaginary, instituted position — coordination in Thrift, provision in this chapter — is, therefore, not simply a desire or will to control and efficiency, but an orienting to and assuming of a position. The generation of new practices in the convergence discussed here must, therefore, be seen as knowledges conjured in the context of the formal apparatus and the repetitions that generate them. A change in an infrastructural practice or process, and the anticipatory knowledge it holds in place and performs, also requires a change in forms of doing that conjure the repetition. This concerns both the means and achievement of that knowledge, meaning that change must be pre-enacted through and as pre-conditions for practice (i.e., in building infrastructure itself).

As the following chapter explores, to repose the curatorial as an active, critical infrastructural actor or 'composer' requires not only positioning that meaning, or imagining new meaning like provision in existing forms, but finding ways to activate it. How infrastructure can be activated and re-aligned in the curatorial space in this way is taken up in the next chapter. This establishes the basis for a critical framework through the re-positioning of curatorial composition into the creation infrastructural convergences through, but not limited to, expanded practices of art and curating.

# Chapter 2 – Patterning Disposition

Making verification, coherence and 'bumpy' repetition possible in the curatorial.

## 0. Introduction

In the previous chapter, infrastructure was rearticulated as a form and practice through which a relational meaning is created, embedded and enacted. The artefacts of this intersection of infrastructure and an expanded practice and theory of art and curating could be seen as both mediators within the practices of repetition the infrastructural work this scene initiated. The composition of these mediating artefacts defined felt and anticipated modes of experience and promise, enacting a political aesthetics and address in this process. However, while art and curatorial practices, theory and staging can be composed as part of this convergence, their presence alone cannot transform an infrastructural scene. Moreover, where claims made for the transformation of infrastructure *are* made in discourses that cross over between Contemporary Art and what I describe as an Infrastructure-Focused Critical Contemporary practice, this relies on forestalling and separating the alignment and repetition necessary to infrastructural form. Articulating infrastructure through the curatorial in its current form produces effects on infrastructure, but also reaches a critical limitation.

Though infrastructure is brought into focus and reposed by the curatorial at various infrastructural alignments, the patterns of outcome these alignments produce, in general (short duration, singular exhibitions, publications, events and so on) shows the split articulated in Chapter one maintains and upholds one arrangement in the particular criticality of institutional positioning. This arrangement or *patterning* of curatorial practice and artefacts holds open routine models of infrastructure (such as how housing infrastructure relates to cultural infrastructure) to imagine new conditions *as if* it were possible to leave present ones behind. That is, where forms such as the exhibition operate as an expository and speculative device which are enabled by the particular ways that institutional resources are put to work, recognised and repeated as part of a cultural sphere or field. These exhibitionary infrastructures include, notably, the platforming of display and interpretation so that exhibitions and exhibited objects are both specific and singular *and* open to interpretation.[56] This split is,

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[56] An entire chapter could be written to expand this point. However, implied here is how the "exhibitionary complex", the "network of ongoing exposures — material and immaterial, of physical things and abstract ideas — where exhibitions take place" (Rito 2021, 71) in which, as described by Tony Bennett (1994), disciplines, discourses, management and power relations are constituted, has been manifested and practised through the form of the exhibition space such as the white cube, museum (Doherty 1976) or indeed black box. How this has, through institutional critique and conceptual practices, been subject to an undoing that is centred on the structural systems and structures of display as well as an emphasis on how modes of display are caught between enabling aesthetic impossibility and institutional re-invention and expansion (Rito 2021). As Vishmidt has written in "Between Not Everything and Not Nothing: Cuts Toward Infrastructural Critique" (2017a), however, where the critical and practical effects of these

however, maintained whilst its manifest images and models also produce / are produced through forms of alignment that both challenge the role and capacity of art and curating in infrastructural change.

As described at the end of Chapter one, however, alongside a standard critique of collusion with or resistance to infrastructural instrumentalizations (Rosamond 2016, 120) there is for Emily Rosamond, another view of this separation. That is, following Michel Feher (2013), a tension to be created between instrumentalization and patterning: one offered by adopting the mode of these alignments to create difference *within* them. For Rosamond, writing on models of social-financial alignments, this means taking on the position of the investee to develop an opportunity for a more active stake in the position of mediation, a *becoming-image* (Rosamond 2016, 124) rather than an opaquely abstract one. Extending alignment to the compositional and mediating position of the curatorial and what it can produce, this chapter argues that alternative reality constructions can be found in how such parts and actors are aligned. This argument can be used as a mode of composition towards particular, critical infrastructural images or patterns.

At stake in this chapter, then, is the possibility of generating and *tensioning* the infrastructural images and imaginaries of coherence in such alignments through what will be elaborated as infrastructural pattern — that unity or coherence that can be created out of incoherence through an infrastructure or infrastructural imaginary. This will mean figuring the role of, in FA terms, the 'fictive' or remote witnesses that can be conjured in a curatorial setting as stakeholders or actors in the cura-infrastructural scenes examined here. This, allows as an actively undertaken position in the alignments of multivalent infrastructures at stake. Moreover, this also, I will argue, brings together previously unaligned images and imaginaries to generate the possibility of rupture by making the repetition of those alignments, and the infrastructural images they produce, 'bumpy'. In this way, the curatorial can be reposed to be specifically concerned with generating and activating artefacts, dispositions and effects *into* these alignments. This will show, moreover, how *infrastructural* imaginaries can be figures and formed in the curatorial.

This proposition responds to how infrastructure is increasingly understood as a mediator and communicator of information (Easterling 2016, 13), as well as, and to coordinate, other layers

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approaches have been circumscribed by disinvestment and hegemonic drift is an increasing realisation of the centrality of intersecting infrastructural conditions in any critique of representation and subjectification in the institution. The scope of such critiques must be extended to "the thoroughly intertwined objective (historical and socio-economic) and subjective (including affect and artistic subjectivisation) conditions necessary for the institution and its critique to exist, reproduce themselves and posit themselves as an immanent horizon as well as transcendental condition" (Vishmidt 2017a, 267) as part of an infrastructural whole.

(see how it functions as a conceptual layer in the art field) and as such generates meaning by embedding and mediating this information in socially and culturally-defined material form (Martin 2003). Here, this meaning is of a coherence composed out of distinct environmental parts, events, actors, etc., in infrastructural pattern.

<p style="text-align:center">*</p>

**Patterns of coherence**

> Something similar happens in Palestine when the infrastructural conditions of life are constantly being destroyed by bombing, water rationing, the uprooting of olive groves, and the dismantling of established irrigation systems. This Destruction is ameliorated by nongovernmental organizations that reestablished roads and shelters, but the destruction does not change; the NGO interventions presume that the destruction will continue, and understand their task as repairing and ameliorating those conditions between bouts of destruction. A macabre rhythm develops between the tasks of destruction and the tasks of renewal or reconstruction (often opening up temporary market potential as well), all of which supports the normalization of the occupation. (Butler 2015, 13)

As I am re-working this text, a stream of videos and images documenting the 2022 Russian invasion of Ukraine is uploaded onto social media platforms. These traces and testimonies are collated, pulled together by more or less organised groups and individual from open-source streams and verified against Google maps' coordinates and other images by self-styled open-source intelligence (OSInt) investigators and investigative journalists like Bellingcat, Oryx or mainstream media outlets like Channel 4 (UK) and the New York Times (US). The stream is chaos reflecting chaos.

As in other conflicts, like the Syrian civil war and occupation of Palestine,[57] these images are forms of testimony made by those involved to be witnessed by the wider world/public often where official claims or accounts exclude, cover-over or invert a reality experienced and recorded by civilians and journalists on the ground. Aggregating these images is also an attempt to provide data for a pattern or coherence to come; that is, a pattern made in

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[57] See: https://twitter.com/EliotHiggins/status/1500931858216931333 Last accessed: 30-6-2022.; https://forensic-architecture.org/location/palestine-israel. Last accessed: 30-6-2022.

anticipation of open-source data journalism and investigations, as well as formal mechanisms such as the International Criminal Court (ICC).

By articulating those fragments as part of, and as derived *from* a whole, a truth claim can be made in cohering and verifying fragmentary information that escapes official narratives. Here, the reliability of infrastructures of image capture, display or context including social media, publicly-available satellite imagery and google maps, to repeat certain parameters, conditions, forms and practices can be used to *emplace* a trace or image within that infrastructural patterning. This points to a synthetic coherence and verifiability made up of the multiple infrastructural layers that stretch and can be stretched into a multi-layered public realm over an event and the recognisable patterns they create. As this chapter argues, how events, objects and subjects are arranged by and within these patterns constitutes and constructs a particular form of reality. That reality is constructed through the practice and repetition of the mediation of information as part of a world, this pattern extends the forms of abstract social diagram discussed in the previous chapter to enact the social and infrastructural promise of coherence and expectation in the practices that are shaped through the mediation of infrastructural scenes embodying such patterns.

Where the experience of infrastructure comes to be built around forms that mediate experience, infrastructural meaning is, "not identical to system or structure," but rather as Lauren Berlant writes, it is defined by how it determines the "movement or patterning of social form." (Berlant 2016, 393). Pattern is how infrastructure appears to meet and expand its promise; how it creates a sense of unity or recognition in the composition or alignments of parts and practices its enacts and embeds in the realities infrastructure constructions; the weave of that infrastructural world. In pattern, it is possible to determine, sense and experience that performative image or practice which infrastructure holds together, and in which that image of togetherness is met and felt. Not just a record or reproduction of an event, pattern can also be thought of as an active form, shaping the disposition of events and the space and time in which they leave traces, are sensed and recorded; a way of knowing what is an event in its disposition. With infrastructural pattern as a result of material and semantic repetition, another way to view the entanglement of curatorial and infrastructural artefacts is as the productive outcome of the troublesome alignment discussed in Chapter one.

As such, *infrastructural pattern* and *patterning* as I am defining it here, does not simply mean the outcome of a calculation or a model or diagram. Rather, it refers, as in Berlant, to an application of a model or imaginary as a reality constructing and composing operation and artefact. That is, it is in the terms discussed previously in how we recognise the form by which

an infrastructural imaginary is achieved as it is activated in and as the world of that infrastructure — but also its achievement. This makes pattern more dynamic and contestable than simply a model and sees it as an account of a performatively practised and affective relationship, experience and engagement with infrastructure. It also allows the thesis to address a second layer to the concept and methodology of infrastructural reality construction: the mediation of the experience of the dynamic relationship and alignment between expectation, position and possibility; that which is anticipated and interpreted through imaginaries and effects of coherence and verification. This means that *pattern* and *patterning* indicate a more generic aspect of infrastructural meaning: the mediating quality of the images or diagrams embodied and embedded in it.

This chapter is, therefore, built around an argument that, as a form of world-making, infrastructural patterning does not only produce representational form, nor simply technical interventions into representational fields. To institute pattern, to pattern the social, is to put into repetition, temporal, spatial and sensory qualities, creating an image of that coherence and layering this image into other realities to cohere them as infrastructure, or as pertaining to infrastructure. Critical or what I will call 'bumpy' models of pattern can also be used to create, contest and re-configure how reality constructions unfold and are activated. This definition offers a mode of world-making, not as a form completed in advance, but enacted in practice. It builds on the problem of a critique of infrastructure in the field of art by offering an operation and artefact which can inhabit the gap created between different, aligned parts.

The field of art Is not incidental to the achievement of *patterning* here. How it allows particular ways for curatorial objects and frames to shape aesthetic and material experimentation and sedimentation will be key to have pattern can, in the words of Haraway, "redistribute the narrative[s]" (Haraway 1986, 85) mediated by infrastructural patterning. That is, by using pattern to tell, institute or articulate "another version of a crucial myth … [where] the whole field is rearranged in interrelation among all the versions in tension with each other" (Harraway 1986, 85). It is possible to already see for instance, in the case discussed in Chapter one, that by working on the alignments of infrastructural parts and actors so that a different distribution of narrative in the political aesthetic of an infrastructural scene is possible. Here, the *how* of that redistribution will turn on the ways that infrastructural imaginaries and patterns are embedded in the contexts, communities, institutions and forms that enact them.

By articulating infrastructure as an approach to mediation and composition that is established through the critical claims staged in the curatorial, this chapter aims to reformulate the critical claims made *on* the repetition and materialisation of infrastructure by art and the curatorial and

articulated in Chapter one.[58] This is initially undertaken through a reading of the work of Forensic Architecture (FA) that describes how curatorial artefacts, practices and venues are used to participate in the mediation of information, images and truth claims, allowing them to perform as pattern and patterning that institute and realise in practices the imaginaries of evidentiary coherence.

To explore the possibility of creating difference in the alignments of the infrastructural a close reading of the practice and work of FA is, then, used as a test case in the creation and intersection of curatorial and infrastructural pattern. Where the control of information and its mediation as evidence can mean the control of the truth and claims for it (Weizman 2018, 64), FA seeks to re-politicise what can be called the forum of forensic knowledge (Weizman 2018, 65), to platform more-than-human testimony where other forms of evidence are excluded. This offers a case study in infrastructural patterning as a means of achieving a conceptual, evidential and practical coherence in claims for the truth. In achieve this this patterning, curatorial objects are aligned with its investigative practice in cura-infrastructural artefacts that come to act as public mediators of that infrastructural images of coherence or truth and are a crucial entity in the overall disposition of those claims and their effect. These extend into the juridical field through a composite reality construction in which the curatorial is one means of activating new alignments, connections and parts into the practices of repetition that allow evidentiary models to be articulated in continuity with, but also as a rupture in, the infrastructural substrates from which juridically-legible evidence can be drawn. Ultimately, it is the argument of this chapter that by instituting new infrastructural layers into and through the forums of public truth, the exclusions, closures and porosity of the imaginaries of what counts as and acts on that truth in public fora are contested in *form* as well as category.

While it is argued that infrastructural pattern begins in the work of FA from their investigations, at stake in this case study is how the effect of and claims made in these patterns are additionally composed and activated by being mediated through infrastructural modes of alignment in and with public forums such as the art institution. Two exhibitions that stage their reports form the basis for a comparative case study on how infrastructural pattern is composed, aligned and altered by the relationship between modelling and staging pattern in the work of FA. These are *Counter Investigations*, the 2018 exhibition at the Institute of Contemporary Art

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[58] This echoes Vishmidt's framing of infrastructural critique, which asserts that in order to critique the infrastructural ground upon which a critical practice makes its claims, there is a necessary productive dimension to its negation of that claim, that is, in the creation of a platform on which that critique or claim can be made (Vishmidt 2017a, 267; see also Butler 2018). At stake here is precisely what the difference is in such alternative platforms.

(ICA) in London, which staged one moment in an ongoing publication of investigations carried out by the group since 2011; and *War Inna Babylon* at the ICA in 2021, which was curated by community group Tottenham Rights, Kamara Scott and Rianna Jade Parker and set FA's report "The Killing of Mark Duggan" (2020) alongside historical and archival accounts of police violence and community resistance by Black Britons, centring on Tottenham, London.

### Alignment and active form as effect

Underpinning this exploration of infrastructural patterning are two theoretical frames: infrastructure as *active form* (Easterling 2016) and as *social material assemblage* (Johnson 2018). By combining these frames to read pattern as it is posed here (as an expression of infrastructural repetition in practices, images, outcome, transformations possible because of a certain infrastructural assemblage or setting (see Berlant 2016)), the different effects of particular relational forms, figurations or practices on the meaning instituted by patterning become clearer. Architecture critic Keller Easterling's concept of "active form" (2016) is used to consolidate the alignment of form and practice as a speculative infrastructural artefact. It offers a different approach to generating and instituting meaning in infrastructure. As Easterling writes in *Extrastatecraft* (2016): "how users move through an infrastructural system indicates how the dispositions of an infrastructure are realised through the unfolding relationships between its components" (Easterling, 2016, 21; 72). This draws on how the alignments and consolidation of form and practice, of dispositions of provision through modes of position described in Chapter one, might be speculatively extended as a kind of active form. Active form will be used here to describe and explore more explicit alignments created across this gap, how parts and participants are brought into relational and tension, through the particularities of patterning realised in, through and with the curatorial.

In this respect, the articulation of infrastructure as a mode of patterning established through the curatorial field mobilises, but also departs from, Marina Vishmidt's concept of *infrastructural critique* (2017a; 2017b) whereby the curatorial is a venue and site for the re-articulation and platforming of the resources and affordances on which display is built towards other uses. Where Vishmidt leaves open to question how such interruptions become generic or repeated as form (see Thrift 2004, Chapter one), this chapter uses pattern to articulate a potential approach to the durability and broader use of such platforms by initiating in an infrastructural scene the critical act of a speculative and generative assemblage, repetition and closure.

This means drawing on what Johnson (2018) describes as the meaningful, relational qualities of infrastructural such as the thickness or thinness of the social and cultural connections and referentiality in infrastructural forms or assemblages — how connected and complex the artefacts and practices produced and enabled by that assemblage are. This conceptual lens is used to show how the infrastructural artefacts staged by FA institute more or less relationally complex patternings, affecting both the model of coherence possible and its effect on the assemblages in which it is staged (covering over testimony or creating thresholds for various forms of spoken, material or informational testimony to emerge). It will enable an exploration of how patterning both breaks with and creates new forms of the instrumentalization of mediation to, in artist and writer Imani Robinson's words *cover-over* (2019) what is and isn't sensed, represented and repeated in the achievement of such evidential patterns and their claims for objectivity. Following this critique, however, the chapter also asks how this patterning can also create thresholds for this testimony to emerge and to create effects in the assemblage as an active but delimited form of mediation.

The chapter extends through three sections. The first is how infrastructural pattern creates new kinds of mediation in the curatorial and institution — of movement and practice, embodied and embedded repetition and relational figuration. The second section examines where patterning intersects the "struggle over sense-making" (Weizman and Fuller, 2021, 201), examining this through infrastructural pattern as a critical lens on the constraints and closures in FA's models. As well as re-politicising what can enter the forum in terms of a forensic claim of sensory and investigatory commons — a central claim of FA — this strand of the case study examines the effect of mediating these claims through infrastructural form, repetition and practice. Where these patterns — and the connections, relations and performative promises through which they are realised as active form — are realised through curatorial practices and venues, the third section models how tensions in these alignments and patterning can be created. This finally allows for a speculative transformation and re-articulation of the alignments possible *within* the curatorial to show how the curatorial can be woven into infrastructural meaning as a speculative effect that generates tensions and frictions within that repetition and alignment in the speculative and critical potential of 'bumpy' repetition and expression of pattern: a central critical effect on infrastructure this thesis seeks to show is possible.

### Context

Reading the work of Forensic Architecture as an infrastructural practice allows this thesis to reflect on a contextual shift that is framed by a developing critical and speculative self-reflexivity

in design and architecture. That is, what is increasingly being explored in art and curating after infrastructural pressures such as those discussed in Chapter one take effect, as: the rearticulation of the projection of critical assessments into future-oriented outcomes; the socialisation and specialisation of technology as "socially available and spatially accommodated infrastructure; and the concretisation and giving shape to imaginaries as its key contributions to a counter-hegemonic critical practice" (Jeinić 143 in Heindl et. al., 2019). On another level, the space FA inhabit is an accident of the massive expansion of data, image production and processing. This shift is aligned with the massive gathering, processing and use of data in the training of Large Language Models or 'Artificial Intelligence', as well as the internet of things, an off shoot of track and trace logistics, so-called smart layers in cities and other infrastructure, cheap sensors embedded in mobile and locative passive devices (Bratton 2015; Farman 2012; Forensic Architecture 2014).

As such, FA also exploits the emergence of digital humanities, visualisation and simulation software (including in architecture), as well as open-source intelligence (OSInt), enthusiast tracking sites and the power, violence and force being expressed through these layers in meso-scalar infrastructural (extra)statecraft (Easterling 2016). These factors which can be seen to be pivotal to the expanded role of informational infrastructures to more areas once more concretely the domain of epistemic institutions (e.g., the disciplines of the humanities, architectural typology and legal and regulatory bodies). The political backdrop feeding and being fed by these dynamics also plays an increasing role in how and why FA bring this work to the forum. Beyond making hidden or un-sensed accounts and events visible, sensible or legible, FA's work increasingly seeks to counter a combination of the closure and tightening of possible patterning through data, surveillance and prediction models (Zuboff 2015; Amaro 2015) (in part fragmentation and inequality of power enabled by neoliberalism) and an anti-epistemological turn in the fragmentation of truth claims and narratives of populism and post-institutional politics through its approach of "open verification" (Weizman 2019). Open verification is a crowd-sourced, common and collective method of truth and consensus making that aims to work against the aforementioned closure or fissure in the sensory and epistemic commons that trace and record any event (Fuller and Weizman 2021, 18; 195; 202). These two dynamics can be seen as co-forming, but also creating gaps which FA are keen to exploit.

Arguing this through the establishing of critical cura-infrastructural artefacts allows for the curatorial to be both expanded to include more-than-social models and forms of sensing, aesthetic attunement and exchange and, therefore, to (potentially) change active forms of truth-making / informational closure by pre-enacting alternative patterning into existing/extended forms and fields (i.e., modelling a particular claim from the available evidence). This contributes

to the overall aim of the thesis: to show how the curatorial can be reposed to work on and help re-imagine the forms, practices, meaning and operation of infrastructure. As part of a sequential rearticulation of the curatorial as a descriptive, analytical, critical and speculative (and hence layered) practice and site for critical (self-) infrastructuring across the thesis, this chapter, therefore, lays the ground for the question of how to expand the kinds of infrastructural meaning that can be instituted and instituted through/in novel fields. However, where composing infrastructural form ultimately runs the risk of only re-closing an albeit expanded dispositional and formal possibility of the imaginaries of truth and coherence, it also leads to the question of how to re-configure the distributed and extended imaginaries that stitch these parts together as a world-making practice. This is taken up in Chapter three. How, then, does solving the problem of systemic limits of the exhibition as a particular kind of infrastructural event, negotiate, compose and direct the effects of the closure and recursion of infrastructural pattern?

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## 1. Patterning reality

As well as a critical spatial-media research agency and emergent academic field, Forensic Architecture is also an "operative concept"[59] (Weizman 2018, 65). This methodological and conceptual approach deploys the formal, disciplinary and operational dimensions of architecture to construct and activate alternative forms of forensic knowledge and testimony around incidents of state violence. In *Counter Investigations* this is characterised by five key concepts displayed across the wall of the exhibition: "Counter Forensics," "Forensic Aesthetics," "Operative models," "the Image-Data Complex," and "The Architecture of Memory."[60] How such models come to operate as the basis for infrastructuring evidentiary coherence in the creation of infrastructural pattern will thread through the core of this chapter.

Investigations by FA are primarily undertaken where state violence intersects asymmetries in the state's power over information infrastructures and legal institutions. As a result of control of the entry of information and evidence into the forums of truth making, such acts can be effectively ignored, disputed or made invisible to official routes and forums of redress. For

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[59] See: https://www.ica.art/exhibitions/forensic-architecture-counter-investigations/key-concepts. Last accessed: 30-6-2022.
[60] Ibid.

example, in "The Bombing of Rafah" case (featured in *Counter Investigations*) FA set out with Amnesty International to determine the effect of four days of Israeli shelling in Rafah. However, with FA and Amnesty being denied entry to Gaza neither conventional investigatory infrastructures nor a means of interfacing with local conditions were available (FA, 2015). Alternative forms of access were necessary. These intersections manifest an institutionalised ability to record such events, determine their legibility to legal and civil processes and therefore to adjudicate what is presented as 'the truth.'

As FA's Principle Investigator Eyal Weizman describes, however, state violence increasingly takes place in urban and architectural contexts, spatial regimes and spaces of movement (Weizman in Heindl et. al., 2019, 64). One consequence is the intersection of these acts and their non-visibility with an ever-wider field of actors; private, public and open-source surveillance; mapping, images and data relating to that field of activity — that together produce increasing amounts of information.[61] The models through which FA are re-operationalising image structures, data and experience define how they are exploiting this reconceptualization of urban and architectural space as sources of dynamic and composite evidence against official accounts. This process draws on the dense field of information available from within the infrastructures which structure, surveil and transit that space, but also extends and expands it. Focusing on one keystone bomb strike in "The Bombing of Rafah" case in the *Counter Investigations* exhibition, for example, and despite being denied entry FA showed how an evidential field including metadata, videos and images of its smoke plume from citizen-produced, broadcast and social media; satellite images; local maps; shadows in source images; munitions specifications and so on, could re-create in detail an event not officially accepted to have happened or happen *like that*. Re-composing such a field allows more than human interlocutors, traces and testimony to be composited together and verified against one another into a complex, web-like truth that can reach far beyond the deliberately narrow resolution of state narratives. Thus, these models literally compose alternative perspectives, epistemic values and thus 'truths' to the officially sanctioned ones.

While this complexity might not (need) register in official accounts, these fields comprise a "thick fabric of lateral relations, associations, chains of actions between material things, large environments, individuals, individuals and collective action" (Franke, cited in Weizman, In Forensic Architecture, 2014, 27). Deepening the information in this field makes it possible to

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[61] This ranges from videos and images on social media and broadcasts that are carried out with ever-cheaper sensing equipment, scientific data and satellite information and public domain records; all of which overlap with official and community-produced testimony and reports.

include what can be seen as individually 'weak', partial and remote testimonies and signals (Fuller and Weizman 2021, 1) from spatial, temporal, material and informational infrastructures in a reconceptualization of urban and architectural space as sources of dynamic and composite evidence. At stake here, is not only *what* can, but *how* this process draws on the dense field of information available from within the infrastructures which structure, surveil and transit that space, but also extends and expands that infrastructural ground as its investigation.

### Infrastructural images

The acts of violence FA investigate are often possible — whether by design or accident — by passing under existing detectability, visibility or accountability. While open-source data relating to such events can be plentiful, a common problem faced by those investigating them is not only presenting their case, but how to access that information due to its often poor resolution or fragmentary nature.[62] As found in another investigation featured in *Counter Investigations*, "Drone Strike in Miranshah," (FA, 2014a), what came to be seen as the signature puncture in the roof of a building after a drone strike was used to provide information from all of the matter that surrounds that hole (Weizman, 2018, 22). But this image is also an informational trace: an artefact of the interaction of particular known objects and traceable architectures — or what become in an investigative setting, infrastructures for mediating and understanding the that specific interaction of parts and data points. Where a missile leaves a hole smaller than a single pixel in publicly available satellite imagery (MACBA, 2017), that hole in the roof also exists at the "threshold of detectability" (Weizman, 2014). For this trace to be used in a case built on the use of a particular munition the information of that evidence must be distilled and composed from all that filled and surrounded that pixel. Moreover, where criminal and juridical systems are built around a near-exclusive control of what evidence does or doesn't enter the court (especially in regimes in which state violence is enabled by this closure), an infrastructure must be built in which that missing data can be simulated, re-assembled and activated as a reliably accurate alternative. (Both legible to the court and to a wider public which might be able to put pressure on or side step that legibility.)

This is achieved firstly by expanding the sensory ecology that can speak for that information (Fuller and Weizman 2021, 198). FA re-pose these events through the ways in which they inter-layer the already multiple ways a landscape or environment senses an event: tracks in a dirt road, soot on leaves or banned chemicals remaining in their veins, a depression in the

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[62] Often pixelated satellite imagery, as FA point out, is about as close as most investigators can get (Weizman, 2018, 27).

earth above a burial. Moreover, akin to the artefacts of positioning discussed in Chapter one, the specific means or object of intervention into that field are themselves composite records of the ecologies that produced them. A bomb released from a warplane is "a composite object, its many components arrived from dozens of factories across Europe and the U.S. These products are themselves assembled from other products drawn from hundreds of subcontractors, and these are supplied by providers of raw materials, … extracted from mines spread across the world" (Fuller and Weizman 2021 3). Each of these objects leave signatures (or material testimony) in the mundanity (and so often left in plain sight) of their infrastructural substrates: technical specifications, specific supply chains, etc.; or records its particular material decompositions that, together, can be recohered as unmistakable patterns of coherence between an event and that object.

### Assembling a field as an infrastructural artefact

Forensic Architecture repose an object as both a recording device and part of an event that leaves behind an ecology of substrates, traces and connections through which it takes place (Fuller and Weizman 2021, 1-2); this object is therefore a recording device of the conditions of that ecology: the persistence of which beyond the original event provided an evidentiary opening and platform. At stake is producing a frame to rearticulate this ecology and the relations between it and the event. Once deployed into and transformed as they interact with an environment, these composite objects leave further traces that raggedly approximate the assembled parts (Fuller and Weizman 2021 3), corresponding to potentially verifiable public data trials and further connections in the narratives of causality and conditioning for a particular event to unfold. The re-composition of these objects into a framing and activating context, can also be used to think through the construction of cohesive patterns and infrastructures of verification in the work of FA as it recovers the infrastructural patterning of information, traces and objects produced and mediated by the events they investigate. This provides a form of meaning-making in which the forms and modalities of art and the curatorial can be seen as central potentialities and problems once the conceptual and practical perspective is shifted to infrastructure. However, this requires the work of re-composition and synthesising that infrastructural interaction. Where objects "can and do address the forum…the testimony of objects requires the presence of a subjective forensic expert or "a set of technologies to mediate between the object and the forum, to present the object, interpret it and place it within a larger net of relations" (Robinson 2019, 1; Forensic Architecture in Robinson 2019).

As a form and content combined in use, the infrastructures built to recontextualize these traces set in play relational systems that enable communication, transition and movement by bridging over the gaps they simultaneously invent. Yet, as Susan Leigh Star has described, how we are positioned physically and conceptually by and within the relational ecology of infrastructure is a function of whether that infrastructure and its actors can come into visibility in the first place (Star 1999).[63] For the information around that hole to be accessible — such as the munitions data and news images from the room that was struck — and become the grounds on which a case could be staged and be accepted into a forum that did not previously 'see' it, the infrastructural field it is drawn from must be reconstructed as a reliable and active structure through which an investigation can be built. Secondly, therefore, the investigation itself must be seen "less as a means of interrogation than a mode of assembly… an ecological proposition that brings together media, science and law into new political configurations (Schuppli 2020, 9). Not concerned with the irreducibility of objects attached to an event (Schuppli 2020, 9), this approach sees an event as produced by and producing relations and connections that can be recovered and mapped.

However, not everything that sensed can be easily integrated into sense-making (Fuller and Weizman 2021, 201). As such, brought together like this is a multisensory field that generates a set of artefacts and verifiable layers in which an event can be — for better or worse (Robinson 2019) — registered beyond the fallibility of human testimony. At one level, infrastructure provides the mechanism for adjusting and articulating modes of informational closure and exclusion; setting what can and can't appear, be mediated, sensed, interpreted, etc., on or in its parameters and processes. How an event is constrained and patterned and how it is mediated through that constraint and pattern is a technical problem that is recoverable from where this ground as an infrastructure repeats. At another level, however, this exclusion and violence operate on an infrastructural imaginary that is embodied in practices of exclusion and closure in the narratives given to it. In this sense, to reconstruct an event outside of an official account allows the restaging of the narrative to recover the meaning that was already embedded within it: that is, a coherence verifiable by the repeating and meditating condition for that event, in other words, a more inclusive truth. What is at stake in this reconstruction for an expanded definition of infrastructure and the curatorial?

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[63] For instance, documents such as a telephone directory book can reveal decades of activism and conflict, such as the inclusion of Gay Pride under the section "Community Events". For Star and Bowker, writing in c. 1999 this inclusion "betokens a kind of public acceptance that would be unthinkable 30 years ago" (Bowker and Star 1999).

**Infrastructural work: activating interoperation, pattern and coherence**

In order to be reconstructed, the field must be made to work for an investigation. As anthropologist Ashley Carse clarifies, making forms of transition and interoperation possible does not depend on a concept of infrastructure which delimits *a priori* what kind of components are necessary to achieve the desired objective (Carse 2012, 540). Rather, it is through practices of "infrastructural work" (Bowker 1994, 10), that is, "a set of organizational techniques (technical, governmental and administrative) that create the conditions of possibility for a particular higher-order objective," that "disparate components are integrated and become a networked support system" (Carse 2012, 540). A conventional analysis of extant physical and operational infrastructural conditions for FA might stress how the socio-technical interfaces and protocols they create define their work in relation to other infrastructures and forums,[64] or how the formation of FA marshals considerable resources and institutional capacity.[65] However, by

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[64] For instance: in relation to the resources of art, the exhibition marked the beginning of a long-term collaboration between FA and the ICA in investigative research and methods (ICA, 2018). The most recent outcomes include supporting the "The Killing of Mark Duggan" case (FA, 2020b) and the Tottenham Rights exhibition (Scott and Scott, 2020). In the legal field, FA is constituted into the legal process through the ability of its reports, models and platforms to interface with a complex ecology of collaborations and presentation as part of commissions by institutions of human rights and international law, along with NGOs, and evidentiary packages in court proceedings, legal petitions and letters — either directly as evidence or through citations of their work or press collaborations. Examples include: the evidence used by the Michael Sfard Law office, NGO B'Tselem in Gaza and UN Special Rapporteur on Counter Terrorism and Human Rights Ben Emmerson (see: Statement by Ben Emmerson, 2012, https://www.ohchr.org/en/statements/2014/02/statement-special-rapporteur-promotion-and-protection-human-rights-and-2?LangID=E&NewsID=14233. Last accessed:  30-6-2022.
 and their work with the family lawyers for Mark Duggan in the UK towards an out of court settlement (see: https://content.forensic-architecture.org/wp-content/uploads/2020/06/2020.02-FA-Michael-Lockwood-IOPC-Additional-Reports.pdf Last accessed:  30-6-2022.). This work can be prompted in response to the open calls which came from evidence gathering exercises, such as the United Nations Independent Commission of Inquiry on the 2014 Gaza Conflict (see: https://www.ohchr.org/EN/HRBodies/HRC/CoIGazaConflict/Pages/CommissionOfInquiry.aspx. Last accessed: Last accessed:  Last accessed:  30-6-2022.).

[65] For instance: Established at the Centre for Research Architecture at Goldsmiths, University of London, FA has been primarily funded and structured as part of two multi-year European Research Council (ERC) grants between 2011–2015 and 2016–2021, worth €1,197,704 and €1,996,830 respectively and among other core funding from a range of philanthropic foundations. Alongside providing basic operating resources (its methods of analysis are "incredibly expensive" (Weizman in von Bismark et. al., 2012, 87)) the funding from the ERC also define the operating conditions of FA as an agency. This includes being hosted by a legally-recognised EU research entity with adequate departmental intellectual infrastructure for the duration of the project (Goldsmiths, University of London, in this case), and that it must support an individual research PI, under whom the team works, thus defining the structure of FA (see: https://erc.europa.eu/sites/default/files/document/file/erc_2010_work%20programme.pdf. Last accessed: 30-6-2022.). As such, the self-definition of FA as a research agency — a service provider, part of a larger organisation, and working on behalf of others, and becoming an agent within the field of this service — is itself very much conditional on those enabling infrastructures, and the frameworks within which these are also situated (for example, slotting into the structural aims of the FP7 and H.2020 European programmes to boost EU knowledge economic and scientific performance (see: https://www.europarl.europa.eu/RegData/etudes/BRIE/2015/568327/EPRS_BRI%282015%29568327_EN.pdf. Last accessed:  30-6-2022.). The construction of FA as an agency represents its own form of

developing a concept of "infrastructural work" to create new conditions one offers a route into how, by practising *infrastructurally*, FA offer a test case in how formal and aesthetic layers of infrastructural meaning might be composed, staged and mediated through curatorial spaces and artefacts. This requires attunement to how coherence is registered and registerable across a set of substrates not legible to the institution or forum, but which can rather be addressed in interaction with an infrastructural frame. This provides certainty according to how they reliably pattern the social *infrastructurally*.

Registering the full scope of dimensions in which these events took place begins by incorporating other information that could be sensed to contextualise and verify available evidentiary traces within it. This also means seeing an event as a field co-composed with plants, minerals, animals and multiple technologies (Fuller and Weizman 2021, 18). Moving beyond the human as a locus of agency and effect, FA sees the social, historical, cultural, spatial and technical field or world that made an event possible (Weizman 2018, 64), as an evidentiary actor: both a witness and source of testimony and as a protagonist. Recomposing the conditions that both create that threshold and which push evidence beyond perception is central to their work. When ordered or focused into distinct infrastructurally-produced layers, capacities and interoperations around an event, this fabric is seen as a field from which a pattern can emerge where the pre-conditions of knowledge it enacts are expanded, thus changing the epistemic outcome of those conditions.

Re-making informational pre-conditions has consequence for what can be made available and count as evidence in public forms; but also, on how information and artefacts can act infrastructurally. As Sarah Pink writes, contemporary digital images are more than just data points in multisensory environments (2011). They are produced in order to mark a position within a movement through this environment. These traces, images and other artefacts are made through what Berlant calls the "terms of transition" (Berlant 2016, 394) of the multisensory environments they transit. These terms of condition provide "conceptual infrastructures not only as ideas [or imaginaries] but also as part of the protocols or practices that hold the world up" (Berlant 2016, 394.). This conceptual infrastructure corresponds to the repeatable and predictable protocols and practices that define how it is possible to move and to make images in them; and how these are connected. Accordingly, such multisensory interactions can also be used to reverse engineer the conditions in which they took place and

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infrastructural work (see also: https://www.iconeye.com/architecture/features/forensic-architecture-the-threshold-of-visibility/. Last accessed:  30-6-2022.)

registered that event as well as the dynamics, mediation and transitions that constitute it.[66] And as the dynamic effects of the assemblage that made them, these traces can be used as meso-dimensional records or coordinates in the world that made an event possible. How does this change information and evidence and who can enter the forum and its effect? How does this infrastructure work to recover an event?

### Interoperation and Coherence

Where pattern is an achievement of the repetition and recursion of alignment (often resisted in the field of art), Easterling's concept of "active form" (2016) offers a useful model for the consolidation of form and practice and for the analysis of how different "dispositions" (2016) of coherence and verification are achieved through modes of patterning. For Easterling, the speculative horizon or frame of infrastructure is therefore defined by how its form relates to practice by creating dispositions for action, operation, transformation and so on — in other words, the outcomes and means of its performative repetition. Disposition allows us to read intent and potential in dynamic unfolding conditions. For instance, how users move through an infrastructural system indicates how the dispositions of an infrastructure are realised through the unfolding relationships between its components (Easterling 2016, 21; 72). These two properties — the promised, potential or actual action and the shape that determines it — can be combined, Easterling argues, in what she calls the active form (Easterling 2016). The active form can be used to show how patterns drawn out of a field are activated as its imagined *and* instituted *coherence* — an imaginary and given conceptual form that is applied to the worlds mediating it.[67]

The methodology report of "The Killing of Mark Duggan" case (Forensic Architecture, 2020) describes this process well. Mark Duggan was a 29-year-old Londoner who worked in retail. He had grown up on the Broadwater Farm estate in Tottenham. The Broadwater Farm estate was the scene of riots in October 1985 when, after years of (still continued (Scott 2019)) heavy-handed policing of black residents (including in the aftermath of the 1985 Brixton riots and the police shooting of Dorothy 'Cherry' Groce a Jamaican woman who lived in Brixton (BBC 1985; 2014)), 49-year-old Cynthia Jarrett, an Afro-Caribbean woman who lived on the estate had died of a cardiac arrest during a police search at her home; during the riots (BBC 2015), Keith

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[66] See for instance the transponder (a location and identity transmitter) on an airplane or ship.
[67] For instance, alongside *switches* that have remote effects down the line (Easterling 2016, 75), *governors* that define the interplay between states and across boundaries (Easterling 2016, 78) are *multipliers*, a systemic event that repeats a change across an infrastructural field (like the elevator allowing cities to grow upwards) (Easterling 2016, 74).

Blakelock, a police officer was murdered (Ibid.). Duggan also spent time as a young teenager in Manchester, his mother's home town (Prodger 2014). Described as a family man (Harding 2014), and is remembered as friendly and respectful (4FRONT). He was the son of Pamela and Bruno Duggan (Prodger 2014), and father to six children, including a daughter who was still born (Schlesinger 2011; Barkham and Henley 2011). In August 2011 he was killed by a police marksman. Duggan previously had only light convictions for drug possession and the sale of stolen goods (Prodger 2014). The police had alleged that they had intelligence to suggest that he was a member of the violent Tottenham gang Man Dem (something contested by his family (Schlesinger 2011)) and, that at the time of his shooting, he had collected a gun from a man called Kevin Hutchinson-Foster (Prodger 2014). The "Killing of Mark Duggan" case undertaken by FA at the request of the Duggan Family (Forensic Architecture 2020) set out to explore the validity of the official account of events in which Mark Duggan was killed by police officers. Since no video existed of the moment itself, FA instead created an investigative infrastructure to simulate what might have been seen and how this intersected with the different accounts from statements by officers and other witnesses.

On the fourth of August 2011 a convoy of armed officers from the Metropolitan Police followed Duggan and stopped the minicab he was travelling in, killing him only seconds later as he left the car. The officer who fired had claimed that Duggan had a gun in his hand as he exited before throwing it into an adjacent park. Duggan's family lawyers had commissioned FA to reconstruct this event to show if this account was plausible. (FA later worked with Tottenham Rights to present the findings in public). As with other cases, this investigation rests on examining the shape and dynamics of an incident field through various types, qualities and durations of oral evidence, images, expert analyses, official reports and so on. This also intervenes on the particular infrastructural asymmetries of information and evidence through shifting the threshold of detectability in this case.[68]

To bridge between these elements FA begins by establishing a composite 3D digital model using proprietary software (instituting a different layer of infrastructural dependency).[69] As an

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[68] Since video did not exist around key events, the report only seeks to establish *doubt* around the official account. This serves as a basis for mounting/grounding legal actions, as with FA's letter to IPOC, the Duggan family's out-of-court settlement with the Met Police, see: https://content.forensic-architecture.org/wp-content/uploads/2020/06/2020.02-FA-Michael-Lockwood-IOPC-Additional-Reports.pdf. Last accessed: 30-6-2022.
[69] These include: the 4D animation platform Cinema4D, a "Proprietary 3D modelling and animation software for staging, motion, texturing and deforming 3D objects in time and space […] In particular, we were able to utilise the take system as a procedural tool for representing testimony"; Blender, an "Open source 3D modelling and animation software for staging, motion, texturing, and deformation of 3D objects in time and space"; Mixamo, a "Proprietary 3D character-rigging and animation software […] Allow[ing] the uploading of a 3D model so that it can be 'rigged'"; motion capture software, Reality

"analytic device," these architectural models serve as a "venue" for interrogating the sources and relationships between them. Their conceptual and organisational parameters allow FA to suggest how evidence is produced along parallel unfolding timelines. FA construct these dynamic assemblies using three operative layers (Forensic Architecture, 2020b, 45–46). The first, "site," is generally a highly accurate model which reconstructs the spatial and infrastructural features that are visible before, during and after the event (e.g., street topology) and that can be determined from architectural surveying methods, available evidence as well as existing information-generating infrastructures (e.g., maps or metadata). This site is populated in the "scene" layer with objects that are subject to change in position but are present at the time of the event (e.g., police cars, shadows). The construction of the site layer allows a precise corroboration of the scene elements in a "highly accurate model" (Forensic Architecture, 2020b, 45). Using these parts, investigations entail four-dimensional reenactments of "as close as possible" to what — or what might have — happened: this is the "incident" layer.[70]

Bringing together disparate sources from site, scene and incident FA create forms of infrastructural interoperation to mesh together fragmentary (or only loosely articulated or visible) testimony and signals. This enables various plausible scenarios to be played out in a relevant, modelled setting. The relevance of infrastructural work sits within what curator Avi Feldman describes as a wider shift towards the modelling of truth through reconstructing "coherent narratives" within the incident field (Feldman, 2018, 18) and the narratives that can be drawn from them. As Weizman and Keenan discuss, this reflects the backdrop for FA's work: a shift from an era of the witness to a forensic era (Weizman and Keenan in Feldman, 2018, 18). The advent of a forensic turn after its incorporation into a form of testimony concerning war crimes investigations meant that objects can give testimony where other forms are not available. In forensics, "the main arbiter of truth [is] no longer only that which transpire[s] from human testimony," (Robinson 2019, 2). Instead, evidence is generated from "material investigations" (Forensic Architecture 2014, 10), with testimony reconstructed from

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Capture, that is "Photogrammetry software […] We use Reality Capture to create a 'point-cloud' and 3D model of the site based on a photogrammetric survey"; and so on. Available at: https://content.forensic-architecture.org/wp-content/uploads/2020/06/2020.06-Report-The-Killing-of-Mark-Duggan.pdf. Last accessed: 30-6-2022.

[70] For instance, timelines constitute a key methodology and appear in many investigations by FA. They are used to locate the media that recorded an event — such as mobile phone video — in space and time. The timeline locks a model proposed by FA to a narrative in which fragments can cohere both spatially and temporally. Moreover, by organising fragmented and models in time and space, each dimension can interoperate and be used to verify the location and veracity of the other. The timeline can be seen in this way as a kind of infrastructural pattern, with time as an infrastructure for meaning making (cf. Vishmidt 2017b)

"the speech of objects," or the often scientifically-verifiable consequences of actions onto material substrates, be that physical, chemical or biological.

In contrast to the fragile, partial testimony of the individual witness — whose moral and legal accountability rests on being directly *spoken* and *heard* — forensics assemble and examine "more reliable" scanning and medical data concerning a person, object or site's biography. This combined approach and epistemology brings with it "the scientific promise of a higher probability of speaking the truth" (Feldman, 2018, 18), leveraging this promise on the reliability of the repeatable nature or methodology of the scientific methods on which forensic investigations are prefaced. By making objects legible to the forum in this way (Robinson 2019, 2), material evidence formed beyond human capacity can be conveyed in as well as transform forums like the court or tribunal through reconstruction, models and visualisations where it is mediated and contextualised by expert witnesses able to construct this evidence and "speak on behalf of things" (Keenan and Weizman 2012, 13 in Robinson, 2019, 2). (Crucially, it is the investigative infrastructures and the operative models that can be staged within or through them that can accommodate other evidentiary forms or testimony and make them legible or able to interface with other public fora.) This does, however, situate such claims within an ethical and epistemic framework defined by what is assembled in that infrastructural work according to what is or isn't included, can testify and how. As such, this work exemplifies the central stake of this chapter: In mediating the convergences of meaning, materialisation and practices that comprise this coherence, this infrastructural work allows an alternative infrastructural patterning to be generated from the traces of events normally invisible to authorised accounts.

### The long duration of the split second

In commissioning FA, the Duggan family hoped to contest the inquest and police/IPCC accounts (who concluded that Duggan had been throwing a gun and that the police had no case to answer), and the wall of silence and control of the truth built by them. As the community organiser and co-curator of *War Inna Babylon* (2021) Stafford Scott made clear (2021), so often police violence extends through the control of what counts and is repeated as truth, with victims faced with the impossible task of meeting the police response to criticism: *prove us wrong*. Indeed, the hard stop that led to Duggan's killing took place where there were no cameras. As such, the investigation by FA offered a means of inserting doubt and public challenge to the legal processes, including an inquest finding of "lawful killing" through an opening created by the judge.

Into this narrative, the FA's report sought to specifically amplify the contradictions that had been the basis for a High Court challenge by the Duggan family, the inquest judge's report and one of the inquest questions: How did the gun get to the grass? Where the inquest, IPCC investigation and High Court ruling were based on the memory and testimony of the officers, the taxicab driver and 'witness B' who filmed the aftermath from a nearby tower block, FA's investigation rearticulated this central evidentiary problem as a spatio-temporal one. How could the gun have ended up on the grass? Could the various possible mechanisms for this have occurred in the one and half seconds between his exit from the minicab and the shot being fired? And could this match up to the testimonies of the officers? Through a reconstruction of the event matching predominantly written statements and video made by witness B and a police helicopter to a timeline that combined the spatial reproduction of the environment, vehicles and actors known to be at the incident the model described previously compares different permutations of these questions in its event layers. It compiles these as infrastructural patterns against which simulations of the claims could be played out in the context of other information and evidence.

The coherence of the relationship between evidentiary layers in this model enables narratives of causality to provide a functionally different shape, scale and distribution to the existing patterns and narratives established in this field. It is the first intervention or how evidences patterns the appearance and content of its 'truth' according to which infrastructure is used to provide evidence and what context it can support. Previously-excluded actors (victims, investigation commissioners, FA) (Nankivell and Elsey, 2019) are activated in frames in FA's models which provide them visibility within forums that can register them. For example, witness statements were organised across time, with these ordered narratives serving as field or infrastructure across which different dimensions or lines of contradiction, possible movements and interactions and coordination between statements from the event could be plotted, simulated or recomposed. This provided a central structure by which to reconstruct a 3D model of various possible scenarios. Through this modelling, FA were able to show, they claimed, and as the inquest jury had also stated, that on the balance of probability the gun could not have been thrown before Duggan exited — another officer would have seen it.[71] The reconstruction raised a number of contradictions and impossibilities in these accounts. This model, and the doubt it shed on both the veracity of the officer witness statements and conclusions of the then

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[71] But in addition, by combining this model with the expert bio mechanical testimony, it also argued that Duggan could not have presented a threat *and* have thrown the gun after having been shot (see also: https://www.theguardian.com/uk-news/2021/may/28/mark-duggan-family-police-lack-courage-to-reopen-investigation. Last accessed: 30-6-2022.).

IPCC would come to be used in the civil case the Metropolitan Police Service (MPS) ultimately chose to settle with the family out of court.[72]

### Patterning what is not 'seen'

The efficacy of this model is based on the ability to cohere and verify traces, testimony and evidence against one another — to create different patterns from these traces in the recreated and expanded "split-second" of the event and its aftermath. Infrastructural work between and within information, site and scene constructs the field as a consistent and repeatable world, keeping the constructions of that world practically bound to itself.[73] Integrating the model as one infrastructural layer in the assemblage of evidence that could be seen, these other infrastructural, i.e., predictability, repeatable and fungible traces and dynamics could be used to determine and visualise the probability of various accounts (see Forensic Architecture 2021). By re-registering and activating an unaccounted-for disposition of the scene, the model used by FA in this investigation and report intervened in the given narrative and exploited tensions between public court documents. FA could make the efforts and effects of police coordination and contradiction visible by spatialising events in witness statements, drawing links across this space on a timeline model which could also incorporate sensory and interpretive data and perspectives not available to human witnesses. Staging the consequences of police testimony in a series of 3D simulations like this allows their content and inconsistencies to be explored across these additional temporal, spatial and narrative registers

This 'timelining' of seemingly disparate traces into a coherent pattern could also incorporate and uncover the fractions of time that were compressed into the "split second" in which the police officer had decided to open fire. It also allows, as Weizman states (2021), the decompression of what cannot be registered in conventional accounts, for instance, the historical compression of racism and pre-emptive judgment in so-called split-second decisions. By aligning these different and distinct images of coherence — those of the police witness accounts with that which could be recovered by FA from the split second: the patterns of coordination and rupture as the text of police testimony was mapped in space and time, and those fleeting moments of visibility and in the simulated visibility of movements caught on camera (or not) — two distinct dispositions of that scene are interfaced. Where they both claim

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[72] See: https://www.theguardian.com/uk-news/2019/oct/10/mark-duggan-shooting-family-settle-high-court-claim-against-met. Last accessed: 30-6-2022.

[73] Following Rossiter, an infrastructural world is the domain in which the rules of a system apply, and in which the logical extent of those rules defines and keeps the relevant extent of that world in a constituent relation to itself (Rossiter, 2017).

continuity with the scene, this produces a rupture in the image of coherence presented by different positions in that scene.

The claim that can be made in this context of this thesis of this particular form of making public (of a public claim on the truth) is that this is achieved by engaging the event as an infrastructural substrate. More specifically, the investigation acts as a critical intervention on the imaginaries of the coherence on the evidentiary disposition of that scene that is attributed to an event by the police and the claim they make — but also mediate. The activation of this disposition turns on how these technical, aesthetic *and* narrative forms directly support the task of an investigation: to measure and articulate the distance between accuracy and speculation makes it possible to posit a truth, or in the Duggan case, extend a doubt. In this sense, the operative models described at the outset are not free-floating architectural methods but exist as a set of organisational techniques embedded into and as the infrastructure of the investigation, the scene it accounts for, and the juridical settlement it challenges. This allows an alternative pattern to emerge; they show that an alternative patterning was already extant, both in terms of what was registering traces of evidence and in terms of how a particular and prejudicial story had unfolded in that context.

The more general point to be drawn from this example is that central to FA's claim is that human interactions with the built environment leave material traces that can be interwoven with human forms of testimony. This means building a framework to ask how an environment or "building might read its users" (Weizman 2018, 54). But where state power is expressed by the delimitation of what counts as truth (Forensic Architecture 2014, 10), FA re-creates and composes infrastructural patterns or patterning to firm up what can be recorded and how this can be accounted for. This draws and combines "individual recordings [and other evidence] until they become" a sensory and investigatory commons (Weizman and Fuller, 2021, 4; 11).

For FA, the discipline of architecture is particularly appropriate for investigating the physical sites within which such incidents take place (Weizman in von Bismark et. al., 2012, 87). As both analytic and support structure it enables the accurate mapping and restaging of extant architectural and infrastructural conditions. However, by enabling the group and their collaborators, stakeholders and direct and indirect users to *move* purposefully *through* the spaces, events and material traces associated with an incident — and to be able to reliably and repeatedly transition between different social forums, reconstructed states and reenacted locations through and as this movement (Gallanti, 2020, 81) — there is much to be gained by describing the investigations carried out by FA as the work of creating and activating infrastructural patterning. FA does not simply identify infrastructural elements in their models,

however, but puts them to work in dynamic relationships between a digital model and a re-enactment of the relationship between an event and its context. Moreover, the mediation of an event and an account through infrastructure is a specific sort of construction which has effects on its objects, assemblage and event (for those participating in or with a stake in that testimony), in addition to how its effects repeat beyond the event.

If infrastructure can be understood as creating dispositions in forms of operation, transformation and so on — the outcomes and means of its performative repetition — that is, its active form — these models are not tied to standing for a specific set of objects or things. Rather, they offer models that hold together the relationship between the right combination of the right conditions. Their disposition — and the actual action and the shape that determines it — compared to official promises or claims, allows those interacting with the models FA produce to read intent and potential in dynamic and unfolding conditions.

### Assembling pattern and activating coherence

Instituting systemic and structural closure infrastructural work makes conditions and resources stable, repeatable and reliable. This coherence is, however, only provisional. Prone to failure and glitch, infrastructure is for Lauren Berlant much less stable than imagined (Berlant, 2016). Using approaches to the poetics of infrastructure established in literary studies to reflect on how "the commons" or "austerity" sustain infrastructural promises, for Berlant infrastructure also demands and depends on creating patterns — formal rhythms and horizons of activity — in social life so that its particular conceptual, operational and political parameters are actively held together by users and other actors (Berlant 2016, 393–394). As a result, and solution for the provisional rather than an *a priori* unity of infrastructure, the concept of pattern helps diagram how FA encode structural or systemic affordances within their investigations by tying repetition and expectation to a form that meets this anticipation, and by training this knowledge. The persistence of this patterning relies on the resilience of its organising principles and manifestations, the power with which it can be enforced and how convincing an imaginary it institutes. Changeable nonetheless, pattern also clarifies how particular differences are introduced by reconfiguring the 'weave' of infrastructure's imagined stability, making it "harder and softer, tighter and looser" (Berlant 2016, 394). The quality of this weave, rhythm or texture is key to how infrastructure is defined in movement, transition and the "patterning of social form" (Berlant 2016, 393).

As such, by incorporating the proposed narratives and methodology as well as the 3D Models, VR, timelines, videos, reports submitted in legal and civil forums and the online platforms, the cases displayed in FA's exhibitions serve both as organisational techniques for articulating a field as a coherent interoperating assembly of evidence, data and testimony (interacting, crucially, with various other forums and forms beyond, like the press, court and wider public debate). And following this, as the platforms on which truth claims can be reliably and repeatability built. These models are articulated as the coherent forms or patterns through which those techniques are consolidated, manifested and deployed. *Infrastructural pattern,* as I have articulated it, becomes the expression of a coherence that can be attributed to and repeated in scenes where other more recognised evidence is not available. It is through this frame that this expanded sensing and narrative capacity can be integrated with what was previously excluded into existing modalities of sensing and pattern recognition for an alternative testimony. In this field, traces can begin to appear as though mediated and experienced. As part of infrastructural patterns these traces can, furthermore, operate as the dynamic relationship and alignment between expectation, position and possibility are anticipated and interpreted through imaginaries and effects of coherence and verification. Such an active alignment makes it possible to affect its reality construction; that is, to adjust or rearrange how alignment is registered on how the imaginaries of coherence and verification are expressed or experienced.

This recomposing and mediation of the infrastructural layers that constitute a reality construction through such patterning underwrites the ability to make infrastructure and the meaning it embeds and embodies, transformable. Yet, the infrastructural artefact described above is only one part of the story. Reflecting the claims made by Forensic Architecture on the necessity to make a cultural and aesthetic shift in what counts as and is mobilised as a truth claim after the forensic turn, the other key aspect is the entry of these models into the public forum (Forensic Architecture 2014). This can, nonetheless, again be thought of in infrastructural terms. That is, institutional staging, framing, practices and affordances (including the curatorial) can be understood as part of, or functioning towards, the wider infrastructural reality construction generated by the group's work.

On this basis and where this pattern goes on to mediate an expanded understanding of the infrastructural world in which an event has taken place, these models are used as the basis for a speculative curatorial-infrastructural artefact which mediates and *patterns* the exhibitionary as a function of this claim. How FA integrates the exhibitionary and the institution of art into an expansion and socialisation of what can be brought into frames of evidence and truth-making that previously excluded them is achieved in part by how such an expansion is made public.

However, FA also build on the discontinuity and ruptures created in the disposition of what can count as evidence to create new possibilities for infrastructural meaning as a social and cultural artefact. By aligning this with the continuity of the imaginaries of coherence and juridical and public truth, this meaning can reproduce the closure of the imaginaries on which it works and relies in the assemblages that these infrastructural models generate and mediate. Yet, the role of the curatorial settings in which this work is made public can be seen as a key point of differentiation in how such assemblages are mediated. This staging has implications for the balance between discontinuity and continuity in the infrastructural meaning these models make possible. This is a central contention in the reposing of the curatorial as an infrastructural practice that threads through the thesis as a whole — and upon which subsequent sections, and indeed chapters, can be built.

In the following sections, pattern is used to both describe and analyse what is achieved by the intersection of curatorial and infrastructural mediation, specifically registering this achievement in the effect of alignment on the assemblage in which that pattern is realised, including the exhibition (Fuller and Weizman 2021, 7). Following this, the processes and artefacts which realise these effects can be used critically and speculatively. The second part of this chapter argues that more than just making pattern visible and creating new forms of attunement (Fuller and Weizman 2021, 12), the curatorial can be used to create effects in the infrastructural assemblages that embody that pattern, or in which they are embedded and practised. Though this presents a challenge to a familiar account and critical position of the curatorial (as a performative event that can stop short of the instrumentality or operationality of infrastructure outside the field), at stake in this chapter is how the curatorial can be reposed to introduce a critical stake, position and arrangement into infrastructural patterning. How this reposing is achieved centres on placing staging into the relationships that are held in the patterns or images that make a world knowable and mediate it. Thus, the curatorial can be articulated as a scene that can, in part, define the possibility built on infrastructural work, and into infrastructural disposition. Crucially for the model of infrastructure being established in this thesis, how these technical *and* aesthetic techniques are jointed both makes the fields and forums in which FA operate cohere as new sites of intervention, but also generates new forms of closure that offers a different concept of curatorial difference in the repetition and disposition of the evidentiary assemblages the FA group create.

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## 2. Counter Forensics: A case study in infrastructural pattern

At the heart of Forensic Architecture's work is a claim to re-connect the truth produced by the forensic turn to the public forum, to the acts of witnessing and testimony and to mediation. This work is two-fold. It is achieved firstly by claiming a wider field or commons from which to generate forensic 'truths' — an accident of the proliferation of sensing technologies and infrastructures combined with complex modelling techniques as well as artistic and architectural sensibilities, approaches and analyses of trace and composite forms, events and assemblages. Secondly, FA stage coherent accounts of events that are derived from this counter forensics into public forums, to both broaden an account of public truth and to expand what can count as a forensically-derived public truth.

While forensic models might present a powerful coherence in the composite truth claims of their investigations, as Weizman writes, these models can "never really overcome the complexities of the subject, the ambiguity of language, and the fragility of witness memory" (Weizman in Feldman, 2018, 18). To be *heard* in court they must nonetheless be mediated. The success of this intervention rests on both making a coherent account in the face of cross-examination, and on the risk of an acceptance of the novelty of its methodology and content (Weizman, 2019). This latter facet relies on institutional settings, practice and encounter to *socialise* this former approach and to weave that approach into a wider public forum and imaginary. And while FA utilise and stage their investigations in a number of public forums (including the juridical and legal field, journalism, civil society and political and activist groups) are key to both this study and to the capacity of the group to expand and materialise an aesthetics of the truth, is the development of their claims through the material and discursive affordances — as well as the staging and mediation of the institutions and infrastructures — of art as discussed as a limit in Chapter one. Within this framework, the curatorial becomes a key mediating venue and vehicle, offering a framing of the investigations as an artefact produced as a function of this mode of staging.

### Instrumentalizing the exhibition, infrastructural detectives

To be consistently *used* as a publicly agreed form of infrastructural knowledge, Forensic Architecture's investigations are also instituted into practice through publication and staging in

forums such as the exhibition (Christie 2018).[74] *Counter Investigations* was the first UK survey of their work to date; it comprised wall texts, timelines, videos and physical reconstructions relating to 11 selected investigations displayed in FA's signature case-report aesthetic format. A research agency, FA shape and engage various legal, informational and spatial infrastructures around the world. The exhibition architecture in *Counter Investigations* provided "the physical infrastructure" for a short course based on the five key concepts central to their work. Individual exhibits functioned as "anchors" for public events, discussions and this pedagogy.[75] For some, the directly functional content and the relationship between often-overwhelming information and simplistic exhibition forms is problematic insofar as this process openly instrumentalizes the ethical and sensory capacities of art (Walsh 2018; Pearce 2018; Feldman, 2018, 19). But for FA it is precisely this aesthetic engagement with these problems and the negotiation of forensics into that forum which creates a social contract between the various contributing actors and subsequent forms of mediation — what Weizman calls "socialization" — that opens forensics out to questions over its processes and composition (Weizman, 2019; FA, 2014).

For instance, "The Bombing of Rafah" case and *Counter Investigations* together demonstrate how FA negotiate the pattern and instability between opening a capacity for transformation and fixing the provisional terms of that possibility in place. Like other cases, its central video uses timelines, satellite images, maps and CGI models to narrate a blow-by-blow account of the siege. The video is accompanied by a large composite satellite image and a small architectural model of a key smoke plume (formats which recur throughout the exhibition[76]). As the three-channel video unfolds, the closed structure of this video narrative creates a temporal progression along which to string events. Three-dimensional urban models and satellite imagery serve as reference points for the day's events, with documents, testimony and remotely sourced footage made by bystanders or victims and social media images geo-located and fixed against the real and conceptual rhythm of a frame-by-frame timeline.[77] Contradicting official denials, animated lines sweep across various austere visual planes and diagrams to connect parallel yet related events and data and mark the trajectories of bombs into civilian

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[74] Elsewhere, this includes, use by Human Rights NGOs, by the press and investigative journalists and in various Truth and Reconciliation Commissions.

[75] See: https://forensic-architecture.org/programme/exhibitions/counter-investigations. Last accessed: 30-6-2022.

[76] See the floorplan of the café in "The Murder of Halit Yozgat" for instance (https://forensic-architecture.org/investigation/the-murder-of-halit-yozgat. Last accessed: 30-6-2022.).

[77] The implication is that events and environmental traces shown in more than one image, video or other source can be cross referenced and used to fix other traces into spatio-temporal grid or model and into a patchwork of coherence in the narrative of events.

populations. Joining disparate military and civilian actors to video segments, the process is both clarifying and complexifying.

The expressive diagrammatic mode of these videos is extrapolated in the staging of *Counter Investigations* as a whole. As a spatial experience, the relation between the apparently distinct mediating elements of the exhibition merges the physical models and sequences of video with viewers' own (mostly) linear experiences of time in the duration of a visit. Setting the rhythm and tone for the detective work unfolding in FA's broader practice, the movement between these videos, timelines, diagrams and physical and CGI 3D models supports and directs viewers in the infrastructural work of detecting, reading and unfolding the infrastructural coherence of information in its models of site, scene and incident so that reconstructed evidence is put back in its place. Yet, by introducing the possibility of new information — the difference that makes a difference (to paraphrase Bateson (1973)) — into the extant infrastructural patterns of social activity in specific forums, FA change how infrastructural agents approach one another; how a social world can and is to be *understood* through the relations and operations of legal, informational and spatial infrastructure and the role of that infrastructure in specifically public meaning-making. This is emphasised across the experience of the exhibition as a whole, and in particular, through its physical manifestation or props. Though closed, the sequences of videos, models or reports pattern this movement as a form of infrastructural work within, between and beyond these selected investigations so that viewers come to actively use the recognisable forms and figures of the exhibition as an infrastructure to institute and therefore socialise its investigations. This is in one sense, a rehearsal for where these forms can be used in and as a public — reflecting what Thrift (2004) describes as the creation of an anticipation of infrastructural coherence by putting forms into circulation and repeating them so that and until they become, in Berlant's words (2001), *genre*.

To activate the case-objects the viewers of *Counter Investigations* are, to varying degrees, figured, willingly or not, as infrastructural agents — or more precisely as users. That is, they are figures who activate rather than change these patterns and the meaning embedded in them as a kind on infrastructural detective or user; and who are therefore figured only in relation to this action and its parameters. As Feldman writes, as part of a forensic turn, this work intersects a history of witnessing in which case for representation, but also instigates an ethical necessity to address this limit as what must be nonetheless faced, accounted for, called out and avoided. However, the forensic turn also re-calibrates this limit and therefore how an ethics is developed through it. If for Feldman, the synthetic models produced by FA allow for forms of "fictive witnessing" — that can see what cannot be witnessed (and thus recounted as testimony) of an event (2018) as part of an infrastructural turn (as described here) — this witnessing is further

reconfigured and re-calibrated to the repetition and practicing of patterns staged by the investigatory and mediating infrastructures that are enacted by FA. This figuring of those using its investigative infrastructures (including those moving through the exhibition) as remote or fictive but real witnesses is precisely the result of the cura-infrastructural artefact at stake here. This articulation shifts the ethical and aesthetic problem around the mobilising and ventilation of the patterns registered and intervened with by FA and the problem of witnessing and representing an event becomes — as in the problem of negotiating the alignments between stakeholders discussed by Rosamond (2016) in Chapter one — a relational and embodied problem of being embedded and having a stake in these alignments.

For the stakeholders of the original investigations,[78] how these broader parameters are socialised in the structure-system of exhibition as a meaning-making event determines how it is possible for different, but connected, users to move *within*, conceive of and therefore approach one another in the wider infrastructural parameters the investigation works to build or dispute its public. (And thus, what truths are possible and legible within it.) Constructed into the informational and mappable infrastructural relations patterning this work as the pedagogic mode of the exhibition.[79] These users must, however, both accept the closure of the social-technical jointing of the 3D models, data and composite testimonies in the coherent narrative and reports of its investigations *and* repeat this information as an opening within and between the socio-political, spatial and active parameters of the exhibition, the broader public sphere it stages, and the fields about which its claims are established. Relating and organising users between differing patterns makes the whole supporting structure *work*. This sets the ground for what is staged in *Counter Investigations* and how it is staged, these platforms also become a curatorial problem.

### Public composition, staging and collective mediation

In the section above, I argued that as an infrastructural artefact the reports of Forensic Architecture enact/enable a reality construction that is composed and staged through multiple parts and tensions. This creates the conditions for open-source/excluded traces, data and testimony to be treated as coherent and verifiable where they might have been deemed illegible, fragmentary, extraneous and, thus, inadmissible (in juridical or more general public for a). Yet as Forensic Architecture themselves argue, this structural and operational capacity only

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[78] Including the affected communities, investigators, commissioners, journalists/civil society, academics, the host university and ERC OpenAIRE Portal users (open access platform for all EU-funded research).
[79] This is highlighted by the description of the exhibition as a leaning infrastructure, a pedagogy which can also be seen to indirectly shape all of its visitors

becomes meaningful, gaining force or value, through its institutionalisation and use. That is, in the terms discussed here, by becoming capable of being embedded and embodied in and as infrastructural meaning (i.e., being instituted as infrastructure) — something which is extended and experienced across transition and mediation in different scenes to those of the event (such as the institutions of law, art, civil society); the forum; the public realm.

The next section draws attention to the specific institutional practices, objects and capacities that are realised in the field of art and curating and which contribute to this instituting, or "socialisation" as Weizman calls it (2019). That is, how the composition of active forms brought into repetition as a disposition by curatorial staging is mediated by the affordances of the art field (indicated in Chapter one). Rather than deviating from the infrastructural, the point explored here is that these practices, objects and capacities or affordances of art, curating and institutions, become venues, vehicles or components of infrastructural reality construction. That is, where pattern is posed as a practice that might hold together different kinds of infrastructural meaning, the disposition of active form is perhaps better understood as a condition of what Adriana Campos Johnson calls the *social material assemblage* (2018) and the dynamic of interaction between the parts, relationships, actors and forces within it. That is, the structures in which the things, relations between things, forces and values that are held together as infrastructure converge as socially-understood processes (Anand, 2015, in Johnson, 2018, 73) and how they are enacted together through, because of, and to sustain the infrastructural ground or ensemble within which they enact meaning.

Through a combination of infrastructural work where the gallery is developed as one platform through which to perform a process of "intense radicalisation of seeing and studying material reality" (Weizman in von Bismark et. al., 2012, 86), FA's practice can be seen as a patterning of the interoperating infrastructures of public truth working on them as social-material assemblages. Part of this intervention rests on curatorial artefacts acting as information that shifts and reshapes asymmetries in the socio-political and socio-technical relations and parameters set by the infrastructures of the investigations and through their staging or exhibition. Here the operative concepts in FA's work are embedded in repeating and interoperating forms that exploit the existing formal, aesthetic and political capacities of those forums as infrastructural elements (Weizman in von Bismark et. al., 2012, 86–88). This alternative framing means a different role and status for art to one that individualises particular objects and actors of infrastructural critique.

This difference is construed firstly in the construction of disparately and performatively associated infrastructural users whose relational agency is constituted by the ethical terms and

rhythms of infrastructural work that connects its curatorial and legal guises (Berlant, 2016; Bratton, 2015, 252). With shared but different stakes these users are indexable by their particular movement through these infrastructures. Secondly, this difference is the ways in which the narratives and textures of art's critical spaces and speculative objects define the parameters of transition through material and oral testimony and infrastructural fields for infrastructural agents. Akin to what Andrea Phillips has described as a prop-object — a circulating object that carries within it information that is subordinate to, but not incapable of, altering that circulation (Phillips, 2008) art objects are treated as active configurations that introduce information to redistribute infrastructural meaning and reconfigure its functions. In this context these circulation and relationships are developed as a systemic and ecological proposition enmeshed between materialities, traces and infrastructure (see: Schuppli 2020, 9).[80] Enacting and encapsulating this work in public creates openings between patterns of internal and external interoperation that are more often kept closed and predetermined.[81] It makes infrastructural realisation, repetition and content-relations changeable.

**Making pattern public**

The forensic turn both represents and enables new cultural sensibilities and understandings (in Robinson 2019, 2-3). It also establishes a ground for meaning-making that is specifically infrastructural. That infrastructure enables a coherence of parts through the repetition of the forms and practice which hold it together and make it reliable, is key. This is both in terms of how this repetition constructs layers in the model, and how these layers intersect and interoperate with known, already existing and trusted infrastructures.

The multi-layered and multi-dimensional reality constructions that FA build around a case (described above) turn on the specific and different effects of the various elements that constitute it; but also, how the parts (art/models) come together as practices of patterning and practices of socialisation in the field of art and its institutional capacities and practices — especially by the curatorial. Yet at its core this work sets about recovering, reconfiguring and reworking the information and relationships that were already there: be those traces of an event, or information sharing, modelling or simulation tools (Fuller and Weizman 2021, 5; 16–

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[80] For Phillips this described the action of a self-contained contemporary art work in the market (Phillips 2008). By suggesting that such an art prop-object might participate in the creation of multiple, alternative forms and structure-systems of circulation as well as its content, the work of FA can also be used to break from the need of unitary concepts of the art field, contemporary art etc., by showing in other words, how alternative infrastructural bases are produced.

[81] Often precisely to exclude politics. See Rossiter, 2017.

17). As such, and despite curatorial claims made for the role of FA's work in the expansion of the sensible, witnessable or political (Feldman 2018), the repetition and practical and aesthetic closure and recursivity that comes with the reports of FA — and which an infrastructural lens shows, is constituent to the possibility of those claims — are seen as instrumentalizing and aesthetically reductive.

The group have been criticised for this often dryly-technical exhibition-making. Judged as failing to "harness the exhibition as a sensory experience" (Pearce, 2018), the installation of their reports in *Counter Investigations* has been instead described as a "barrage of facts" (Walsh 2018) that leave little room to "develop much bigger pictures of what is 'really' happening" between state, public and 'truth' (Charlesworth 2018). Conversely, critics of Forensic Architecture often try to use the fact that they exhibit in art institutions against them (such as when a German politician attempted to frame the work as only art, not evidence).[82] As Forensic Architecture argue, however, the disciplinary limits implied by these discussions are both misleading and potentially productively dispelled (Weizman and De Wachter 2018). By calling upon the codes and practices of those various spaces, in which the art gallery becomes "just another channel of dissemination" (Charlesworth 2018) (albeit a strategic one), this form of instrumentalised presentation becomes key to making claims on "the evidentiary value of art" as part of wider questions of knowledge and power (Weizman in Khong 2018), but also inherits other aesthetic, political and epistemic effects, forms and power relations.

What is the effect of instituting this new cultural sensibility as infrastructure? As Maria Walsh writes in her review of *Counter Investigations* for *Art Monthly*, through their exhibitions, "a viewer can read the documents and letters, as well as view relevant news footage and other material at a pace that conveys a sense of the drama […] but also gives the viewer some autonomy in their attempt to absorb the intricacies of the case, which is important if this cultural forum is to be of value" (Walsh 2018). Is this form of exhibition-cum-evidence bound to enclose that autonomy in the repetition of the (infrastructural) meaning it poses and relies on? Is this an important metric when considering the infrastructural patterning it can be seen to produce? As a close reading of FA's work has shown these investigative infrastructures also offer a case study in what — by passing through or by being instituted in a wider public field that includes the field of art — allows the composition and mediation of infrastructural forms of patterning that can act on the juridical field. The field of art is not incidental and it has shown itself as a space which allows aesthetic and material experimentation and the sedimentation of this by re-

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[82] See: https://content.forensic-architecture.org/wp-content/uploads/2018/09/FAs-response.pdf Last accessed: 30-6-2022.

mediating, socialising and teaching that infrastructural patterning can, in the words of Haraway, redistribute narratives (Haraway 1986, 85) specifically and in general. Moreover, it is the specific compositional and mediating capacities and affordances of the curatorial to compose, generate and mediate practices towards this aesthetic adjustment, attunement and redistribution that are at stake, and which are deployed in both the claims made by FA and which I have posited here as central to the composition and mediation of infrastructural form.

Yet there is also a fine line to be trodden between expanding and opening up and instrumentalizing what can be seen here as infrastructurally-determined images. Where the meaning and infrastructural form and practice converge, it is possible to argue for a different view of these claims. As in the creation of position and provision in Chapter one, the creation of the patterning of coherence and verification can be seen as an *achievement* of repetition. The shaping and mediation of reality by how it patterns the social is achieved through the performative repetition that Thrift argues is necessary to constituting infrastructural meaning in predictable form, and which manifests the expectation and reliance that infrastructure will show up as anticipated (2004). That is, pattern is an achievement that gives form and practice to the meaning embedded in infrastructure: as producing recognition, familiarity, rhythm, distribution and so on. Specifically, this pattern conveys coherence and verifiability in order that this meaning can be relied on to provide a consistent account or narrative of an event. Thus, the exhibition (and the press) becomes key to training this expectation. An exploration of truth which is at once novel and transformative and relies on the recursive and repetitious closure of forensic methods and epistemologies given infrastructural form and status.

In the following section, the composition of infrastructural models and modes of curatorial staging is consolidated through the production of pattern as an artefact that is developed through the aesthetic-material possibilities of art and the compositional-mediating practices and forms of curating. This means that re-posing the curatorial at the convergence of practice, meaning and materialisation to compose and mediate worlds is not only a discursive shift, as in Chapter one. Rather, it also corresponds to how objects, practices, figures and meaning can, along with the concrete as well as the abstract institutions which hold them, be articulated as part of, and as, qualities of an active form and infrastructural disposition. However, while the critical and procedural approaches in art and by the commons articulate the pitfalls of this treading this line, they also circumvent, rather than address the embedded, embodiment and repetition of certain, necessarily limited infrastructural meaning. Can this critical attitude to the repetition and recursion of infrastructural closure and its ability to articulate and make new claims to a sensory, informational and investigatory commons possible be expanded and used beyond the specific language and setting of forensics? Can the expansion of effect of

informational expansion be brought to bear on the construction and mediation of these models in the curatorial field as well? These questions are key to understanding infrastructural meaning less as a closure and instrumentalization, and as a critical practical approach to meaning making that exceeds the institutional.

While FA make a critical claim on the architectures and artefacts of public truth by entering novel forms into both legal and aesthetic forums, by reading the claims made by FA as infrastructure it is possible to indicate the terms by which they institute certain forms of (infrastructural) meaning not only by opening up a "commons", but also through specific kinds of closure of infrastructural repetition. Can these two threads be productively intersected? Instead of asking how infrastructure encloses meaning, viewing through pattern as achievement requires new questions:

- What does pattern, as an outcome in the reality constructed by infrastructure, do to the practical, discursive and critical application of art and curatorial artefacts in relation to infrastructural meaning?
- How do these different approaches and how these are deployed in the curatorial, institute infrastructural meaning such as pattern differently?

These questions are key to moving from the simply indicating that patterning (including the recursivity, materialisation and practicing of infrastructural meaning) is possible and can be deliberate in the field of art, to positing forms of self-infrastructuring taken up in the next chapter. The second part of this chapter clarifies how a focus on the effect of and on the disposition of an infrastructural pattern in context offers the possibility of a qualitative rather than simply quantitative assessment of the difference engaging infrastructure can make.

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## 3. Pattern as an active form

Many critical accounts of infrastructure seek to make its form and determination visible in order that spontaneous social forms might emerge. These seek to build on, 'hack' or hijack existing infrastructural form and its repetition or recursive closure of embodied and embedded form. These approaches can be seen, however, to paradoxically close down the possibility of new infrastructural formation. That is, by viewing infrastructure as only instrumentalizing or

restricting the openness of socially-produced meaning (encapsulating it in repetition or verifiable and therefore constrainable coherence), such perspectives reject the possibility of new formations occurring *within* and *through* the constraints of infrastructure. This can limit the possibility of sustainability for any emergent form that is provided by infrastructure (Vishmidt 2017, 268). Following the work of Berlant (2016) and seeing infrastructural meaning as an achievement of this emergence, the following sections set out the terms for differentiating the effects of the double sense of infrastructural form as discussed by Larkin (2018), as poiesis and aisthesis, and how this translates into a practice that performatively generates and changes infrastructural images and the realities possible therein.

A further close reading of the practice of FA as a mixture of infrastructural and curatorial artefacts can be used to explore the effects of the achievement of pattern through the discursive claims of both FA and the curatorial field. But where these might stop short of a critical claim on the form and repetition that makes infrastructure, it is also necessary to establish and frame an infrastructural analysis of this convergence. This section develops such tools conceptually and thematically. This concerns how these artefacts create different effects in FA and the curatorial as a discourse and scene, but also how they intersect to produce difference as well as problems across that relationship and interconnection by operating as active forms in these relationships. This analytical framing is key to understanding *why* one should make a claim for instituting infrastructural form as an intervention into and through the curatorial at all.

Positioned in the institutions (or forums) of art and *patterned* as an artefact of the curatorial, the work of Forensic Architecture can be used to mobilise models of visibility that connect what Marina Vishmidt describes as art's Enlightenment legacy of exposure and its Kantian preoccupation with defining how and what can be critiqued as art (Vishmidt, 2017b, 219; 2017a, 267), with those developed in infrastructure studies (see introduction) to highlight structural and material conditions though interruptions and breaks. Here, contemporary curatorial institutional framing (and critique) promises to provide that interruption, also using this break by being a *cut* in the repetitions embedded in and as a result of infrastructure through which history can be both seen (Vishmidt 2017a, 265) and re-entered. This interruption is also where ethical questions can be posed about who and what has agency in these models. This approach, which can only view infrastructure as a descriptive rather than a productive or active form, limits any critical change or accounting of patterning (such as by FA) to a break or visibility that also cannot affect those conditions.

As the preceding argument anticipates, however, a reading of the work and forms of public-making involving FA as a kind of patterning opens up to what Easterling calls active form. Easterling's approach is based on a key shift: from reading architecture and urban space as enacting a set of typologies, to reading it as enacting a series of active forms whose disposition tends towards wider meso-dimensional effects. For Easterling individual instances such as Free Trade Zones contribute towards a larger systemic effect, such as neoliberal globalisation, in part by emptying out form of specific object or image qualities, and instead focusing form towards enabling *dynamics* such as transition, operation, activation. Here architectural entities (buildings, urban plans, spatial arrangements, fences, etc.,) are primarily designed to operate as part of a wider economic infrastructure. This makes an area of a city correspond to the systemic needs or operations of the global economy through fences, ports and specially-demarcated warehousing or the suspension of local labour rights and laws; doing this above and over local needs and conditions, for example (Easterling 2016, 25–70).

It is the disposition of these elements that, for Easterling, in place of typology create a systemic-infrastructural rather than simply formal architectural language (and allows for a qualitative reading of this.) Where disposition can be shown to have qualities, it can be used to describe differences and interfaces with and in the art field. This differentiation includes how FA's claim can be distinguished from other forms of measure, objectification, description. This helps to describe the claim made by FA in their work (see also Fuller and Weizman 2021) as a performative practicing of infrastructural imaginary and knowledge. It suggests that the models and their staging are an activation of a truth claim as a ground for mediation and for socialisation of an expanded sensory filed and participation in a narrative. As well as this, active form and disposition become the tools to re-make a ground for truth claims.

If the genesis of the approach established by FA can be seen to be rooted in the production of architectural models or objects, with the attendant arguments about the relevancy of such models and objects to the categorical horizons of particular authorizing institutions acting as a brake on their discursive relevance, I want to echo a shift made by Easterling: from a typology of objects, to a disposition of infrastructural dispositions that are generated in this intersection of practice and form (2016). In this sense, patterning is experienced as an effect of transition (an active form)) as an effect, artefact and mediator, that shapes "the character or propensity of an organization that results from all of its activity" (Easterling 2016, 21) and which is expressed into the ever-changing "medium" of interlocking and interleaving infrastructures that Easterling describes elsewhere (2017). In FA's case this is a material-social as well as conceptual effect — articulated, in part, through the exhibition.

**Social material assemblage**

For FA to make a field work for an investigation is to generate active forms that give an investigation and its scene of inquiry a new disposition or reveal its existing one. Yet, for Easterling the value of active form is that it acts systemically, within that medium of interlocking and interleaving infrastructures; this makes these systemic effects on that medium both designable, but only ever partial (Easterling 2017). This is the precarity of pattern, its lack of solidity until realised. Something connected happens in the exhibition and other public forums, where the combined disposition of the investigation and event are used to pattern an experience of the exhibition. This activation of a broader sensory disposition and coherence is also used to train and socialise this model beyond the scope of that exhibition — into and as a public image. This is an attempt to change the disposition of the narrative of particular event as well as the imagined public truth that this narrative threads through.

While the disposition of active form can be used to consolidate the effect and form of pattern — coherence as the disposition of a pattern used to verify a truth claim, narrative or trace — a second analytical problem arises when thinking about how to measure or account for this effect. That is, if a disposition is only realised when the potential of that active form is activated, the question is: how does this activation happen? And how are its qualities transposed to the disposition(s) of its outcome? As Chapter one argued, infrastructural meaning is manifest and held together through a circular relationship between performative practices of repetition and forms realised in repetition, that are consolidated in distributed, uneven and situated reality constructions. Active form offers a useful framing of pattern as an infrastructural form realised and having a readable, differential effect, or affect, in and on the world it creates. This can also have effect in the field of art — enacting a disposition as outcome on the *medium* in which dispositions emerge (Easterling, 2017).

Following Thrift (2004) and as argued in Chapter one, to enact active form requires the ability to generate an apparatus for a knowledge or practice so that a particular kind of form (or doing) circulates and to enforce the conditions under which that practice must be performatively achieved to access or be addressed by a dominant social form or genre, thus becoming anticipated and expected as a norm (Berlant 2001). Infrastructural disposition can be seen as the expression of this 'genre' and forms which circulate to enable it. An infrastructural disposition can, then, in an uncritical sense be activated through the power to determine these relations as constitutive of an infrastructural world. As Rogan has argued (2021), the concept of medium design, which Easterling uses to propose a practice of infrastructural design or intervention in this framework, can simply flatten how infrastructure is used to express power

through the activation of disposition. Simply designing effects into infrastructure can, in an uncritical sense, only repeat existing power to activate an infrastructural form. Interestingly, on a surface level, this relationship can be used to describe both those forms which FA critique and seek to counter and the alignments FA themselves construct. From a contextual, ecological perspective, however, this effect can be read more expansively and in relation to the particular dynamics and relations that assert power through an infrastructural alignment.

As Johnson has made clear through her reading of Lauren Berlant's work, infrastructure is a much more fragmented and much more loosely hung together than the imagined systems of control often depicting it would imply (Johnson 2018, 73). Infrastructure as Berlant describes is more provisional: "What we commonly call 'structure' is not what we usually call it, an intractable principle of continuity across time and space, but is really a convergence of force and value in patterns of movement that's only solid when seen from a distance" (Berlant 2016, 349). Since we can only imagine infrastructure as solid at a level of remove from its specific use or effects, however, our actual interface with the forces, values and objects that compose infrastructure becomes much more complex: perhaps better thought of as a socially-created and situated process. The creation of what can be called an active form is not simply the imposition of a physical object. It also constitutes the embedding of principles of organisation that define how infrastructure is configured and held together from material and discursive conditions into social-material assemblages which must be maintained in use.

In this sense, infrastructural pattern is not solid or stable. Nor is the infrastructure that manifests it. Pattern is simply a relation "between unity and multiplicity" (Stenner 2012, 136). It suggests a "multiplicity of elements gathered into the unity of a particular arrangement" (Ibid.). Pattern is a lens that can arrange a noisy scene into a readable one. As an achievement, pattern is not, therefore, just an *outcome* of systemic infrastructural form. It is also the result of meaningful, systemic and recursive effects and actions on the mediation and experience of the reality construction achieved in the repetition and weaving, of a particular pattern — where that pattern offers a kind of coherence or recognition in the context of uncertain, new or simply complex contexts, experiences, events.

As infrastructural compositions, the disposition of pattern takes on dynamically and contextually textural qualities that can be used to differentiate the effect of different compositions or alignments of what and how that pattern effect or mediation takes place. The social material assemblage can, then, be seen as a venue and vehicle for alignments that effect pattern. For Johnson, writing on the integrating of film as an infrastructure of visibility into Latin American social movements, the social-material assemblage through which that visibility is achieved offers, drawing on the work of Berlant on how a structure is held together, a frame in which that visibility establishes a thicker or thinner visuality. That is, a quality to that assemblage in which visibility is established in more or less connections within and for a social movement. The arrangement of that assemblage determines the quality and its capacity to convey different kinds of meaning. Hence, qualities allow disposition to be read as having, mediating and differentiating meaning. To return to FA, this can be understood as framing how pattern is achieved, the depth or complexity. In both its composition and how it then goes on to mediate the world it narrates and stages. This can be used to analyse the differences in that achievement of pattern. Moving past claims for or against instrumentalization, the effect of active form on the assemblage it emerges from offers a frame for how infrastructural patterning can be negotiated and can produce productive alignments.

As such, Johnson argues, infrastructure must be thought of as a process: actively performed as social-material assemblages. To form the particular connective structures reflected in the discursive model of infrastructure proposed by Larkin (2018), social-material assemblages stabilize the particular conditions of infrastructures as they are used and interoperate with other systems and structures. While Easterling uses active form as an expository and analytic model for the built effect or outcome of infrastructural disposition, I want to extent the analytical scope of this dispositional approach to read the disposition of pattern as active form of and in the multi-dimensional and layer assemblages gathered by reality construction. To read and differentiate where disposition in the mediating assemblages these patterns enact, to shape the flow of information and meaning in it through practical and formal dynamics interleaved into reality construction. This will register the systemic effect models of meaning, mediation and intervention have on their context — beyond a specific built or manifest instance — and on the accounts or narratives of events as they are re-assembled into the contextual fields through infrastructural work. This is key to showing that pattern is not only possible, but can be differentiated and articulated critically through the field of art and curatorial practice.

Thus, pattern can be teased apart, glitches installed and threaded, layered or interleaved into other patterns, rhythms and practices of recognition. A key question that can, therefore, be asked of pattern turns on how to read the consolidated effect of a pattern as an active form of

coherence on the context in, and from which, a pattern in that context is composed when its parts, practices and forms of mediation, socialisation and come together in this way. As Chapter one saw, how to read this consolidated effect is not well developed in art field. But it is also recognized here as a constitutively different formation of knowledge or meaning. In this next section I argue that active form — a way of reading forms in and as the movement, circulation, activation that constitutes part of their realisation, meaning and effect — is also a way of staging alignment in / through art/curatorial field so that meaning is made. Pattern as active form can be used as a frame for an analysis of the quality and effect of pattern as an achievement on its context. And how pattern might be speculatively extended as a kind of critically active forming to make a specific effect in this these fields

In these final sections I will propose that, despite previously discussed limitations, and if posed as one infrastructural disposition among others, the curatorial offers a particular speculative and critical capacity so that productive and potentially transformative / transitional tensions created by relational complexity in the social-material assemblages instituted through active form can be established. To unfold this claim, and the speculative potential located in how the relational stakes of infrastructural form are held in a potentially transformative tension, I will turn to a second exhibition by FA at ICA, this time in collaboration with the Tottenham Rights group, *War Inna Babylon* (2021).

In the framing of infrastructural pattern, this exhibition turns on the socio-material temporality of the 'split second', a descriptive fragment of time that abridges human perception and used by the officers involved in Mark Duggan's killing to explain their actions. This temporal imaginary is also used by Weizman in his talk with community activist (Tottenham Rights) and co-curator of *War Inna Babylon* at the ICA Stafford Scott (of which the talk was a part) (2021), to articulate the purpose of the work done at a practical and curatorial-discursive level in "The Killing of Mark Duggan" case (FA, 2020). At the practical level, the work done by the case-report and modelling seeks to open out inconsistencies in witness statements of the officers involved about the movements and supposed threat posed by Duggan, particular those claims of the officers to have acted in a split second.

### Expanding the split second

As Weizman describes, the split second is also used as a justification in many of the accounts for the use of lethal force. At the discursive level, collapsed into the split second in this case is a wider assumption based on a history and racialised cultural narrative about the threat posed

by people of colour in a (post) colonial state. An imaginary also seen in colonial contexts it is for Weizmann a statement that articulates the colonial or post-colonial subject as a threat; it belies an assumption of a knowingly suppressed or racialised people as inherently violent always about to erupt (FA 2021, 7). State violence is applied in this context with little evidence through the anticipatory justification of "forestall[ing] their possible future violence" (FA 2021, 7). The split second is, therefore, used is a socially performative device that sees, anticipates and seeks to minimise black and brown *bodies* as non-human, as threat to the subject, to the white state. The rationale being that the state cannot wait or risk uncontrolled violence it *assumes* or imputes will come.

The use of the split second as a defence in the Mark Duggan case, articulates a culturally-coded, performative anticipation of threat. It constitutes a *patterning* of Duggan into a normative infrastructural narrative or setting of the state, about what can be expected, about what is the ground on which humanity and in-humanity is divided (which, in this case is of who or what is a threat to the persistence of the world, institutions and public sphere, policing as an infrastructure maintains).[83] The split second can in this sense be understood as active narrative event and form that is used by each officer to cover over what they could not know, but to also *cover over* the dehumanisation of Duggan implied by the expectation of danger embodied in his presence. This temporal image and act also, therefore, collapses histories of oppression and normalisation of de-humanisation (exacerbated by being infrastructural: a bridge coving over the precarity it creates) into a fleeting moment of decision; it is in this sense akin to a state of exception (where law is suspended, and a different infrastructural imaginary can enter).

But this temporal narrative, this descriptive patterning, can also be expanded through infrastructuring more-than-human sensing and pattern forms enacted by FA. This is a temporal and spatial expansion of the social material assemblage (or field in FA's terms) in which it exists, is accounted for and is mediated. The modelling of each scenario described by different officers on the same infrastructural substrates by FA shows that the 'split second' decision was in fact much less certain than first thought. Indeed, alongside sowing doubt as to the threat Duggan was supposed to have posed (as per the case model described earlier), FA also examine the possibility of the gun being thrown (as claimed), or whether it could've been placed there by one of the officers to corroborate that account. Where a spatial and temporal expansion of what escapes the cognitive and sensory capacity of the officers shows that testimony based around the idea of the split second does not match up in each account (at the

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[83] This narrative is indivisible from the colonial roots and practices of policing, particularly in this case of the policing of Northern Ireland (Weizman 2018, 306; Fuller and Weizman 2021, 13).

practical level of the model), it is cultural, historical and an assumed meaning or imaginary that makes up the gap. Similarly, the confusion of a decision in that split second is used by police officers and the state to cover over the question of the gun. That gap is, then, made up in the event itself, in the narrative posed afterwards and where the jury is asked to put themselves in the officers' position.

In this way the split second becomes an infrastructural pattern, a reality constructed in the juridical, legal and cultural social material assemblage built around the Police; it is naturalised, normalised and relied upon precisely by operating and being kept outside the threshold of human perception, but which leaves traces as it interoperates with other infrastructures. (Opening out to these dimensions is another of the implications of the forensic turn). This includes where cultural norms, racialised narratives and assumptions and juridical precedents are built on this ground 'truth' as though it is the solid, *aisthetic* ground on which other things can be built, known and expected. (For example, police officer testimony as evidential, or the colloquial understand on the difficulty of a split second.) The point here is that this is, in Larkin's words, simply a repetition of an infrastructural poiesis. The key to understanding the challenge that can made to the split second as an infrastructural artefact is, therefore, to be able to access and address the infrastructural work involved in the poiesis of that assemblage, and to be able to sense and visualise the full (or at least wider) range of outcomes of such expanded infrastructural patternings, be they material, cultural, social, informational, spatial, formal, relational and so on.

### Changing the pattern

By positioning and situating the split-second, as a means of shedding doubt on the police account — in the hope that the IOPC would re-open their investigation — FA show that the split second is also both a colloquialism for the threshold of perceptibility and a racialised image that is intrinsically subjectively and culturally-formed, not the objectively infinitesimal unit of time it seeks to imply and convey. While Weizman's noting of the use of cinematic language in these accounts (close up, etc.,) in order that the split-second might be seen as a freeze-frame among many others that can be spooled back and forth (Weizman and Scott 2021; Forensic Architecture 2021), might in a practical sense be limited, this critical media lens on the split second is nonetheless instructive. As a critical spatial-media artefact and curatorial artefact, FA, conversely, use the split second to carry both these meanings and intersect them.

By shifting the perspective to the infrastructural dimensions of this scene — the combined human-sensible and sub-sensible temporalities — this pattern can be brought to the surface and into public and its disposition changed. What I want to draw attention to, therefore, is how community organiser and co-curator of *War Inna Babylon* Stafford Scott articulates the intersecting and interoperating role of this modelling as part of, and as operating alongside, a broader cultural and political history and activist work, represented in the exhibition *War Inna Babylon: The Community's Struggle for Truths and Rights* (2021).[84]

As Scott explains, the FA report was an important tool, both in the case (described above) and in the exhibition. In the first instance, however, the role of the exhibition is framed by the use of work by Forensic Architecture in the Duggan Family's civil case against the Metropolitan Police. This represents, for Scott, a shift in tactic for the Tottenham Rights group, including those specifically affected by police killings they represent. Echoing the Granby Four Streets, this moved from community organising and action committees built around raising visibility, demands for action and establishing collective self-defence, to incorporating the capacities of "comrades" FA in their legal fight — especially where Tottenham Rights' own legal capacities is limited (Scott, 2021). FA are seen by Tottenham Rights as a kind of tool in the fight for truth and accountability. The capacities brought by FA operates on two entangled threads: the police monopoly on violence and accounting for the events (including the IPCC, now IOPC); and the juridical process and inquest around the killing of mark Duggan. How FA were used as a tool to open up the narratives compounded into the split second in these two threads is key to the reading and articulating the role of the exhibition as a public forum and dimension of the groups' work together. They offered a re-alignment and re-tensioning of the relations between testimony, place, evidence and narrative which could lead to a shift in the kinds of truth claim possible.

In complex cases, such as those involving the police, an inquest can include a narrative conclusion as to how and why the death occurred.[85] The scope of the Duggan inquest was to arrive at narrative conclusion: not to decide fact, but to determine the narrative of events leading up to his death. This was reflected in questionnaire put to jury after evidence had been

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[84] The exhibition is one outcome of the relationship established between FA, the ICA and the Tottenham Rights group initiated as part of the 2018 exhibition at the ICA, *Counter Investigations*. See: https://news.artnet.com/art-world/forensic-architecture-mark-duggan-ica-london-1886013 Last accessed: 30-6-2022; press release, 2018
[85] See: section 2, https://www.judiciary.uk/wp-content/uploads/2013/09/guidance-no-17-conclusions.pdf Last accessed: 30-6-2022.;

given.[86] This narrative is also where a fundamental contradiction crept in, repeating the assumptions of the police officer V53 that Duggan presented a threat. Despite a 9 to 1 majority expressing serious doubt that Duggan had a gun when he was shot, the jury said that they nonetheless "accepted that 'at the moment' that V53 fired, he had [or may have] an 'honest belief' that Duggan held a gun" (FA 2021, 5,7). Neither Duggan's DNA nor fingerprints were found on the gun (FA 2021, 3).[87] The assumptions possible in this narrative account of the events leading up to and causing Duggan's death — did the officer believe a threat was presented — coupled with an empathy for the police assertion of self-defence, in the sensory uncertainty of the split-second judgment in which that decision took place, meant the jury could nonetheless decide the killing was lawful. A decision made on the basis of this assumption and as opposed to the evidence.[88] It was this narrative which was propagated by the media in this case and in the resulting UK-wide riots and uprisings. Despite an unexpectedly revealing "Schedule 5" report by Justice Cutler, the inquest judge, which raised eight 'concerns' about procedural failings in the operation that lead to Mark Duggan's killing,[89] these rulings would represent, as Scott described, another brick in the *wall of inevitability* of police violence going unpunished (2021).

In large part, the investigation by FA was use to challenge the police accounts given as evidence to the IPCC and inquest, and around which much of the narrative about the killing was focused. A similarly important factor to bringing this intervention into forms through which the legal route took place here, is the question of what is achieved by bringing this model into a number of public forums such as the exhibition — and how, as is claimed here, doing this as infrastructural patterning might offer a wider understanding of the possible effect of that patterning at the intersection of infrastructure and curatorial theory and practice. Echoing and multiplying judge's concerns about events in the lead up, and that had been collapsed into "lawful killing", the legal tool used by the Duggan family, is also used as a mode

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[86] See: paragraph 40, https://www.judiciary.uk/wp-content/uploads/2013/09/guidance-no-17-conclusions.pdf. Last accessed: 30-6-2022.; paragraph 2, https://www.judiciary.uk/wp-content/uploads/2015/12/r-duggan-v-hm-assistant-deputy-coroner-for-the-northern-district-of-greater-london-2014-ewhc-3343-admin.pdf. Last accessed: 30-6-2022.
[87] Whether the jury believed that he had the gun was one of the narrative verdict questions structuring the inquest conclusions, see question 5, p39–40, https://www.judiciary.uk/wp-content/uploads/2014/06/Duggan-2014-0182.pdf. Last accessed: 30-6-2022.
[88] Despite the family seeking to challenge the positive assertion of lawfulness based on this contradiction in the High Court, it was nonetheless found that procedure had been followed and the description of self-defence used in the inquest had precedent and that the officer's belief was enough in this case. See: paragraphs 27–28, 84, 86, https://www.judiciary.uk/wp-content/uploads/2015/12/r-duggan-v-hm-assistant-deputy-coroner-for-the-northern-district-of-greater-london-2014-ewhc-3343-admin.pdf. Last accessed: 30-6-2022.; and: paragraphs
[89] https://forensic-architecture.org/investigation/the-killing-of-mark-duggan. Last accessed: 30-6-2022.; https://www.judiciary.uk/wp-content/uploads/2014/06/Duggan-2014-0182.pdf. Last accessed: 30-6-2022.

of publicing by Tottenham Rights to rearticulate this case in an explicitly public forum and with explicitly different images and narratives to those used both by the police, inquest and by the model prepared by FA. In this setting, the making public of this process through the multi-disciplinary and platform approach of FA be seen as an attempt to break down what Scott called the wall of inevitability (2021), a conceptual, yet applied to policing and the courts an, *entirely consequential* edifice built in public through the exhausting and ultimately frustrated journey for the truth as it was met by systemic cover ups and failings. Drawing on the work of Thrift and Easterling, it is possible to suggest that by changing the disposition of epistemic composition of this event through the wider assemblage of the investigation and it staging as part of the *War Inna Babylon* exhibition. This alternative narrative offered a drag on the performative enactment of a social or public setting of 'the truth' previously narrated most forcefully by the police.

### Tensioning temporalities and testimony: *War Inna Babylon*

As Scott described (2021), the exhibition is where the FA report and models used as a tool, the incident itself and the subsequent riots or uprisings were set in a historical and cultural context. *War Inna Babylon* used the 'symbolic location' of Tottenham to describe the dynamics of state violence, institutional racism and resistance that led up to the UK-wide 2011 riots that took place after the killing of Mark Duggan, a history often excluded from media and academic accounts. Curated by community group Tottenham Rights, Kamara Scott and Rianna Jade Parker, the exhibition comprised artworks, archive material, documentary photography and film, audio testimony and the 3D modelling and report by Forensic Architecture.[90] It was arranged in three parts: A history of Babylon — the forms of state violence that hold up the 'promise' of the state — and a history of lives and communities that resist more often held in stories, music and collective actions than in official histories (Scott 2021); Stories and testimonies of lives wrecked through a memorial to those killed at the hands of the police (in portraits and banners and the "State Assisted Deaths room"); And Forensic Architecture's presentation of the Mark Duggan report and modelling.

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[90] Artists and collaborators on the exhibition: Daniel Amoakoh, Remee Bailey, Sarah Booker, Vanley Burke, Pogus Caesar, Ceddo Film and Video Workshop, Robert Croma, Kimathi Donkor, Garnet Dore, Lloyd Gardner, Howard Grey, Henry Jacobs, Colin Jones, Neil Kenlock, Weyland McKenzie, Nigel Norie, Simon Phipps, Menelik Shabazz, Russ Swan, Homer Sykes, Sharron Wallace, Andrew Wiard, Janine Wiedel. Organisations: Bernie Grant Trust, Black Cultural Archives, British Pathé, Bruce Castle Museum (Haringey Archive and Museum Service), George Padmore Institute, Getty Images, Institute of Race Relations, Magnum Photos, Media Archive for Central England at University of Lincoln, Report digital, Senate House Library, Shutterstock, Yorkshire Film Archive. Source: https://www.ica.art/exhibitions/war-inna-babylon. Last accessed:  30-6-2022.

Before entering the *War Inna Babylon* exhibition (designed by Abi Wright) through one of two black arches a 1982 quote by Kenneth Newman, the then Commissioner of the Metropolitan Police, sets the social-historical context: "In the Jamaicans, you have a people who are constitutionally disorderly […] it's simply in their make-up, they're … disposed to be anti-authority". What follows this example of the institutionalised racism of the force's policing of London's Black communities, in a thick set exhibition plan of bright orange with black dividing walls and archive trays and spatial divisions, are a set of documentary films, archive and artworks, characterising the forms and impact of state violence that has been meted against Britain's Black communities. Further strands, "Routes," "Deprivation," and "Sus" (law), used archive footage, photographs and text to chart the arrival of West Indians (on-invitation to the UK, but to little welcome); and the deliberate economic, educational and legal challenges and police harassment of Black Britons. In the two further strands, archival ephemera and photographs give insight into "Ragamuffin" culture, a relationship to other international black movements. "Front lines" describe confrontations in what Kenneth Newman called symbolic locations and where Black youth stood up to demand safety from police violence.[91] Each of these front lines, deprivations and histories of movement is an infrastructural record of historical context and abuse, but also sedimented community organisation and memory recorded in archive documents and artworks.

Through a second arch, Tottenham is given focus through the work of local politician Bernie Grant which is highlighted alongside the Broadwater Farm youth association, an uprising in Broadwater Farm Estate following the death of Cynthia Jarrett following an illegal police raid. Together, the artworks and archival pamphlets, event flyers, photographs and articles showed how the battles lines in Brixton produced the space for the culture of sound systems to happen; of a history in music of Babylon; and how the definition of Black children as 'educationally subnormal' by educational authorities and educators meant parent groups could fuse with political action groups scaling up to the Black People's Day of Action (March 2nd 1981) and mainstream Black political victories. But they also tell of a story of the state's retaliation, a culture of fear and managed decline of the Broadwater Farm estate. Elsewhere in the exhibition, the stories and testimonies of lives wrecked through a memorial to those killed at the hands of the police are reflected in portraits and banners in the "State Assisted Deaths rooms" as well as the "Five Families of Tottenham" which replays testimony, projected onto 8-foot

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[91] The exhibition also includes 'front lines' in Handsworth, Birmingham, St Pauls, Bristol and Toxteth, Liverpool

columns, from the families of those who have died in police custody.[92] Finally, across the hall from this memorial, Forensic Architecture's presentation of the Mark Duggan report and modelling is set alongside evidence from the inquest, IPCC/IOPC investigations and a case study into the MPS gangs matrix.

As Scott spelled out, alongside opening out to other potential comrades, a visibility raising, the *War Inna Babylon* exhibition made clear the long history of racial profiling and dehumanising deprivation and injustice that was *compressed* into that split-second and the police officer's actions; into the assumption of the subsequent IPCC investigations; and into the jury's empathy with the officer's belief in a present (but factually unproven) threat. It also made clear what was *excluded* in that split second, in the media accounts of the killing (including the infamously cropped portrait of Mark Duggan at his daughter's graveside[93]) and of the UK-wider riots or uprisings sparked in Tottenham after the MPS refused to meet and answer the questions of Mark Duggan's family. Excluded, Scott reiterated, was the grief and memories of the family of those killed, the resistance and lives lived in spite of state oppression. The exhibition expressed, for Scott, a humanity and the chance for the benefit of the doubt, of more than a split second to consider his case. For Scott, showing this history as a context for the Tottenham uprisings, and to contextualise the involvement and work of FA, is the reason for and rationale of the exhibition; and the exhibition fits into a much longer struggle for justice and for giving testimony to the truth of those conditions. This is history telling that is not in the academic field, but told through music, shared experience, resistance and in telling this experience in its own terms (Scott 2021). But this is not to suggest that this part of the exhibition is simply a lead in to the work of Forensic Architecture; rather that together these aspects act as different but co-productive and generative dimensions of a more complex curatorial-infrastructural assemblage.

In the inclusion of FA, where the gaps and contradictions visualised by the models are brought into the public forum of the exhibition, a key aspect is show to what a lawful killing *actually* looks like (Scott, 2021). For Weizman, to diagram this in a public forum, is to show what could not be seen in the event / police account and bridge a gap in history of London's infrastructural patterning in which a split second and decades-long history is compressed. This combination opens up that wall, the covering over of one set of narrative, procedure and assumption.

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[92] Testimony on the loss and the lives of those killed by the police was given by the families of Cynthia Jarrett (killed 1985), Joy Gardener (killed 1993), Rodger Sylvester (killed 1999), Mark Duggan (killed 2011) and Jermain Baker (killed 2015).

[93] As used by the Daily Mail and other tabloids, a portrait of Mark Duggan containing only a hard-faced stare was used to characterise him as "gangsta" (FA, 2021, 96). It was in fact a cropped portion of photograph taken of the grieving father holding, in the uncropped image, a heart-shaped memorial stone at his daughter's funeral.

Reading the exhibition as an infrastructural, social-material assemblage which changes the disposition of this event and investigation, *War Inna Babylon* creates in the expansion of that split second the space for empathy and humanity afforded to the police by the jury to Duggan to re-enter through the other concepts of *War Inna Babylon*, that together offers a deeper set of connections, stories and accounts. For the curators, as was written on the wall of the final room, this ultimately offered the possibility of that which is foreclosed in the official juridical process: a "people's verdict".

The operation on the split second by FA is therefore two-fold: it works on the condition of the event itself and — in connection, since the event incorporates a patterning reverse and forward engineered by fitting it to a history and culture perpetrating and legitimising racialised violence — on the descriptive mediation of that event in advance of it and after the fact. Through this assemblage, the original infrastructural patterning of the split second is opened out, it is at one level no longer able to repeat as a form of closure or completion. It can no longer be used in the same way, to generate the effect of collapsing time into the assumption and anticipation of a threat in the description of that event. We can, therefore, read this intersection of temporalities as also an intersection or convergence of curatorial and infrastructural composition, mediation and pattern.

Here, the split second can be brought back into relation with the social-historical construction of time (i.e., as a cultural rather than ontological unit of time) that produces it through a curatorial assemblage in which these temporalities act on one another. Together these dimensions create a qualitative effect in the patterning of the assemblage: an opening. This provides a different model of mediation and alignment to *Counter Investigations*. Further made clear in Scott's account of the relationship between FA, his work as a community activist and organiser with victims of police violence in Tottenham, including the Duggan family and this exhibition, is how this practical, conceptual and curatorial relationship explicates and as Scott emphasises, articulates, the stakes of reposing curatorial artefacts at the relational convergences of infrastructural meaning, materialisation and practices that compose and mediate active form such as pattern. That is how, as a curatorial object the deep history, or slow violence, of culturally-determined and determining infrastructural patterns of assumptions and rendering in-human is also intersected into this technical, infrastructural expansion of that split second in the public forum of the field of art. A tighter form of control is made looser where the thin connectivity of the models of meaning making by the police (i.e., low resolution, relying on questionable testimony), is made thicker (see Johnson 2018) through the introduction of more information into the patterns drawn from the events at stake and, therefore, less able to rely on the benefit of the doubt, assumptions and racist narratives.

In this history, infrastructure is more than a context. This technical modelling was key to breaking open the institutional wall of silence built, Scott described, and which is built around the case and the expectation that the law would fall on the side of the police (2021). It shifts the infrastructural conditions that made this silence operative; but this model must also be put into an active relationship to a context to become transformative. One the one hand it reflects an embodied and embedded disposition and a history of infrastructural analysis and self-organisation. This is what an analysis of the effect of infrastructural pattern as meaningful form of social material assemblage can show. But, reflecting on the interaction of the two aspects or alignments in this exhibition discussed here (and how different kinds and textures of temporality and the social, material and cultural content possible in them), I want to take a further step. That is, to see the *intersection* of these histories in this particular model of assemblage as making it possible to articulate another temporal dimension *into* the infrastructural assemblages of the events re-constructed by FA. Creating historical, experiential and affective depth of connection and alignment in the modelling of the *scope* of contributing factors in the assemblage of that moment, the exhibition viewed as a whole both reconstructs and expands that gap: symbolically, but also practically.  Thus, to pose this articulation as a creative and critical proposition used in order to expand the gap collapsed into the split second offers a, more a more general possibility for shifting the disposition of an infrastructural scene, making its repetition bumpy and changeable.

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## 4. Test Case 2: Speculative cura-infrastructural artefacts

At one level the meso-scalar imaginary of the exhibition established between the representation of the cultural, historical and human aspects of this story by Tottenham Rights and the visualisation of previously 'unseeable' infrastructurally-derived patternings by FA, simply makes explicit and multiplies the wider social material and cultural assemblage that is often created, but left implicit, in FA's work. That is, that their models are situated by and interventions in the political, historical (and cultural) contexts from which events and the capacity for that event to be registered arose: "the world that made them possible" (Weizman 2018, 64). The compression of political and historical factors into the technique of an event and its mediation is the effect on which FA seek to work, and to return to a public forum. This is why

they can claim that the investigation becomes a question of *public*, rather than *empirical*, truth, an investigative commons or *forensis*.

However, and reflecting the problem of the gap or split between curatorial staging of infrastructural images and models established in Chapter one, the form the relationship between event, model and context takes in the exhibition is in many ways articulated as only working speculatively, an action on a potential public imaginary. Yet, as an infrastructure mediated by pattern this assemblage might also constitute an experience of thicker or thinner coherence, depending on the level of connections that are possible within in it (Johnson, 2018). This can, as claimed, be used to define how different patterns of connection, relationship, dimension, scale, sensory input, cultural and historical positioning and interpretation allow for those claims to coherence to be verified. (Verification means, here, the ability to coherently put and activate a claim in relation to the infrastructures that constitute the reality construction into which that claim is made and is mediated.) In this final section I will examine the tensioning of these different temporal registers and accounts as a test case for pattern as a second speculative curatorial-infrastructural artefact.

With these parts in place, it is also possible to argue that FA articulate a particular speculative curatorial-infrastructural artefact that closes a loop between sensing, anticipation and recognising what can come to be expected from a scene. Or to be more precise: this work offers a particular layer and aspect to generating speculative infrastructural effects of coherence in the disposition of a social-material assemblage so that the narrative and *emplotting* of things into that narrative can be verified against what can be known about it beyond official accounts. This is a form of making public in which both infrastructure and a public mediation and socialisation is key to both its achievement and its 'texture'. Patterns can, however, enact a closure of meaning or imaginary (coherence), in part, through an assumption of subjectivity when these descriptive forms are addressed by the forum and naturalised by curatorial formats: for instance, using the report or investigative format can simply repeat a positivist empiricism or journalistic mode that leave little room for nuance or question. Moreover, when this closure is rendered as infrastructural or active forms, this can be operationalised and repeated in the investigative and computational models and platforms on which such patterns as well as other curatorial-infrastructural interventions rely. This is a problem for the curatorial staging of Forensic Architecture in particular. But it is also a more general problem where the curatorial is re-posed at, or as, an infrastructural convergence of practices, materialisation and meanings in order to mediate such active forms of patterning as its claim. That is, the problem of instrumentalization.

In previous sections, it has been shown through the work of FA to be possible to generate infrastructural disposition and pattern both within, and because of, staging new models of sensing and mediation through exhibition and art institution. Yet can the complexity, held together by the active forms staged in the work of FA, re-enter the curatorial space? Do those infrastructures allow an only thin sense of coherence, or do they allow deeper and more complex layers of truth? Can this be used to develop critical alignments between the curatorial and other fields and event so that the curatorial enacts that complexity into infrastructural composition and mediation?

Where the models of FA are used to mediate the assemblage of an event, and of making that account public, both pattern and patterning can be seen as dynamics achievements of the same assemblage, but which are connected and interleaved by different alignments. The effect of these alignments on the assemblage are connected: it is possible to offer a new account of an incident in part because the model it is based on comes to be expected as an infrastructure for verification precisely because it has been socialised through exhibitions (and other forums). However, such socialisation also challenges the claim that a commons is opened up, it is in fact a form of training in expectation and, therefore, practices of repetition on the infrastructural layers of patterning given form by Forensic Architecture. Moreover, this socialisation can indeed be seen as an instrumentalization of the curatorial artefact and space for this purpose. This is a function of the conceptualisation of the curatorial and how these models are staged and mediate the exhibitionary scene because of it. As Chapter one argued, critical perspectives on infrastructure are maintained through a non-systemic approach to staging its images and models. Individualising and making a specific instance of an infrastructural form more deeply contextual and contingent on its constituency, rather than smoothly systemic as in this case through dominant infrastructural settings, is key to the possibility of new meaning here. (This new meaning comprising the deepening relationships and alignments constituting it and the social performativity it requires and through which that infrastructural setting is staged (see Thrift, 2004)).

In this sense, where the exhibition is simply seen as a mode of socialisation of a patterning through the mediation of that experience, this patterning is in fact a thinning or closure of possibility to reveal what was already there — albeit by expanding what is already there. This closure of meaning is instrumental to the legal claim; but it is also a thinning or closure of the meaning possible in the publics FA also aim to make. Indeed, as Imani Robinson writes (2019), through the very act of performatively reconfiguring the status of objects as testimony into a forum, the forensic disposition of these patterns can act as a form of description that stands to *cover-ov*er or obliterate the very complexity, subjectivity or instability of testimony, that FA seek

to give voice to.[94] Can this be broken? By taking a more relational approach to the model of the commons — a model of the commons not about a shared possession, but as Berlant writes (2016) and Johnson emphasizes (2018) being patterned by being possessed by the relations that make it possible — there is a speculative potential located in increasing the relational quality and stakes of infrastructural assemblage. These can as Reed notes (2021), produce tensions, that act on the disposition or closure of infrastructural patterning. By drawing attention to this implicit operational context, the alignment between and through these two dimensions in *War Inna Babylon*, the exhibition also articulates a speculative infra-curatorial potential. That is, the capacity to create and shift the disposition of an event, its description and its mediation — doing this by extending its effect across an extra-disciplinary and meso-scalar assemblage.

### Reposing the curatorial as infrastructural convergence

As a diagram of the dimensions that contextualise, but might escape, the spatio-mediatic models constructed by FA, the *Counter Investigations* exhibition can be seen through the curatorial objective of the 'send-off' (see Rogoff in von Bismark et. al., 2012), a proposition that expands the possible conceptually and semantically. But this is also carefully crafted so that the impact of this send-off is only activated by its viewers as a public whose agency lies beyond the confines of the institution on the one hand and the instrumentality of the investigative aesthetics of FA on the other. From the point of view of critical curatorial discourses (including institutional critique), of re-imagining public norms by maintaining aesthetic impossibility or inclusivity of representation and participation (often specifically against the political, ethical and aesthetic consequences of measurability, technology and systemic recursion) this send-off or proposition aims to allow for the possibility of what cannot be shown or authorised.[95] This possibility includes the culturally as well as technically determined 'excess' of forms of life and artefacts that exist beneath the threshold of detectability and which is embodied in the fictive dimension of what cannot be witnessed or give testimony (Robinson 2018; Feldman 2018).

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[94] For Robinson, the forensic approach and its genesis in Brook's slave ship diagram, with its black figures stacked shockingly but consistently objectifying its subjects, is paradigmatic here, both in general in its current form and how this approach is mobilised in the work of FA (Robinson 2019). As Robinson writes, though these diagrams were for used as part of anti-slavery campaigns, that they were for a predominantly white European audience meant the people, humans, community members represented never became more than (evidentiary) objects (Ibid.). Their life worlds remained *covered over*.

[95] For instance, in the 2016 Bergen Triennial programme curated by the freethought collective (of which Rogoff is a member), a series of public panels sought to uncover from the infrastructures of shipping, the histories of the shipped (Curated by Stefano Harney with artists Ranjit Kandalgaonkar, Arjuna Neuman, Wu Tsang and philosopher Denise Ferreira Da Silva), the experience of oil workers in the context declining oil prices and rising unemployment (Mao Mollona and artist Anne Marthe Dyvi's contributions), and an exploration of the infrastructures of feeling (by Louis Moreno and artist Paul Purgas). See: http://2016.bergenassembly.no/en/freethought/6-chapters/ Last accessed: 3-1-2024.

However, as Vishmidt writes (2017a), while the incorporation of infrastructure-like platforms, practices and expansive multiply-layered images and operations of these platforms into the practical and discursive legacy of institutional critique might offer a negating *cut* into the repetitions and crystallisations that sustain the institution without some form of repetition it becomes difficult to ensure "the reproduction of a wholly different form of social life [posed therein and] over time" (Vishmidt 2017a, 268). Indeed, by rejecting the infrastructural, operational or instrumental effect of these models on the space of the exhibition and publics or commons convened around them, this leaves little room for critical appraisal of what the recursive and strategically complete patterns modelled by FA actually does as it enters the curatorial or public forum and what this might do differently. Moreover, it also excludes an account of what infrastructural meaning, material and practice does more broadly in this field: something which I have argued through pattern and position contains the possibility of transformation and opening, just in different form / mode.

By reading the exhibition as a whole, as both itself a social-material assemblage in which different active forms, or patterns are established and intersected to enact distinct affective experiences of the scenes in which different figures are embedded in these patterns, *and* as a dynamic, affective layer in a larger social-material assemblage created by the work of FA across different forums, a different critical and speculative account is possible. Here, as a curatorial and infrastructural convergence, the exhibition directly interacts with the repetition of the 'slow' and immediate violence of infrastructural time,[96] shifting its disposition, what occurs or is mediated by the form of temporality it creates or upholds. Re-reading *War Inna Babylon* as a model for cura-infrastructural intervention makes possible an activation of infrastructure which can be thought of through the exhibition experience. This is to do with the institutionalisation of truths, kinds of evidence and experience, of an expansion and shift of who adjudicates. But this is only one layer, however. The models and history and actors of infrastructure are also activated in context, in the layers of legal struggle, in the joining threads of Tottenham Rights of FA's model and in the history it is spliced into via both groups' expansion and upsetting of the knottiness of the 'split second' as an evidentiary and a racializing, dehumanising device.

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[96] By slow violence, I am referring to the kinds of gradual, out of sight, delayed and dispersed forms of violence that accrete over various timescales because of decisions, carelessness or accidents baked into infrastructural conditions, often on those who are not the primarily beneficiaries or users of an infrastructure; see: Nixon 2011; the systemic, large-scale spaces of infrastructure's wider remote proximity (Rossiter 2017); and the hypo-sensible dimensions such as the split second.

**Negotiating the repetition and closure of pattern**

By describing this pattern as an achievement of infrastructure, that is of the composition and performative practicing of composite form and experience discussed in the previous chapter, the creation of pattern can also be seen as formal shift in what infrastructure can be. That is, a question of *how and what is composited, constructed and mediated in and by that infrastructural convergence*. This allows a comparison and contrasting of the differing alignments in the social-material assemblages engaged by FA. Moreover, the convergence of infrastructural meaning, materialisation and practice generated by FA to be analysed as in part a function of reposing the curatorial.

For the present analysis, by posing the events, investigations and mediating forums in the work of FA as an assemblage, and as composed of different alignments within that, it is possible to explore from the different perspectives that hold these scenes together in practice and how each shapes and reflects the systemic whole.  That is, where the systemic whole is both the patterning created by the investigation and the claim to a coherent and verifiable truth. Thus, pattern can be understood as a kind of meaning that holds together an assemblage, and, as Berlant writes (in Hayles 2017, 196), as the meaning generated by the experience of being embodied and embedded in that scene — by being mediated by pattern.

A second perspective is, therefore, possible by engaging the parameters and composition of infrastructural patterns the achievement of the convergence of parts, practices and images that make up infrastructure and its meaning. As a reality constructed around this convergence, the achievement of pattern can also be seen as having a quality tied to the ecology of parts, relationships and participants knotted into an event. This means that the coherence provided the infrastructuring and mediating pattern, can in Berlant (2016) and Johnson's (2018) words offer a tighter and looser control of information, a thicker of thinner connectivity in the model, depending on location and on use. In this way, the verification — and indeed 'verifiability' — of a claim concerns whether or not that claim (and the model used to support it) can allow for new information to enter and for its overall claim to remain consistent when this happens (for example, when the split second is expanded, do the officers' claims stand up to scrutiny?). Moreover, with this compositional analysis, it is also possible to disaggregate *how different infrastructural effects are achieved in the field of art and curatorial practice* as an assemblage in which active forms create systemic effects, dynamics or dispositions. That is in place of a rejection or categorisation in non-infrastructural terms.

Where pattern can also be, as argued above, used in the field of art, the intersection of these temporalities works on the assemblage such knots creates and intersect. As a whole, therefore, the *War Inna Babylon* exhibition enacts this difference in the meso-scales of infrastructural work and imaginary; it does this through de-compressions of infrastructural imaginaries and instituted outcomes like structural deprivation, or the gangs matrix,[97] as registered in the split second into the cultural, historical and political temporality shown through archive documents and the testimony and memory of the five families of those killed by the police. This establishes, and makes explicit, key differences with a curatorial model of staging its truth claims as stand-alone models, as in earlier exhibition (which was a more methodological and pedagogical artefact).

In this framing, relating and connecting traces, testimony and indeed public forums to the wider assemblage FA construct infrastructural patterning across their practice as a whole and beyond it. This allows them to make use of the internal differences and variations in disposition in it. Simply making these investigations public, presenting them, as in *Counter Investigations* as standalone artefacts, can be seen as a limit on the possibilities of the curatorial to stage difference into this assemblage, that is, to contest or complexify the imaginaries, forms and practice Forensic Architecture seek to pre-enact in the exhibition. Where the curatorial is aligned to another field, without its own internal infrastructural complexity, the pattern by which it mediates that aspect of the assemblage can only repeat and recursively enclose the expectation and claims made by FA.

Of course, at the scale of the work as a whole, *Counter Investigations* and each report can be seen within the "world that made them possible", but at stake in reposing the curatorial as a critical infrastructuring practice is how *War Inna Babylon* articulates its different dimensions and manifestations explicitly and in relation to one another. If we take the *construction* of the split second from a whole assemblage of conditions at the specific point in time in which it was figured as a guiding analytic, the infrastructural patterns articulated, expanded and staged by FA can be seen as a horizontal axis cutting through the split second. Through this intervention, the split-second ceases to become devoid of history, but is thereafter readable in its expanded from against the representations of definitive and progressive causes and effects of history staged elsewhere in the exhibition through the archival material and testimony. These two axes, the forensic and the cultural form a different kind of infrastructural assemblage, one that pushes on and expands the closures of what is deemed inevitable. This intersection can be seen as a pattern that works across the conditions that made the present in which events it

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[97] See: https://www.amnesty.org.uk/way-out-gangs-matrix-crisis Last accessed: 3-1-2024.

concerns happen (i.e., as a model that helps us to see the literal location of Mark Duggan's killing in a more detailed and extra-sensory way), whilst also bringing these parts together to contextualise and change how these events are part of longer historical narratives. Both elements are key contexts. Viewing the exhibition like this, as a tensional, torsional, relational assemblage of patterning (as well as representations, figurations, aesthetic claims) establishes possibility of a complex and irregular continuum between dimensions, positions and inheritances as they are figured and given form in the embodiment and embedding of pattern in that social-material-assemblage — and a disruption.

The meaning made in this continuum will be further developed in the following chapters, but suffice to say here, the two parts of the exhibition that pivot around the testimonies accentuate each of these axes: historical depth and the transversal affective layers that pattern the moment, actions and unfolding of an event. As active form that works on the assemblage gathered around and enabling those forms, the 'bumpy' infrastructural repetition and pattern established in the intersections between these expanded or introduced temporal axes registers a different, operational, infrastructural role for the curatorial in this case study: that is, as a venue and vehicle for staging critical or propositional infrastructural effects on the disposition and practice of a particular infrastructural alignment. Moreover, by not collapsing the exhibition into either an instrumentalization of an investigative aesthetics, or commons, or as a non-recursive imaginary (that is, by reading it as an infrastructural assemblage), it is possible to view these layers of pattern held in relation that enacts a *tensioning*. This is where different active forms intersect and mesh, but where this interoperation of pattern and its staging is deliberately not seamless, but rather, what we can call a bumpy repetition, a glitchy pattern.[98]

### An opening in the imaginaries of infrastructural truth

In this re-configured assemblage, an opening is created in the wider imaginaries and infrastructures of public truth. By exploiting the contradiction in the officer accounts, a tension can be generated in the model in which the collapse of history, racialised assumptions that it "was reasonable enough for a police officer to imagine a gun in the hand of a black person" (FA

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[98] In formulating what I am calling a *bumpy* repetition, I am grateful to former Forensic Architecture researcher and artist, Ariel Caine who in working on projects such as the Killing in Umm al-Hiran report (see: https://forensic-architecture.org/investigation/killing-in-umm-al-hiran) made clear the creative importance of the tensions between imaginaries in establishing productive interventions into the infrastructural settings of a particular scene or event. By seeking to bridge between these differences, gaps would open up in previously given conditions (such as what truths are possible to know in a particular epistemic regime, e.g., in each of a Bedouin and Architectural mode of knowledge. (Conversation with author and artist Sam Plagerson (22.12.2020).)

2021, 8) where in that split second, that covering over, re-enters. (A covering over, reflected in the IPCC investigation and report released a year after the inquest is opened out.) Moreover, where the intersecting temporalities discussed here emphasize the importance of putting infrastructural models in to context what can be called a *bumpy* repetition installed by the curatorial dimension of this assemblage can be seen to support the claims made public by FA and Tottenham Rights practically as well as conceptually. This suggests that infrastructural pattern can be realised in the curatorial through alignments of parts, one that through its thickening becomes replete with frictions with what came before and after this intervention. Tensions or frictions are, as designer and systems theorist Patricia Reed notes (2021), generated where infrastructural worlds have trouble remaining closed, or complete. In bringing together different infrastructural registers, it also suggests a tensioning of the patterns established by FA that also respond to critical problems of *covering over* established by Robinson (2019) — whether that this is the introduction of complexity into an existing situation through representation of that complexity, or by changing the arrangements and alignments with that setting so that they are procedurally, performatively, informationally in tension.

Reed's notion of worlds offers a useful frame for the closure of meaning, practice and its repetition and mediation and how this closure can be undone. Where infrastructural repetition enacts meaning in reality constructions or worlds that "self-referentially perpetuate a law-like structure of being complete, total or 'naturally' thus", they nonetheless, all "eventually come to an end… indexed by the inability of [a] … configuration to absorb frictions" within that completion, be those the discovery or invention of new contents, the re-inscription of new contents, or the material impossibility of continuing in it (Reed 2021, 1). As such, tensions or frictions can also be the source of thresholds within infrastructural systems or assemblages — that is where tensions and frictions created by relational complexity break systemic coherence, enacting or allowing new connections, relationships, repetitions or transitions. This is of particular use to those systems or assemblages established by the recursive and repetitious meaning of infrastructure. This tensioning can create thresholds in the closure and repetition constitutive of infrastructural form,[99] both in the account of an event and in how the model used to reconstruct that event is staged as a mediation of it.

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[99] As former FA researcher Ariel Caine described, the investigation, forum and participants cannot be seen separately, since it is precisely by working across different organisations and forms of evidence, that it is possible to shift the backdrop of each aspect, and to shift the imaginaries through which they are recognised and verified and staged. This is itself a function of the inherently social as well as nominal nature of language, always being registered in context; meaning in this case that testimony can change according to how it is composed, and the backdrop against which it is read. In Skype discussion with author and Sam Plagerson (22.12.2020).

**Reposing cura-infrastructural intervention: a 'bumpy' repetition**

An analysis of the effect of pattern on the assemblage and how this is construed by different alignments within it, means that it is not repetition or instrumentalization that is itself at stake, or for critique in an analysis of infrastructural patterns here. Indeed, it is precisely this possibility that is generated by thinking the productive dimension of cura-infrastructural alignments through active form. Rather, at stake is the quality of that active relation. Be that the quality of repetition, alignment, coherence, verification, etc., — that is as a compositional and mediating action or disposition that shapes possibility and is registered and interpreted across the different parts of the assemblage constructed and intervened on by FA. This quality, how it is achieved, and the disposition and experience of this is key to a critical analysis of the claims and indeed infrastructural images FA make into the event, investigatory and public / mediating assemblages that address. It is also key to how the curatorial is and can be reposed as the convergences of meaning, materialisation and practice that make up infrastructure and how it mediates the worlds it threads through and holds up.

In this section, how these alignments take effect on the assemblages of an event and public forum is consolidated by how they are articulated as an active form. This means intersecting the curatorial and infrastructural as the generator of effect in the assemblages. Here, the curatorial contributes to the poiesis and aisthesis, as well as the generation of practices that repeat infrastructural form and meaning**.** The curatorial contributes specific compositional and mediative qualities to the effect of pattern and pattern as an effect. Crucially, by tensioning the disposition as an active alignment and experiencing this through frame of active form and disposition, the effect of this pattern can be differentiated in terms of quality, not just quantity.

Suggested by this reading and infrastructural framing of the work of FA in different alignments, is a speculative model for shifting the disposition of infrastructural patterning, and thus the effect of informational mediation on the assemblages, practices and discursive forms (such as the split second) that information holds together. (I will develop this further in Chapters three and four; however, this subsequent work is grounded by the diagram and abstract images developed in the concept of patterning in Chapter two.) By situating the curatorial as a multi-dimensional convergence point for different patternings, working across different organisations and forms of evidence it is possible to establish tension within an assemblage that extends beyond the curatorial event, but which is nonetheless mediated by it (in part). This allows a model of cura-infrastructural practice to shift the backdrop of each aspect, generate 'bumpy', open or more porous modes of mediation. At stake in expanding and distorting the repetition of infrastructure like this, is the pre-enacting of difference into the composition of pattern,

practices and parts. In an argument that achieves the critical stake of CA, Thrift (paraphrasing Judith Butler 2007; Thrift 2004, 187) and Jacques Derrida) (2004), argues that the possibility of instituting difference into infrastructure is driven by finding gaps in complexity of existing repetition, that is to enact what Deleuze calls a pure repetition (1990, 287–288, in Thrift 2004, 188), i.e., a repetition that is performed in relation to that which exceeds its closure and object, holding that opening in the gaps in practice where existing infrastructural form is being not directly inscribed.

However, where the creation of infrastructural form, and difference into it, is at stake, the difference of an intervention is instead articulated as an opening up of the closure of the quality of repetition, of the texture of patterning within and not beyond that form. Difference is understood here as that which interrupts and reconfigures infrastructural repetition, making it 'bumpy' if re-implemented and activated or performed as a constituent that part of that infrastructural scene. It is at this level, of the effect of what Rutgeerts and Scholts described as preenacting and realising practical and mediating pattern on the disposition of the assemblage in which pattern is composed, mediates the world and is used to mediate coherence, that the curatorial is reposed. If to preenact an alternative infrastructure is where new assemblages, axes of activity or practices are brought into relationship and composed through speculative and critical alignments, other possibilities can be explored and enacted, even in existing infrastructural layers. This last point is key to a context of both an expansion of patterning and to the need to develop a critical account and agency within a world already woven together by infrastructural images and pattern through this repetition. (This interwoven character is taken up in more detail in the next chapter.) This change to mediation allows for a different kind of infrastructural image or promise to be generated and staged into the convergences of infrastructural meaning, materialization and practice.

As a consolidation of the alignments discussed in Chapter one, therefore, pattern as active form can be used to discuss the creation of infrastructural effect in and as an assemblage that is constituted with the curatorial, and, through differences and tensions between the different representational and relational (or infrastructural) dimensions and the effect of these on the activation of a particular disposition or coherence. That is between the historical and humanising aspects of the exhibition and the models concerned with the expansion of the infrastructural patterning of the split second. This raises the following questions:

- Can this be used as a model beyond this specific case?

- Can this infra-curatorial artefact operate to generate speculative infrastructural form for re-posing the curatorial?
- What does this say about the wider problem established in the introduction? That is, the capacity to imagine and institute infrastructural meaning as a critical intervention in and through the curatorial practice, specifically as it is figured in the field of art?

If to realise an infrastructural effect requires closure and repetition can such tensions change the imaginary (here of coherence) that infrastructural effects hold up but also holds those effects up? How this model might allow for different kind infrastructural world to be imagined into the convergences and accretions of existing infrastructural assemblages, is taken up in Chapter three.

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## 5. Conclusion

In this chapter I have examined and critically re-posed the limits and possibilities of staging infrastructural pattern through curatorial practice and artefacts. The close reading of FA as a case study in infrastructural patterning indicates the stakes and possibilities in the speculative closure of models, which as infrastructural alignments can be seen to interoperate with other layers and alignments of counter forensics, hegemonic power and the conditions of events represented. At stake is a questioning the degrees of interoperation, repetition and tensioning between them. This is the critical possibility in the staging such tensions into the patterns made through the kinds abstract images or diagrams made in infrastructure and discussed here. *Counter Investigations* offered a base from which to demonstrate how FA engage infrastructure in and as practice; *War Inna Babylon* showed how repetition can be put into tension.

In this framing, the work of FA and its staging in various public fora offers an example in which infrastructural form and practices described in Chapter one can be articulated as critical interventions in an assemblage, field or narrative. This is achieved through curatorial practices of alignment and patterning, rather than those where infrastructural models and imaginaries (real and proposed) are kept apart. Moreover, how the curatorial functions as an element of the composition and mediation of pattern as an artefact of infrastructural meaning, is shown to be central to the difference effects and expression of pattern, and the meaning embodied and embedded in it. By framing the work of FA as an artefact of infrastructural as well as curatorial

staging, how this work is made public is shown to establish productive, generative, critical and potentially transformative tensions in the layers that make up various infrastructural reality constructions. This re-poses the curatorial at the composite practice of meaning making through which infrastructural parts, practices and images converge. But the emergence of reality constructions develops both possibility and problems: a bumpy repetition is still a repetition. As such, it can also be a potential closure of meaning as much as a tensioning and transformation of and assemblage

As was introduced in Chapter one, how FA enter the curatorial can be partly contextualised by what El Baroni characterised as a need to re-make the conditions for speculation and mediation because and despite the fact that they have been compromised (2021). Not only does this mean the curatorial is a venue for concretising and rehearsing imaginaries, but it is also seen as a vehicle for an expansion of aesthetic and cultural sensibility and attunement by enabling artefacts and events that can intensify and shift the meaning of objects and their connections (Schuppli 2020, 4–6). This double and self-reflexive relationship between the composition of objects and how they make and are made public, reflects an ongoing question around the changing infrastructures of mediation and how they intersect the curatorial as a knowledge and meaning making, or stabilising, practice. Specifically, how meso-scalar, recursive and diffuse or distributed patterns and networks of data and information, cohere and are verified in ways that both expand the possibility of meaning, and appear to create an event of informational completion (albeit by being repeated as infrastructure) is at odds with curatorial events based on a conceptual and representational openness or impossibility of completion (See the event in: Derrida in Rogoff 2013, Athanasiou 2017).

I want to suggest, however, that the infrastructural dimension of the work of FA can in fact be understood as a both fully curatorial and fully infrastructural, with these perspectives co-producing and transforming each other. That is, the thickening and thinning of the relational complexity of visibility, description and mediation of patterning in the infrastructural work of these artefacts is achieved. It is through the curatorial that infrastructural repetition can be re-inserted into the social historical; that is, where the relationship between fictive and real accounts or models can be intensified and converged. Here the figuration of primary, fictive or proxy and secondary witness can be brought into relation to enact, consolidate and activate effects in the broader assemblage in which the meaning of those events is generated and interpreted and decided upon and, therefore, to perform infrastructural work, practice and repetition. This relationship and alignment, however, exceeds the curatorial as a disciplinary or institutional field or event. It is not as an unknown or send off, but as an entanglement in infrastructural form or pattern, a systemic layering into that convergence. Key here, is that the

role of the curatorial is understood simultaneously across and as only one part of the practice as a whole layer (i.e., as a systemic event). That, as with the intersecting of the history of deliberate deprivation and police violence collapsed into (an expanded) split second. Staging this work as curatorial-infrastructural artefact creates a tensioning that can in a particular aesthetic, mediating and meaning sense, distort or change the pattern(ing) of an event and how it is narrated and accounted for before and afterwards.

The change registered in pattern is where its disposition, its effect as an institution of a descriptive mode, is shifted in and within the tensioning created by *pre-enacting* one pattern into the continuity of another. This shift takes place according to how it is entered and situated within the assemblage; thus, the staging of this patterning as a form of infrastructural mediation is central to any difference it can make within and beyond the curatorial. This makes certain forms of transformation and transition possible, specifically for the curatorial when it is staged at the convergences of practice, meaning and materialisation as an alignment of differently positioned patterns. This also means that, in place of the exhibition as a central mediating and meaningful artefact, infrastructural pattern is (like position) shown as both a curatorial and infrastructural artefact that can not only hold other forms and inputs within it, but be used to enact and experiment with aesthetic and material materialisations. Here, this allows a redistribution and reconfiguration of the narratives through which a truth is narrated through the specific and repeatable activation of infrastructure and infrastructural trace. In this sense, *infrastructural patterning* presents a transformative mode of making infrastructural meaning, public or constructing realities through infrastructure.

Infrastructural pattern can, therefore in the argument made above, be seen as a contestable artefact used to make and shape world and social form. It becomes crucial in this sense to address how such forms as those in the work, investigation, events examined or produced by FA shape the repetition of infrastructural patterning as an embodied or activated imaginary that transforms objects into objects of infrastructural meaning. This analytic also allows the repositioning of the critical-discursive framing by which curatorial interventions are read and staged into the contexts of infrastructural form and meaning is established. For example, Imani Robinson (2019) who offers a critique of and expands the work of FA, suggests that by, in contrast to the flatness of the images of enslaved Africans rendered as object of the forensic diagram or evidence in Brooks' slave shift diagrams, reading Blackness through the irrevocable duality of being both object and subject, new meaning can be found in an ontological instability in the being more than one thing at once. That is, a black mass made by being mattered, but also existing below the threshold of detectability, a political mass of complexities that belies the fungibility that denies subjective individuality (Robinson 2019, 8). The question that can be

posed from this is: Can reposing the curatorial at the convergence of meaning, materialisation and practice also be used to establish such dualities and tensions in infrastructural alignments and active forms to make new meaning possible and performable? Can new infrastructural worlds be instituted in this way? The next two chapters build on the work done so far to address these questions through a proposition for imagining and instituting critical infrastructure.

Throughout this thesis imaginaries and meaning are central to claims about what staging infrastructure does, or achieves. This chapter has shown that, by tensioning the parts that manifest infrastructural imaginaries, the disposition or effect of that meaning can be shifted or expanded. For instance, the forms of open verification (Weizman 2019) and coherence established in the work of FA makes truth claims porous to new information where state power comes from closure and exclusion. However, in the first and second chapters this meaning has, however, been epiphenomenal or a consequence of practical and formal staging of infrastructure — this can lead to the repetition of forms of closure and continuity in the overall effect of infrastructural meaning and the reality construction it contributes to, even if it makes that infrastructure available to those or that which had been excluded. How to change the imaginary frames it is possible to create through infrastructure is taken up in the next chapter, where putting the creation of meaning established in this configuration and activation of parts is the central stake. That is both as a claim on infrastructure, and on the how reposing the curatorial at the convergence that makes infrastructural meaning, play a distinctive role.

The *bumpy* repetitions indicated by this close reading of the tensions made when curatorial and infrastructural artefacts are configured together offers the possibility of activating ruptures in the continuity of infrastructural configuration in which infrastructural form and figures are bodied forth, embodied and experienced as given. This next chapter will break open the closure of how a world is imagined and configured in infrastructure; doing this critically, politically and speculatively, as well as practically as has been established here.

# Chapter 3 – Imagining Configuration

Creating crystallisations in infrastructural meaning; reality construction as more-than-social historical creation and transformation. Imagining infrastructure and transformative ruptures in its repetition and anticipation.

## 0. Introduction

The thesis began with the question: what does infrastructure institute? While the imaginary, and the task of re-imagining instituted forms has become important to curatorial debates and propositions discussed earlier in this thesis, it can also be seen only as a capacity to be generated, or an opening to be prompted through curatorial presentation, but not achieved: that is, the proposition of a question without *instituting*. Preceding chapters have implicitly raised the following questions: How do we think through (and think because of) the infrastructural? How is infrastructure an instituted form of that which is not limited to infrastructure? It also began by asking how, as Rutgeerts and Scholts propose, could it be possible to pre-enact a meaning and world-inventing image into the repetitions of infrastructure (Rutgeerts and Scholts, 2020, 187). That is, how to realize a promised imaginary in the present as if it can *already* be activated or anticipated, not just imagine it.

As Rutgeerts and Scholts conclude, to performatively stage an alternative infrastructural promise or model through pre-enacting that proposed assemblage allows the question of what alternative infrastructures we, its audience or public, might want to be posed (2020). While this open-ended proposition is key to participatory and institutional critiques central to critical curatorial discourse and practice aware of its own knowledge generation and mediation, at stake here is precisely what such form alterative infrastructure might take and how this is grounded or achieved in an expanded curatorial theory and practice. More specifically, Chapter one reposed the expansion of artistic practices through the lens of infrastructure as a curatorial problem. Where Chapter two arrived at the problem of while being able to generate new artefacts of patterning, infrastructural forms could (in and beyond the curatorial) also establish what Robinson called a covering over (2019) of the complexity it sought to represent. The task here is how to re-imagine how and what an infrastructural artefact could be; how it and could be proposed, performed or made otherwise. The task of this chapter is, therefore, to ask how such infrastructure could be used to compose a world that could incorporate complexity and which could maintain the conditions in which that complexity could emerge — to make an infrastructure and its repetition, bumpy, open to bifurcations in its repeating practices and assemblages and, therefore change. This provokes two-fold question: Firstly, how to realise infrastructural meaning and how to do this as transformation for both infrastructural form, practice and repetition. Secondly, how to achieve this through the curatorial as a site of knowledge creation, mediation and publicing, one with inherited parameters and modalities in its sites, affordances and constituencies.

In this chapter I will look in more detail at how that other infrastructural world might be imagined — that is, not simply exploring it as a technical achievement, but as a consequential form of proposition for world making and re-imagining. This explores the different capacities and possibilities for difference of the propositional forms that allow infrastructure to be both designed and made as well as used depending on how they are first imagined structurally, systemically and figuratively. To do this, Chapter three uses Suchman's concept of 'configuration' (2012) as a critical and speculative artefact to think about how meaning is generated in infrastructure from the bringing together of parts, practices and repetitions.

### Configurations

> Configuration is a practice enacted always from within, in other words, however much its objects may be figured as 'out there' and its concerns focused on how to delineate their relations and boundaries. As Barad reminds us [2007], we are always already inside the worlds that we take as the objects of our actions. (Suchman 2012, 57)

Returning to Fanon as quoted at the beginning of Chapter one on how imaginaries of racializing life are materialised and activated, the preceding two chapters have shown how the creation and concretisation of such infrastructural imaginaries are given shape and circulate as form, and how they are woven into practices that allow them to become anticipated as, in effect, a kind of genre in Berlant's words (2001) through positioning and patterning. That is, how an infrastructural imaginary is materialised, practiced and repeated. They have also shown how this creation and concretisation might be enacted and changed through the curatorial as its affects, affordances and artefacts are reposed into the infrastructural convergences discussed. While producing durational forms of closure by how infrastructural knowledges and apparatus train and recur certain patterns and positions (see Thrift 2004; Chapter one and two), this complexity also allows for the systemic self-creating and compositing imaginary prompted by the discussion above and achieved here by combining and troubling of the work of Cornelius Castoriadis (2005; 1994; 1997) and N. Kathryn Hayles (2017). At stake in this chapter, is how such creation and concretisation cross between different cognitive, information and formal layers and are assembled together in, and imagined through, the configuration of infrastructure and its promises. Or, how infrastructure includes *propositional* forms and layers — a promise — as an essential part of its design as well as realisation.

Though the curatorial is posed in this thesis as a means of producing disruptive or alternative infrastructural forms and practice, this chapter also turns on mobilising the work of Castoriadis

as a provocation to generate forms *in* infrastructure. That is, not just breaks in the gaps in critical approaches to the recursive specificity necessary for infrastructure as embodied by various developments of institutional critique and debates on instituting in that field. To do this, Chapter three deals with how these approaches to infrastructural knowledge do not just represent a recovery, inversion (Bowker, in Carse 2012) or disclosure (Vishmidt 2017a) of infrastructural practice, alignments, determinations, but propose a making: how to make what is re-imagined within the conditions for infrastructure and for instituting. This is central to rearticulating the curatorial as an agential, relational practice within the generative assemblages of infrastructure, as well as to re-configuring those assemblages as artefacts and vehicles of *self-composition and self-creation.*

This means conceptualising and materialising the world of infrastructural imaginaries according to Lucy Suchman's concept of inventive *configuration* (2012). That is, as meaning and artefacts that are established through the jointing and "figuring together" of the layers of productive and generative relations, subjects and objects, that hold together, bridge and make the various enabling relational artefacts of infrastructural reality construction, how these are made to *work together* (Suchman 2012, 52). Two uses of the term configuration will be established here. One, where configuration re-animates what is "bodied forth" by this jointing together and appears as a kind of naturalized or expected infrastructural form (Suchman 2012, 49). Two, by reanimating the con-structedness of an artefact, configuration can also be a site for negotiating and unsettling the terms of repetition and alignments necessary to make infrastructure appear and work where expected. This means the propositional nature of a configuration can also be a site for imagining and pre-figuratively instituting other kinds of infrastructure to those that are inherited and appear as given, or as the scene on which others must follow.

In this sense, the formal propositions of transformation in configuration will be explored in this chapter first through a critique of the achievement of seemingly closed loops of one systemic imaginary by the instituting of new imagined loops. Second, I will offer a critique of forms and practices produced through what is described as a *more-than-social-historical* transformation of infrastructure. Through the speculative framing of Castoriadis's concept of self-creation and instituting imaginaries (the idea that an institution is nothing but a social historical creation through the meaning a collective makes and remakes about itself), the chapter will conclude by asking if the critical practices of the curatorial can be remodelled in order to transform infrastructure accordingly and to build on previous discussions of alignment and tensioning as a practice of configuration.

Guiding the conceptual arc this chapter are the following critical and speculative aims:

- How to imagine a different infrastructure?
- How to imagine a transformable infrastructure?
- How to institute ruptures into the continuity unfolded by infrastructural imaginaries?

Through this chapter, these questions are explored through the device of critical infrastructural *proposition* made in and as configurations which will pull on previously established tensions and alignments, figuring them into forms of infrastructure able to create and alter the worlds they propose. Setting the ground for this chapter is a comparison between the two propositions of infrastructural reanimation and configuration as form of making public made by the Artist-duo FRAUD, looking specifically at the EURO-VISION platform (2021a) and the Danish curatorial / research project Primer by members of the Diakron research group. These are compared as configurations which can both recover and make infrastructural imaginaries public but which are staged to instructively different effects. This comparison is used as the basis for a propositional framework through which to establish the terms by which the kinds of formal intervention and model in previously explored test cases can be rearticulated and redirected towards critical infrastructural imagining and 'self-infrastructuring.' In this sense, the chapter generates its own propositional form in this framework for reimagining and re-making infrastructure, i.e., through infrastructural configuration.

As such, this chapter will not 'test' the effect of these examples on the curatorial context they stage / into which they are staged as in chapters one and two. Rather, the analytical and speculative emphasis of this chapter will draw on the form of these propositions, analysing and reworking these as a modes of rupture and creation in relation to the proposals for repetition and configurations they address. In part this is a practical constraint of the examination of an online platform and of the difficulties of travelling to Denmark caused by the Covid-19 pandemic. Nonetheless, by developing a more general formal and systemic analysis of these artefacts it becomes possible in the second half of this chapter, to establish a theoretical account of how to critically re-imagine the invention of infrastructure. This addresses the problem that, while in previous chapters it is shown to be possible to change the positioning and disposition or materialisation of an infrastructure, this can simply the expand what contents can enter, rather than change *how* a world is imagined in infrastructure and thus what is repeated in it.

By comparing these proposals, the chapter will also define how the imaginary can be used to remake and reimagine the active forms of infrastructure in how they repeat and in how the

bring together a context. Configuration is, therefore, articulated theoretically as a critical and practical cura-infrastructural artefact that can be used to be conceptualise how speculative conceptual infrastructures allow modes of making public and the curatorial to be further layered into infrastructural practices; allowing such interventions to performatively repeated as a disruptive mediator into the convergences of materials, meanings and practices of infrastructure. How the curatorial is integrated into the making and staging of meaning in this chapter is key to its capacity to affect infrastructural change. But only once it is re-posed at the convergence of material infrastructures and infrastructural images.

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## 1. Bodying forth: two propositions

How to re-imagine a world made by infrastructure? What follows is a comparison of two approaches to setting out how a world can be imagined and configured through infrastructure.

### Artefacts of extraction: EURO-VISION

EURO-VISION is an **"**art-led enquiry by FRAUD into the extractive gaze of European institutions and policies" (website), the project aims to chart "modes of power entangled in surveillance technology and migrant flows." The project comprises public programmes, exhibitions, talks, publications and podcast interviews. It collects, translates and presents a multi-media archive of research into European extractive infrastructures (such as the Critical Raw Materials Initiative) through an extra-disciplinary collaboration between academics, practitioners, economists, lawyers, actives and journalists. It explores what FRAUD refer to as the extractivist gaze of the EU's migration policy and its inscriptive operations on territories and bodies at its peripheries" (Arts Catalyst / RADAR catalogue, front cover).

The Critical Raw Materials Initiative (CRMI) was instituted by the European Union through the official communication "The raw materials initiative — meeting our critical needs for growth and jobs in Europe" (2008),[100] sent from the European Commission to the European Parliament and the Council. It is set out in a typically detailed, point-by-point EU policy document and

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[100] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52008DC0699. Last accessed: 30-6-2022.

constitutes a strategy to, in its words, ensure access to raw materials from international markets comparable to competitors; set the right framework conditions within the EU to foster sustainable supply from European sources; and boost overall resource efficiency and promote recycling of primary raw materials, decreasing import dependence.[101] The current list of over 30 rare earth materials includes the brittle, crystalline and greyish-white metalloid Germanium (used as a semiconductor), Phosphate rock (used in fertilizers) and the soft, silver-yellow, alkaline-earth metal, Strontium (used in many applications, mostly drilling fluid, magnets and pyrotechnics) (Latunussa et. al., 2020, 236; 525; 723).

As the object of study of the EURO-VISION research project and platform by artist/architect duo FRAUD (Audrey Samson + Francisco Gallardo),[102] the CRMI offers a key example of the convergence of infrastructural meaning, manifestation and mediation as it is practiced as a primarily conceptual model or protocol. By unpicking the composition of the European Union's Critical Raw Materials strategy, it shows how bodies, materials, the earth and so on are not only converted, but are also configured into the objects of a series of interlocking, *stacked* infrastructural imaginaries passing through the EU. Focusing on how imaginaries are implemented in practices that position, pattern and configuring various ecologies, resource supply chains and labourers, the project outlines the terms by which the imaginary layers of the European Union infrastructural reality construction and converge operates.

### Infrastructuring Critical Raw Materials

CRMs "are resources deemed economically and strategically important for the economy of a sovereign state, and have a high-risk associated with their supply.[103] Criticality is not derived from scarcity, but rather through the covalence between significant economic importance, high-supply risk and the lack of feasible substitutes".[104] For the EU, "securing reliable and undistorted access to raw materials" is an "important factor for the EU's competitiveness and, hence, crucial to the success of the Lisbon Partnership for growth and jobs"; resource stability is, moreover, not just about economic performance, but essential "sustainable functioning of modern societies" as a whole (European Commission 2008).

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[101] Ibid.
[102] Available at: https://euro-vision.net. Last accessed: 30-6-2022.
[103] See: European Commission. 'Communication from the Commission to the European Parliament and the Council - The Raw Materials Initiative: Meeting Our Critical Needs for Growth and Jobs in Europe'. European Commission, 4 November 2008. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52008DC0699. Last accessed: 30-6-2022.
[104] https://euro-vision.net/glossary/critical-raw-materials Last accessed: 30-6-2022.

As part of its strategy on CRMs, the commission produces three-yearly lists of CRMs. It builds trade and investment policies across the bloc, implemented through the European Investment Bank, facilitates national level trade policy and agreements and sets regularly-updated frameworks geared around these interests. (Küblböck 2013, 9). Alongside a list of current CRMs,[105] and where they are sourced from,[106] the CRMI homepage also outlines an ongoing updates and integration of CRMs at a practical and policy level of EU business: such as circular economy and their use in strategic concerns. The Commission also set up in 2020 the European Raw Materials Alliance (ERMA), open to "all relevant stakeholders along strategic value chains and industrial ecosystems,"[107] and which aims to focus the implementation of CRMI policies to increase EU resilience in the rare earth elements. The alliance's stated aims include identifying and responding to challenges in raw materials for specific industries including by "unlocking regulatory bottle necks"; and selecting, prioritising and bringing together investment cases in supply for EU funding and financing.[108]

Like other conceptual legal infrastructure, the CRMI is not visible as a whole, single or even mundane object, but is pulled together by plans such as the CRMI communication, whose repetition in policy and is consequences in practice effects systemic patterns across multiple trace instances of supply chain and extraction processes and regulations and is instituted into a normative, hegemonic and scalable form through institutions like the European Investment Bank, the ERMA and the EU institutions. The imaginaries or promise that sustain it are empty, but instrumental: sustainability, reliability (unhindered) access and growth.[109] This both entrenches an economics and supply chain of extraction into the bloc, but also consolidates the maintenance of European imaginary of a modern, technologically-dependent community in how these practices and apparatus are applied to the resources it addresses, their supply and processing chains and the locales from which they are derived.

As FRAUD make clear, how the agreements are positioned, or position a locality often lead to biological and geological exhaustion, often in the global south. As such, the visualisation of these infrastructural tools is situated into a geopolitical political imaginary and public, where

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[105] These include heavy and light rare earth elements and other metals; in 2020 there are 30, including Bismuth, Scandium and Natural rubber. See: https://ec.europa.eu/growth/sectors/raw-materials/areas-specific-interest/critical-raw-materials_en. Last accessed:  30-6-2022.
[106] Including Russia, China, Indonesia, Australia, the USA, Brazil, Democratic Republic of Congo, South Africa and others in Europe and Scandinavia. See: https://ec.europa.eu/growth/sectors/raw-materials/areas-specific-interest/critical-raw-materials_en. Last accessed:  30-6-2022.
[107] https://ec.europa.eu/growth/sectors/raw-materials/areas-specific-interest/critical-raw-materials_en. Last accessed: 30-6-2022.
[108] https://erma.eu. Last accessed: 30-6-2022.
[109] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52008DC0699. Last accessed: 30-6-2022.

these tools are supposed to, if not elide, in effect automate into the invisibility the CRMs and their mediating infrastructures within the neoliberal bureaucratic, legal and economic infrastructures, policy and practices of the bloc. Where the EU does not rely on the performative dimensions of imaginaries enjoyed by the singular nation, such as what Benedict Anderson called the imagined community (2016), this automation allows the bloc to persist as an apparently seamless and coherent lived and economic reality. Accordingly, FRAUD seek with the EURO-VISION platform to show both how the EU imagine a world that can be made to work together with the aims of the EU through the CRMI and, by bringing this to the surface, propose that this might be re-imagined critically.

### Systemic Integration: Primer

If EURO-VISION offered an example of the problem space presented by infrastructural meaning (both with the issues it deals with, and of the question of instituting the transformation or re-imaging it prompts), the following curatorial project, Primer, can be seen as a proposal for negotiating and instituting forms of infrastructural configurations to align with, activate and achieve agency within such systemic infrastructural imaginaries. Primer is a curatorial platform run by the Danish organisational research group Diakron and housed in the headquarters of "cleantech" water filtration company Aquaporin. Diakron are interested organisational development and hybrid approaches, particularly in response to what they identify as the "need for large-scale changes within current societal institutions… [and] work to be done in thinking through the many possible concrete ways such changes may come about" (Hilmer Rex and Aamot Helm 2021, 149). By engaging in research and interviews into a wide range of organisational practitioners, Diakron are invested in both a diversification of activity and structure through the art field and establishing more direct links with complex and systemic problem spaces of systemic crisis and the scientific, technological and organisational developments able to respond to and develop in relation to these issues (Hilmer Rex and Aamot Helm 2021, 150).

Located 15 kilometres to the north of Copenhagen, Aquaporin, their host produce a protein-based water-filtration formulation that can be applied to ultrathin membranes, including paper, which can then be wound up into a variety of use-specific tubular filtration modules. They position their business as a response to the problem of global water scarcity, situating it alongside many other businesses aiming to access the multi-billion-dollar markets which have grown around the 17 United Nations Sustainable Development Goals (2015), such as water

processing (Aquaporin 2017, 17). [110] The relationship between Diakron and Aquaporin began as an organisational experimentation. In 2016, the Copenhagen-based research group Diakron were invited by Danish art consultant Christina Wilson to work with the water-purification technology company Aquaporin (based just outside the city). Diakron was initiated in 2014 as a research platform and studio. Its five members had come together from artistic and curatorial practices, social sciences and graphic design around a shared interest in an increasing prevalence of hybrid organizations, active trans-disciplinary research approaches and collaborative institutional practices.

By mid-2017 and under the guise of the curatorial platform, "Primer," Diakron had initiated the first exhibition called *Self Passage* in Aquaporin's vast production and research facility. (The exhibition included work by artists Rachal Bradley, Vilhelm Hammershøi and Man Ray, science fiction author Peter Watts and material by the global healthcare company Novo Nordisk and America's space agency NASA.) However, when faced "with the challenge of introducing artistic practices, one can quickly over-identify with the space itself, while ignoring numerous other components making up the context" (Hilmer Rex and Aamot Helm 2019). Setting art in this context also allows a number of other overlapping uses, outcomes and "systems effects" (Ibid.). As such, Primer also attempt to open up their organisational research, development and production to systemic imaginaries; something lacking in the field of art. In the relationship between Primer and Aquaporin is an approach that moves beyond a collaboration, but as an attempt to integrate the former into the systemic fields and problems of the latter.

This work considers how systemic possibilities are configured, and how they might be reconfigured, as both imaginaries, and as instituted practices, organisational ecologies and horizons. In connection to, and in order to articulate experimentation in systemic issues, Diakron are also focused on the potential, but also need, for organisational experimentation in the art field; that is of "the capacity to conceive and test initiatives that deliberately negotiate fundamental aspects of how the sector is organized. … and to direct[ing] resources towards the reinvention and deployment of experimental programs that test new ways of organizing the wider sector" (Hilmer Rex and Aamot Helm 2021, 150). They do this in an attempt to address such systemic problem spaces as water scarcity (the focus of UN Sustainable Development Goal 6 and one of Aquaporin's focuses) which are on a practical level beyond the scope of many existing arts institutions and indeed infrastructures. As such Diakron seek to not only diversify the spaces for the showing of art, but also its role in other organisational forms and

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[110] https://www.un.org/sustainabledevelopment/sustainable-development-goals/ Last accessed:  30-6-2022.

processes — including in the corporate, open innovation and platform economies such as Aquaporin (Hilmer Rex and Aamot Helm 2019).

As such, in the guise of the curatorial project, Primer, they make use of what has been described in the infrastructural capacities established in previous two chapters, of positioning and patterning, to integrate curatorial work into the infrastructural domain of Aquaporin's model, production and narrative. Here, forms and relational images of meaning that can be understood in the terms established above offer a proposal for working in infrastructurally mediated assemblages are both at stake in the curatorial work of Primer and subject to speculative critical instituting or infrastructuring in their work with Aquaporin.

Where EURO-VISION explores extant gaps and glitches in the framing of the CRMI, Primer offer the possibility of establishing thresholds and shifts in relation to Primer's positioning and which also works to pattern and configure the systemic context and work of their organisational collaborators. Together and in different ways the examination of these projects offer a model for how infrastructural imaginaries can be mediated and reconfigured propositionally and productively between and in art and advanced technology fields.

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## 2. Primer and EURO-VISION: A case study in configuration

The above two examples can both be seen as explorations in imagining the world through infrastructure. They are each, in different ways, bound into a proposition that posits how a world could be imagined through the compositional alignments and mediating practices of infrastructural work. We can also see them as artefacts of infrastructural convergence, alignment and practice that can be productively be thought of through Suchman's concept of "configuration" (2012). But what is *bodied forth* by these infrastructural arrangements? In what configuration are they made public?

Key to understanding the composition and delineation of complex assemblages such as infrastructure is, for Suchman, the processes of 'configuration.' That is, the "incorporation of the user into the socio-material assemblage that comprises a functioning machine" (Suchman 2012, 56). As an artefact of a process, the trope of configuration retains at its core, not just the figure but also the action of *figuration*, that is, the assignation of shape and designation of "what

is to be made noticeable and consequential" (Suchman 2012, 62). For Suchman, configuration has a useful double meaning: as "a mode of ordering things in relation to one another (Law 1994), and the arrangement of elements in a particular combination that results" (Suchman 2012, 49). In relation to how infrastructure is used to manifest worlds configuration can, at a practical level, be used to study how infrastructures *join together* heterogenous relations, imaginaries and materialities to make things *work together* and produce the particular combination that results from it (Suchman 2012, 49). For instance, technologies must be amenable to the capacities of its users and parts (ergonomic designs (e.g., finger-spaced keys, visible-light-based information display) make human-technology interfaces possible; roads are flat), but users are also steered towards the capacities, affordances and imaginaries manifest in technology, "fixing them through reiteration but also always engaged in 'the perpetuity of coming to be' that characterizes the biographies of objects as well as subjects" (Suchman 2012, 50). Through configuration, users, parts or objects are made to work as a kind of prosthetic (e.g., a logistics worker and user must correspond to allocated times slots to deliver *addressable* objects in *addressed* space, raw materials must be supplied in an undistorted fashion).

Drawing on Claudia Castañeda's use of figuration as a "descriptive tool" to "unpack the domains of practice and significance that are built into each figure," the figure offers two key methods of analysis for Suchman (see: Castañeda 2002). The first is a category of existence that is understood in relation to its use or action. The second concerns what figuration 'bodies forth' (Castañeda 2002, 3). By reanimating the figures bodied forth and configured by infrastructure, speculative infrastructural figures can in this sense be used to explore how the material and the semiotic are held together by the ways that they "become naturalized over time, and [which] in turn requires 'unpacking' to recover its constituent elements" (Suchman 2012, 62). By moving through infrastructural patterns and positions set out in previous chapters such figures can act as descriptive tracers: acting as moments or events of clarification as to what happens when social-material and performative assemblages converge with the practices, forces, conditions that animate them. Yet as Suchman's reanimation of the constructedness of this figure shows, the realization of this figure is neither given in advance, nor does it have no relation to, or effect on, its surroundings. As such, as an analytic device configuration can break the apparent singularity of this artefact to show what went into, and what was excluded from, that 'image' of convergence and configuration between in/out; operative/non-operative, scales of object, relation and effect. It can body forth what loops forwards in the performative practices in the expectations of, and lodged *in*, infrastructure.

While configuration surfaces a familiar *cyborgian* human-non-human entanglement (Harraway 1985/1991 in Suchman 2012, 48), it also indicates how a more than social dynamic imaginary, forming, as well as politics, of infrastructure discussed in previous chapters can come to be operational. To recover the constituent elements of infrastructural events using Suchman's method is then to "reanimate" the figures that an infrastructure bodies forth, such as extraction. It can also be used speculatively, as a way of thinking about when or how things *can* work together; and how a world (or the reality constructed by an infrastructure) is or can be made in this way.

### Re-animation and working together in practice

The EURO-VISION project extends the CRM frame as a lens to understand how a wider set of proto-materials including labour and fisheries are "managed as resources to be extracted," and "how their plunder is mobilised and institutionalised" by the EU.[111] The objects, resources and labourers figured by the CRM and by the device of the Extractive Gaze can, in Suchman's terms be seen as a configuration. That is, as Fraud frame it, as both a means of recovering how things are made to work together and as a way of instituting these particular artefacts to mediating the world through that imaginary. The EURO-VISION project focuses this research, diagramming and visualisation through how the concept of Critical Raw Materials defines a "strategy for …accessing resources viewed as imperative to the EU's subsistence.… Policies are drawn up to ensure continued availability…" (EURO-VISION website, n.d.). FRUAD combine these histories and infrastructural policies in (and with) multiple modes of systems visualization and curatorial research to make this information visible, and to offer a counter point to those modes of mediation instigated by the CRM metric through their status as the outcome of extractive processes.

As an imaginary and framing, 'extraction' reflects and manifests what in Latin American scholarship is understood through what scholars such as Alberto Acosta call *extractivism* (Acosta 2013). That is, as an understanding of the earth and beings on it as "inherently commodifiable, violently turned into 'things' operating as a standing reserve for the accumulation of profit and power in the hands of a few" (Davis 2019, 15). Using this extractive attitude, or gaze, as a wider lens to understand how the EU might conceived of its broader subsistence in these terms, EURO-VISION draws attention to the instituted forms of this infrastructure.

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[111] See: https://euro-vision.net/about. Last accessed: Last accessed:  Last accessed:  30-6-2022.

As such, by reanimating the configuration of resources into the EU through the CRMI, a central question for FRAUD is how to "understand extraction beyond the removal and displacement of minerals"? Through examples, including videos about Franco's use of agricultural and fisheries policy and a booklet surveying surveillance research and development projects publicly funded by the European Union,[112] at stake in this project is *making visible* how CRM institutionalises a historically rooted extractive imaginary, baking it into legal and geopolitical trading vehicles such as Free Trade Zones, Free Trade Agreements or Public-Private Partnerships and using these as inscriptive devices distributed across a field within and without the EU defined by and for the persistence of its economic and resource sustainability. This aims at redefining EU institutions, labour within it and the political (imaginary) of the constituency / polity it conjures.

By seeing the CRMI and indeed the proposed figuration of the extractive gaze as a configuration reanimated from within the processes and economies of the EU, FRAUD challenge the singularity of the CRMI, that what "every artefact enacts … through delineations of that which it incorporates and those things that are beyond its bounds" (Suchman 2012, 50). This includes how the CRMI interlocks with surveillance and the flows by which migration negotiates legal and illegalized transitions across border infrastructures, including sea and land that become, through surveillance extendible, distributable infrastructural boundaries as discussed in the introduction through the performances of Zaides (*Talos*, 2016); or where ecosystems such as those around fish populations covered and depleted by EU fisheries agreements that displace these negative effects outside of those borders. Moreover, by expanding what in fact counts as part of that figuration as a mode of infrastructural public making, this can also be seen to, as Suchman describes, undermine the naturalization of those boundaries as "antecedent rather than ongoing consequences of specific socio-technical encounters" (Suchman 2012, 50) i.e., outsourcing these impacts as someone else's problem or fault in the supply chain. In an infrastructural sense this reanimation also, therefore, challenges the *operationality* of those figures implied by being configured into — or out of — the boundaries of the CRMI — or indeed coming under the Extractive Gaze.

### Speculative re-animations and visualisation: FRAUD

EURO-VISION reanimates the CRMI as part of a so-called extractive gaze, but it can also be seen to propose a configuration itself. That is, the concept and platform is a way of proposing the extractive gaze as a way of visualizing the outcome of a particular way that the CRMI makes things work together. By articulating a concept of what, how and why infrastructural

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[112] Published with Arts Catalyst and RADAR, Loughborough

imaginaries create — and how their composition is related to the conditions from which they are created — we can think of EURO-VISION as configured as an artefact and vehicle that layers into previous accounts to define and shape the imaginaries possible in and mediated by the realities constructed by and in infrastructure. But for Suchman, this can be taken further, the question of "how humans and machines are figured together — or *con*figured — in contemporary technological discourses and practices," can also be used to explore how "they might be reconfigured, or figured together differently" (Suchman 2012, 49).

This can be seen, akin to the use of patterning in the previous chapter, at least at a surface level, in the platform's use of the double capacity of diagram as a both an account or visualisation approaching the status of fact, and as a creative, organising or information-making and mediating structure. On landing on the platform this diagrammatic aesthetic begins with a graph showing the names of critical raw materials mapped against the two axes of supply risk (y) and economic importance (x). The design is pared back: white, with feint grey gridlines demarcating the field across the screen. Its diagrams are seen as both descriptions and constructions of power (Dávila 2009). But this is only a basic conceptual ground against which the rest of the project is articulated.

Clicking open a button marked "CRITICAL RAW MATERIALS" at the top of the page (alongside more static pages, about, publications and a glossary of terms) a series of colour-coded fronds descend to a set of case studies (each enclosed in a further expandable boxes) that thematise the so-called extractive gaze: "Carbon", "Fisheries", "Phosphate Rock" "Silica Sand". On clicking each of these case studies, further resources branch down: practice outputs and, following this, exhibitions grouped-together by the diagram according to the extant as well as expanded connections the project makes visible. A user must scroll down to view the curved, filament-like lines of this diagram which provides project paths to explore each subsequent, related part. In the lower parts of the diagram each boxed-in title is surrounded by a fan of images of an output or exhibition — this spread allows a user to navigate through to an archive and documentation of work produced for each part of the project (such as, for instance the video *Unclaimed latifundium: Eat more, fish further!*). The resulting effect is an impression of a connection between these parts that appears sequential and linear, but also seemingly dynamic and mediated by that connection towards a greater whole, outcome or systemic logic. This sets a *dendrogram* set this hierarchical arrangement of dependencies and connections as a primary interface with the project's themes, activities and exhibitions or publications.

The dendrogram is a kind of decision tree that shows hierarchical relationships and paths between parts of a relational or process-based structure, allowing objects mediated by those

relationships to be clustered together.[113]  This lends the platform a stated connection with the EU's CRM initiative (it is used to visualise resource and material scarcity and flow, such as in the Raw Materials Information System, particularly the Raw Materials Scoreboard[114]), a machine learning and web platform structure visualisation. But as convergences formed across layers and strategic integrations, visualisation or deployment of their functions, capacities, compositions and synthetic models as well as sensing capacity, drawing them in, these images can be better thought through how Lucy Suchman has conceptualized configuration: as a method of invention (2012) that makes these elements work together as well as on each other. More importantly, by staging this research as a proposal for how that infrastructure should be understood, making it public, suggest that for FRAUD such a platform and the understanding it establishes enables the possibility of looking beyond these instituted practices. This allows users of the platform and the researchers themselves to "look beyond these [extractive] practices to the possibility of thinking and doing *otherwise*" (FRAUD 2021 a). We can in this sense see in EURO-VISION two forms of configuration: reanimation of the extractive and the CRMI and of the proposition for thinking along the lines of the project diagram, a means of restaging the diagrammatic space of the CRMI in the terms, artworks and texts of the EURO-VISION project.

Primer offer an all-together more nebulous and entangled approach to configuration.


### Speculative re-animation and systemic negotiation: Primer


When asked why set up an exhibition and research space like Primer, the curator initially suggested that it was part of diversifying the spaces in which art could be shown.[115] As Primer go on to describe on their website, this symbiosis is connected to how an arts organisation might have to operate once the institution, or indeed institutionalisation is no longer a given trajectory: "We believe that renewing relations between artistic, scientific, technological and business practices necessitates novel organisational forms."[116] This appears to be less an interest in expanding audiences in the traditional sense of widening participation or local community engagement. It can rather be seen as a way of re-configuring the curatorial and the

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[113] https://online.visual-paradigm.com/knowledge/business-design/what-is-dendrogram/. Last accessed: Last accessed:  Last accessed:  30-6-2022.
[114] See for example: https://op.europa.eu/en/publication-detail/-/publication/eb052a18-c1f3-11eb-a925-01aa75ed71a1. Last accessed: Last accessed:  Last accessed:  30-6-2022; https://rmis.jrc.ec.europa.eu Last accessed: Last accessed:  Last accessed:  30-6-2022.
[115] Conversation with author, 2018.
[116] https://primer.dk. Last accessed: Last accessed:  Last accessed:  30-6-2022.

capacities of the field of art by bringing artistic and curatorial research into prolonged and open-ended contact with advanced technology platforms and organisations such as Aquaporin.

In many ways these overlapping registers stem from the mixed intentions of its organisers. For Aquaporin, a relatively small start-up, without the money for the art collections held by many larger companies, Primer offered an alternative way to use their space for art (Mitic 2018), also addressing a sustainability gap for artist-run spaces in Denmark.[117] Nor are Aquaporin simply a willing *venue* for these exhibitions. Based on an "open innovation" business model, it also represents the novel organizational forms Diakron had studied (Hilmer Rex and Raby 2019). In this model, Aquaporin encourages externally-developed products to make us of its fundamental purification system in a variety of other products (akin to the apps built for mobile phone platforms). While the exhibition and residency model has been central to how Primer are able to make use of Aquaporin's infrastructure and the value the company see in the presence of Primer in as but one, albeit divergent, aspect of its day to day running (Jensen in Steiwer 2019), this also allows Primer become proximate to the daily working of Aquaporin.

More importantly here, however, this relationship is also connected to the aims of Diakron to research and develop models of structural expansion, practical scaling up and shifting the scope of the field of art (Hilmer Rex and Aamot Helm 2021). Set amongst other organisational research by the group this can be understood through the organisational and infrastructural approaches and imaginaries within which they interface, and attempt to configure the curatorial / field of art into.[118] In this case Aquaporin. More specifically however, while Primer have a stated intention to diversify where art is shown, it is the speculative and responsive insertion of the *processes, figures and forms* defined by art and curating into the daily operation of Aquaporin, that is at stake. That is, how this reanimation can be used to stage a proposal for how to rearticulate the ways that infrastructural forms of making public might be transformed by speculative configurations and what is configured.

At one level the engagement between Primer and Aquaporin can appear somewhat nebulous. This relationship is, as members David Hilmer Rex and Aslak Aamot Helm write, based around research and developing a "set of processes and tools that would allow us to grasp the complexity" of the company, its platforms and their relationship with it in which, moreover they

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[117] Exacerbated by 2007 financial crash: many small-to-mid-sized galleries closed, meaning fewer spaces for the showing of art (Mitic 2018).
[118] See for instance, their research on Focused Research Organisations, which crossover and fund research between academic, start up and state levels, doing this based on road mapping and hybrid models necessary to work on systemic problems (Hilmer Rex and Aamot Helm 2021)

could think about long term effects of that working together (Hilmer Rex and Aamot Helm 2019). That is, to "explore the notion, that thinking through the effects of projects is not an afterthought, … but part and parcel of their development, execution and afterlife. This is what we term a systems approach to effects" (Hilmer Rex and Aamot Helm 2019). It is precisely this uncertainty that they aim to explore, and into which they institute alternative limits and operating parameters and work processes in that interface between Primer and Aquaporin.[119] The nature of this proposal can be seen to indicate a generative and deliberately incomplete understanding of how the organizations and their participants might be configured as they learn about each other; transformation can be modelled through how the configuration that allows them to work together is imagined and developed towards uncertain future goals that are emergent, or arise from the ongoing encounter. This is, in its form and in its configuration with the infrastructures that enable it, a distinct critical proposal to the speculative re-animation proposed by EURO-VISION.

Drawing on this possibility, alongside a means of recovery, configuration can also be used to conceptualize forms of relational instituting imaginary or inventive image able to be pre-enacted as a form of imaginary creation. Moreover, as is shown later, by using this framing, the particular mode and conditions of that configuration and the effect of making it public, of staging a configuration into infrastructural repetition, allows for a critical, transformative approach to the meaning infrastructural mediation and manifestation gives form to, composes, embeds and which is embodied and experience by infrastructural practice. As I will argue, by differentiating the effects of making a proposed configuration public, it becomes possible to speculatively *imagine* and reverse engineer different modes and conditions of configuration and bodying forth (or formed, activated and practiced) into an infrastructure. These differences can be used to transform how and what infrastructure institutes.

### Proposing configuration; Configuration as proposal

Where configuration can be used as a device to denaturalise the singularity of an artefact, to show that it is an ongoing negotiation (Suchman 2012, 50), it can also be used to think about the structure and effect of the forms of configuration when conceptualised as a proposition too.

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[119] While I was not able to carry out follow up research or formal interviews because of the Covid-19 pandemic lockdowns, this chapter has been informed by discussions with Diakron members over a number of years and project collaborator Victoria Ivanova (Goldsmiths, University of London, "Collaborative Constructions and Speculative Structures: panel discussion, 26 February 2020). It is nonetheless possible to focus on the structure and form of infrastructural configuration as it is materialised in this proposal.

For philosopher of science Helen Verran (on whom Suchman draws), being made to work together, indicates an onto-epistemological aspect to the act of configuration; that is where the assemblages and arrangements created by configurations is also a *working* together of knowledges (Verran 1998 in Suchman 2012, 52). In this is an aesthetic and ethical dimension. As Suchman channels Verran, in configuration is also a question: does this working together of knowledges homogenise "translation into a dominant party's terms" or does it allow for the creation of partially shared, imaginaries (Suchman 2012, 52)? For Verran, a some-times negotiator in land rights claims, this question rests on the capacity for recognition of multiplicity and difference, that allows for a negotiation. But if a configuration of knowledges can be conceptually transformative it must also allow for that partiality in the structure of that configuration too.

Such reconfigurations can enable new agential possibilities (Suchman 2012, 54), but this possibility also depends on the arrangement and repetition of the forms that make up the particular assemblage in which a configuration can appear. Suchman compares field work in medical management systems in the US and of public health accountability in rural Andhra Pradesh in India in which the completion and partiality of how the imagined operations were configured into different infrastructures can be used to examine how those figured into them could transform the system towards better outcomes. For instance, in a study of a US software system conducted by Judith Gregory which imagined a medical decision-making and control system that could be all things to all users (2000; 2009 in Suchman 2021, 51), the complexity of competing interests of automated expertise (software company), the eradication of clinical mistakes (medical researchers) and flexibility in representing the complex needs of patients (nurses and doctors) was ultimately obscured by the method of its achievement: a singular electronic health record (Suchman 2021, 51). A transformative rationalisation resulted in a standardisation.

In contrast, in India, as C. R. Ranjini showed, despite the imposition of monitoring and accountability of external targets set by international funders for meeting health care metrics, (which were in any case either falsified or being seen through the lens of "discipline and punishment rather than learning and co-development" (Ranjini 2007, 132, in Suchman 2012 54)), it was the ability of local healthcare workers to use initiative and draw on records and knowledge from outside official process that allowed for more effective healthcare provision (Suchman 2012 54). Abbreviating a much longer case study, the transformability and actual efficacy of public health was achieved by placing a figure that could negotiate, rather than an imaginary of a complete and unified system at its core. Reflecting this, how such formal differences give form to an infrastructural imaginary, and how this can be transformed or

negotiated, is key to rethinking infrastructure and how this form entangle and figure that imaginary in practice. Moreover, the systemic completeness or partiality of the artefacts such as configuration that realise its imaginaries can be explored by the extent to which it allows for difference to be incorporated and the extent to which it can also maintain that capacity for change or re-negotiation and re-configuration.

If EURO-VISION and Primer can be read as both imagining and instituting propositions for speculative configuration and the qualities an analysis of it can reveal — about what and infrastructural knowledge is, could be and could do — configuration offers a useful means of evaluating the difference between how the forms of those propositions attempt to stage a break or change. The partiality or completion of configuration can in these cases be used to differentiate the effect of how that proposition is imagined and staged has on the transformation or ongoing transformability of the infrastructure they address and of the relationship to that infrastructure for those configured by these proposals itself. This difference corresponds to the scope, scale and durability of the agential relations set up in the form of the negotiation in this proposition — moreover, such agency can be understood as a function of the thick or thinness of those relations as what the systemic closure or porosity of a particular infrastructural convergence and its repetition makes possible to know and do or not, as discussed in Chapter two. Specifically, exploring these propositions as not only critical claims, but as modes of making public the form of this proposition can be analysed through the means of configuration it employs: platform visualisation and practices of organisational non-differentiation and entanglement.

### A complete vs partial configuration

The formal and modal characteristics of a configuration can not only be used to analyse what is recovered, but also differentiate what is proposed, or imagined when things are imagined to work together as an infrastructure. Moreover, as Suchman indicates by invoking the question of the negotiation of a configuration through the capacity to partially-share or distribute multiple imaginaries in the same configuration, the composition or form of a proposed artefact can be used to describe its effect as an infrastructural model for making public. That is, as a model which is systemically iterated to imagine and institute a particular world, mode and form of achievement or mode of working together.

Though EURO-VISION offers an important visualization and reanimation, and though Primer's proposal for reconfiguration are nebulous, as modes of making public these two proposals

have a different effect on the infrastructural contexts to which they refer or work - that is as forms of complete or closed and partial or uncertain configurations themselves. What is the effect of *staging* a configuration as proposition on the singularity it creates; how do these negotiate ways of instituting infrastructural imaginaries in the forms they deploy? One way the propositional configuration made by FRAUD with EURO-VISION is made public centres on the platform and the visualization that structures it. By focusing its other modes of reanimation and platforms of display (artworks, podcasts, publications, etc.,), this platform and visualization are key to its critical claim of making it possible to allow the polity mediated by the conceptual and operational infrastructures of the EU think *otherwise* (specifically to extraction).

By incorporating what is excluded in how the EU make the public through this resource layer in the configuration of the infrastructural convergence it enacts, FRAUD offer an alternative account of how this imaginary is composed and how this shapes the European imagined community in relation to its economy. This sees those resources as limited and infrastructurally necessary economic units critical to the persistence of the political-economic imaginary of the EU. This is, of course, at the expense of those 'resources' as they exist outside of this framing; and in the diagram of the research into these processes. To think and do otherwise, this reanimated configuration is incorporated into the platform itself. When focus is turned to the mediating qualities as well as the interpretive and creative scope of these imaginaries as they are used, experienced and transitioned — that is, as composite means of instituting an infrastructural world — this example indicates how infrastructural imaginaries are actively constructed and practiced as a kind of image in which multiple domains, fields, layers (incl. the curatorial) participate and realize such imaginaries. By positing configuration as a reality construction and analytic lens to read this project, the layers, domains and fields that cohere around the CRM can also be visualized. These can be made visible, as in the EURO-VISION platform itself.

Yet they are not the images created by actors establishing a relationship between themselves and the world, but images automated into infrastructural diagrams and operations. Configuration also poses the con-figure as a *device or vehicle* for carrying partial and contestable imaginaries into relation with and within infrastructure. By returning to configuration as mode of instituting, to seeing it as Suchman does — as what John Law calls a method assemblage (2004) and for whom methods "are enactments that make relations between what is *present* (…knowledges, representations…) and what is *absent* (…context, … an othered, … an open-ended horizon of the unremarkable…")" (Suchman 2012, 55) — then the effects of making public through the proposition of configuration can be also differentiated according to how it articulates and stages that relation of what goes in and its repetition as a partial or

complete configuration. If in this sense configuration is a device "for articulating the relation between the 'insides' of a socio-technical system and its constitutive 'outsides'" (Suchman 2012, 55), then the effect on the possibility or proposal of transformation in the form of this visualisation would turn on its negotiation of this relation between its *own* inside and outside as what constitutes its ability to negotiate with its subject or object.

In these terms, while EURO-VISION is an example of the kinds of research and platform for collecting the distributed traces and instances of infrastructural work, meaning and study. But where it relies on a model of visualizing infrastructural inversion — bringing the back stage into the foreground — it also indicates the limits of *showing* as a mode of instituting the changes and difference these forms of infrastructural critique seek to enable. That is, while the extractive lens, EURO-VISION certainly develops a partially-shared imaginary with EU, configuring what was not present into the critical figure of extraction. But in the articulation of the project and its critique of EU extraction through the various forms of visualisation used, the constrained freedoms of the user-journeys on the platform itself and in the articulation of that lens as a mode of making public are a closed or complete configuration. They are, in short staged apart from the EU infrastructures and instead more like in Chapter one, in an autonomous public (this is in respect to the EU itself).

The specific technical-aesthetic quality of the dendrogram is of interest here and how FRAUD use its qualities as a diagram which creates a geometric space that can be cut into segments. Despite emphasising interoperability of the elements it coheres, it also builds a composite logic that builds from a single point. On the one hand this aims to make clear and provide a counterpoint to the fact that "despite its evident visual order" as Adrian MacKenzie writes, the decision tree, "does not say anything about how that order was obtained" (MacKenzie 2015, 437). On the other, while this clearly a project that uncovers something of the creation of the order in the CRM / extractive gaze, because of how the visualisations are consolidated in this way, and though it is representative and critical, it does — cannot — negotiate the method of those configurations. Simply, this is since the platform is not configured with them. From an analytical point of view, the starting point of the platform, more fundamentally this diagrammatic approach 'bakes in' a concept its aim is to maintain a critical separation with that edifice too. Its proposal is rather to enable a negotiation between the perspectives of user and the platform and that which it represents (CRMs, the EU, extraction and so on), to make the user re-think the polity of which they may or may not be a part.

By suggesting that EURO-VISION might also be read as a speculative curatorial-infrastructural artefact that can replicate and re-articulate some of the infrastructural world the CRM conjures,

this two-fold reality constructions (of extraction and the CRMI) can be posed as a kind of bridge or holding structure between multiple perspectives, points of entry and interpretative position. Yet, while it makes these issues and modalities visible, it also offers an example of the limits of *showing*. As — in its own terms — an only expository and explanatory platform, the EURO-VISION project demonstrates the limits of critical representations in re-imagining and re-making public such operations from a closed or critically autonomous position. That is, where critical practices (such as in art or curating), in an attempt to critique the organizing power and centralization it seeks to address from representational modes of disclosure and critique, where "art can point, but it can't grab" (Vishmidt 2017a, 267). The consequences this raises for approaches to transformative instituting that might take up the challenge of this kind of research in critical modes of making infrastructural imaginaries public (specifically through the curatorial) are taken up later in this chapter. But suffice to say, while the re-animation of an infrastructure requires a shared imaginary, to show such visualizations by making them public in this form configures them into non-negotiable propositions or imaginaries. Viewed as a kind of method assemblage that doesn't include its object, this proposal cannot, as such, work on the infrastructural imaginaries of EU, the CRMI or the chains of extraction themselves. It can only be differentiated *with* them. This cannot provide a model for re-imaging and re-inventing infrastructural intervention as has been explored so far.

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The proposal made by Primer on the other hand centres on establishing terms of engagements and the creation of interfaces and systemic recursions with and within their host organisation and, it is proposed, into the wider field of Aquaporin's work. As they write: "We wanted to operate with a differentiated model, that did not settle on any one specific format or type of relationship, but the purpose of which was to initiate experiments and learn from them" (Hilmer Rex and Aamot Helm 2019). One way this is achieved is that their proposal is built around the production of organisational research tools such as an *Impact Schema*, a conceptual grid used to navigate the relationship with Aquaporin.

The impact schema lays out a road map of speculative outcomes in several domains: *Impact Areas*, *Impact Types*, *Impact Questions*. These move up through increasingly interwoven scales from the "Aquaporin Culture and community" to "The art field." This optic enables operative "projects with more diverse effect chains and spectrums" (Aamot Helm and Hilmer Rex 2019). At stake is not the quantification or accounting for the fact of impact, but where 'impact' takes on "a navigational quality *during* our discoveries of possible impact areas and effects, allowing us to gradually facilitate and operate projects with more diverse effect chains

and spectrums" (Aamot Helm and Hilmer Rex 2019). Importantly "*Impact Cycles* may occur over a few days, to several years or even decades, but they all require a certain commitment or engagement to not simply falter and dissipate" (Hilmer Rex and Aamot Helm 2019). This aims to allow systemic research, work and processes to interface their host and studies systems and reflect the outcome of these interactions back into the processes, narratives and the conceptualization of shared strategic and systemic outcomes (Hilmer Rex and Aamot Helm 2019; 2022) as a kind of action research.

This aims to re-mediate the systemic imaginaries and practices of these non-art or curatorial forms through the specific capacities of that field. To do this, Primer follow Aquaporin's business practices, which are based on what Primer describe as an "open innovation" model.[120] This approach to business, which is developed around a focus on project collaboration and the sharing of intellectual property through specific licences habitualized in information economies.[121] For Aquaporin this model can be applied to its three core processes: acquiring the production means and patents for its core technology (the stabilized protein); its incorporation onto a membrane; and application of that membrane into a specific set of useable products or modules such as domestic tap water filtration system units.[122] All of these factors minimises the exposure of Aquaporin to the financial risks of research and speeds up the development possible applications for each of core patent areas. In the words of the company, this model helps in both "priming customers," having them co-develop applications and "obtaining market intelligence." (Aquaporin, 2018, 21))

How Primer attempt to mediate that relationship is a core claim of their project which also aims to purposefully set aside how the "skills and competencies" of the art field are currently deployed and discursively performed and presented in "existing cultural models and values" (Hilmer Rex and Raby, 2019). The curators hold monthly meeting with the company staff to

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[120] http://primer.diakron.dk/Info. Last accessed: 30-6-2022; see also: Hilmer Rex and Aamot Helm 2019; https://aquaporin.com/company/primer/ Last accessed: 30-6-2022.

[121] The Open Innovation model is a business practice that exploits software development open-source approaches to innovation, shared research and co-production, applying this to a variable patent framework. It suggests that companies move away from research-silo mentalities and secrecy and take advantage of external contribution and context. share increasing amounts of information and intellectual property (IP) out, whether through licencing, API platforms, customer testing and competitions. It also draws on skills from open-source communities, higher education institutions (HEIs) and other external organisations. (See: https://openinnovation.eu/open-innovation/. Last accessed 3-1-2024).

[122] As well as controlling the licencing and distribution of each of these three technology platforms through strategic development partnerships or specific product development deals with external research institutions or specialist companies — receiving revenue from how each of these are deployed as a sort of platform (Aquaporin, 2018, 15; 2017, 21); Aquaporin also undertakes much of its research and development through Public Private Initiatives (PPIs) with Higher Education Institutions (HEIs) or through state or EU funded projects. (Aquaporin as a commercial entity was developed out of HEI research, and retains this relationship (Aquaporin, 2018, 8).

share what they are working on, with the hope that, by their proximity, the constituencies of Primer and Aquaporin will inflect each other's working practices and through this discussion, outcomes more generally. The curatorial programme is positioned as a back drop against which to develop a series of open-ended learning processes and tools that allow artists, Aquaporin and Primer "to learn about … possible roles and functions in relation to each other" (Hilmer Rex and Aamot Helm 2019). For Diakron, the relationship with Aquaporin therefore offered both an alternative means to sustain a basic infrastructure, access to space,[123] and at the same time the scenario opportunity to put their research into "the relations of art to science, technology and organizational development," and aims to "create sustained proximity between otherwise disparate fields of practice," (Primer Website)[124] directly into practice — offering a direct interface with Aquaporin's organizational model. These tools and platforms allow Primer to generate a form that is configured to address the potential for their interrelation with systemic issues such as climate change, and resource depletion by making the world of art proximate to the processes and dynamics of an emerging technology platform, in this case, one of water purification technology (Hilmer Rex and Raby, 2019; Hilmer Rex and Aamot Helm 2019). By collapsing these worlds together, Primer also aim to use this proximity to address their own agency to co-determine the "set of possible futures" for these emergent fields (Hilmer-Rex and Aamot Helm, 2019).

While open-ended and systemically enmeshed vis-à-vis a specific critique it also develops a different kind of artefact or configuration systemically enmeshed in the field of art they seek to "diversify" and the organisation on whom they rely. The terms of what that relationship can do, how Primer, Aquaporin, artist residents, workers and the fields beyond this localization will negotiate each other's' work, remains a speculative infrastructural proposal. As a method assemblage that sets out and reworks the relations between these actors, agencies and processes, the proposal for an only-partially defined configuration thus generates a set of entanglement and processes of structural non-differentiation that change *emergently*. The negotiability of this configuration is at stake, but it is unclear how, beyond the practical tasks and project of daily use, what the outcome is, could be; and moreover, what could be changed about the systemic fields entangled in this relation. (This specificity of uncertainty is taken up in more detail in the following chapter.) As such, while the proposal is not a specific critique as staged by EURO-VISION; it is better seen as a mode of configuration that negotiates the partially shared imaginaries of Primer, Aquaporin, artist residents, workers and the fields they

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[123] Facilitated and hosted by Aquaporin; Primer is also funded by Danish Arts Foundation; Lyngby-Taarbæk Municipality; Danish Art Workshops. see: http://primer.diakron.dk/Info. Last accessed: 30-6-2022.

address, which is achieved through recursive and accretive proximity, but also as emergent an effect of being made public in an only partially-defined system.

### Two configurations of an infrastructural proposal

In contrast to the entangled negotiation between Primer and Aquaporin (articulated by the partiality of the configuration achieved by its proposal EURO-VISION is visualization that while reanimating the figuration of the EU, cannot work on it. It can enter into a kind of partially-shared imagining with the user. But by creating a complete system vis-à-vis the infrastructures it addresses, figuring it into the logic of the Extractive Gaze, and of the project itself, it is a mode of making public that does not (and cannot) work on the how imaginaries it addresses are imagined *through* the ways they are repeated. That is, in Thrift's terms, not working on the anticipation that naturalizes them (2004).

How this configuration is made public in form has specific effects. To use configuration as a method assemblage to examine the modes of negotiating infrastructural possibility that come with making them public is to draw attention to how entanglement, if it is partial and can be kept that way can be more transformative than that which even in its critical form is open, but which is in its instituted form closed to that negotiation. Using this frame, though Primer are entangled with a more powerful infrastructure they have only a speculative relationship with, and though EURO-VISION are critically aligned against and therefore apart from the infrastructure they address. In this case, there is a distinct outcome for these proposals for how to imagine infrastructure.

In this sense Primer begins to outline a model in which artists and curators might attempt to work on the broader matrix of interlocking framing conditions for an artwork as well as its content, display and relation to the world, by treating each as part of the same set of infrastructures, or as Easterling calls it, *medium* (2017). This description recovers the enactment of a configuration, but also describes what can be seen as an attempt by Primer to *body forth* a dynamic cura-infrastructural artefact or figuration which, acts a method assemblage re-setting the boundaries of how both Primer and Aquaporin are configured into the world, their context and each other. This establishes into that setting a partially-shared systemic, synthetic imaginary. This models ways of working towards specific goals and to act on systemic imaginaries as they unfold towards specific recursive aims such as scientific development, organisational approaches to open innovation and advanced technologies and so on (Hilmer Rex and Aamot Helm 2019). Here the latent institutional value of art doesn't cease

to exist, but rather becomes functional entirely within the wider assemblage and realities constructed and converging because of these parts, practices and proximities.

Similarly, though EURO-VISION practically, conceptually and visually re-animates extraction, its proposal for thinking otherwise also rests making public an artefact whose singularity is, in contrast to Primer, not disturbed beyond intended use. It is, in this sense, a closed configuration in which agencies cannot be negotiated because the extractive and CRMI imaginaries are not imagined and actively staged into a relation beyond the scope of that visualization. As such, the effect of each form of configuration as a mode of making a proposition public institutes two different degrees of transformability. This comparison should not put EURO-VISION and Primer at opposite ends of a scale, however. Rather, they can be seen as different ways of thinking through re-imagining infrastructure as that which configures, as artefacts that balance between specific critiques and visualization and on the creation of open-ended thresholds and interventions. This question of balancing also allows the possibility of rethinking imaginaries more broadly, and how infrastructural imaginers can be reimagined, and indeed how transformation of infrastructural effects and configurations can be reverse engineered critically. At stake here is the transformation in, and transformability of, these propositions for not only instituting configuration, but imagining different kinds of possibility through it. As such, the form of these proposals configures distinct possibilities for the creation and recreation of infrastructural meaning. This is not simply about the capacity to imagine; but the effect of how they are staged into and as infrastructural artefacts.

Can the convergence of curatorial practices and infrastructure institute configuration and counter-configurations? The difference in how these propositions outlined above for configuration each imagine and stage a configuration — by making it public — also helps to understand how infrastructure can be imagined at all. As the rest of this chapter argues, it is precisely through such specific balancing between openness and closure — of the configuration of that instituting imaginary — that allows both differentiation and re-making what infrastructure can be and do. Can this relational closure and activation of conceptual form of configuration be the basis for re-imagining a cura-infrastructural self-creation?

Specifically, reframing the mode of Castoriadis' concept of the instituting imaginary as a critical motor, in which form acts as a break (rather than being what precedes that break as in institutional critique), the configurations modelled here can also be used to understand how the inventive imaginaries which are at the heart of each chapter of this thesis can:

    a)   be understood as specifically infrastructural;

b) generate a transformation in an infrastructural imaginary that is articulated into its repetition and continuity.

This is key to <u>how, and if,</u> such critical practice might also be used to *transform* those infrastructural worlds.

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## 3. The instituting imaginary

At the core of this thesis is the proposition that, by seeing infrastructure as a kind of meaning making and that critically analysing how this is made (into) 'public' (or *genre*) can infrastructural forms and forming be used as a means of critical invention. Specifically, this is aimed at critically remaking how certain infrastructural worlds that exclude difference and close off the possibility of change. It has also argued, following Rutgeerts and Scholts' articulation of *Talos* as what Castoriadis's would describe as a primary or inventive image (2020), that the imaginary is a useful way of recovering and articulating the disparate traces, instances and practices that come together and are activated as that infrastructural form as a mode of world making or reality construction.[125] Previously, provision and coherence have been recovered from how practices and forms of infrastructural positioning and patterning generate the conditions for and instances of what provision and coherence actually mean and do in practice — a resource put in place, or removed, evidence mediated in / because of a pattern. How imagined images of provision and coherence can be altered, in terms of where or how they are achieved, has also been used to register how practices and forms of infrastructural positioning and patterning can also be used to create that shift in possibility — through building new infrastructure, or through expanding its content; or, in this chapter, in how such images are used to configure parts together and the effect of this style of configuration (here, as partial or complete propositions).

Moreover, this concept of the instituting imaginary has also been used to suggest that the imaginary of infrastructure is used as vehicle to institute new instances and forms of embedded and embodied infrastructural meaning (such as where cultural infrastructure is made, or where

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[125] This is articulated methodologically in the vein of Star's notion of the master narratives present in how infrastructures shape each interaction or mediation (1999).

FA change the disposition of a pattern). However, and more importantly, as is explored in the rest of this chapter, it also draws on the framing of the imaginary by Greek philosopher, economist and psychoanalyst Cornelius Castoriadis as a venue or vehicle by which to change how the worlds (such as reality constructions) are thought in the first place. This draws on but also transforms how Castoriadis mobilized the imaginary as the venue and vehicle of changing society. Through this I will develop a framework through which the connections between how something is imagined, what can be instituted and can be remade can be used as a propositional and practical model for remaking the (more-than-) social historical meaning and forms instituted by infrastructure. As this shows, at stake in the ways configurations are made public is how the form of that proposition relates to the transformative and systemic effect it may or may not have as both a mode of imagining, and of making public.

### Self-creation, the social imaginary and infrastructure?

The work of Castoriadis has been central to the discussion of the creative role of the imaginary in the self-formation of social groups and the meaning that holds them together (Straus 2006). One of his main contributions has been to argue for a positive, creative imaginary through which society was self-created, by imagining and instituting itself. By turning to Castoriadis, I want to ask how such an imaginary might be specifically transformative in an infrastructural sense: exploring how this idea can be applied to infrastructural meaning — which Castoriadis did not do in any more than a cursory sense. This allows the rest of this chapter to argue that the creative imaginary can be used to model what is changed by instituting and imagining change as a critical intervention in infrastructural reality construction; it also makes it possible to read differences in Primer and EURO-VISION as specific and potentially deliberate convergence of conceptual and creative decisions. This will mean posing cura-infrastructural practices as modelling the differences as means of imagining and (critically, politically, ethically) differentiating infrastructural change in order that it can be created through deliberate practices of making public, basing this on how and into what they imagine and make public their propositions.

This approach means exploring how such forms contain in them the conditions in which they can transform themselves and the worlds around them; how to conceive of how that difference is registered and thus the effect it has (on the social historical); and asking, moreover, what are the condition for this to occur? At the outset the concept of the inventive image that was used as a speculative device that could make a real form. As Rutgeerts and Scholts described, this meant that an infrastructural form or imaginary could be changed by pre-enacting difference

into the looping realisation of an existing imaginary. Invention was what enabled to change the condition of emergence in this speculative / critical scenario. As a speculative device that could make a real form; and as a recovery device it could ask: how has an infrastructure already been instituted?

However, as I have shown in previous case studies, while re-imagining infrastructure in this way is possible, another question arises as it is made public. That is, how to differentiate and change the effects or outcome of instituting an infrastructural imaginary: to not only expand it (Chapter two), but to also differentiate the effects of inventing or imagining according to how they do and can re-make the world (this chapter). How can we use the inventive image to stage the difference that Primer make possible in the repetition and configuration in which it emerges? By using this to frame the differences in the propositions between Primer and EURO-VISION as open and closed imaginaries and how that difference can be registered in the ways that infrastructure makes experienceable worlds, it become possible to establish the terms of a critical inventive infrastructural imaginary. This means looking at how for Castoriadis the task of invention was also about imagining a world that can be itself changed. At stake here are the following questions:

- What are features that constitute infrastructural transformability?
- What does pre-enacting actually institute into infrastructural repetition – as the form of the break and its content?
- How is this registered – practically (hence methodologically) and conceptually?

**Creating worlds**

The question of how and what is invented or instituted when a social forma is imagined is central for a thinker like Castoriadis. Moreover, the question at the core of this work was not so much what an institution is, but "*how* it institutes: what forms and what norms are being upheld and practiced" (Sheikh 2017, 127). At the core of Castoriadis' work is the idea that institutions are not representations of *a priori* principles, but that they are simply results of the imaginary which is fundamentally "the capacity to see in a thing what it is not, to see it other than it is" (Castoriadis 2005, 127; Straus 2006, 324). It can, therefore, be understood as a basis on which a social world is made and made meaningful.

> "I talk about imagination because of the two connotations of the word: the connection with images in the most general sense, that is, forms (*Bilder-*,

> *Einbildung*, etc.); and the connection with the idea of invention or, better and properly speaking, with creation. (Castoriadis 1994, 321–322)

The action of the radical imaginary is, in this sense, "what makes it possible for any being-for-itself (including humans) to create for itself an own [or proper] world (*eine Eigenwelt*) 'within' which it also posits itself" (Castoriadis 1994, 326). This image is for Castoriadis, moreover, not just a representation, but how the world, as a meaningful array of forms, figures, practices and concepts, is created. Drawing on, but departing from major psychoanalytical modes of the time (Sheikh 2017, 128), the venue for this coming into ontology is for Castoriadis, the psyche:

> "The psyche is… the emergence of representation as an irreducible and unique mode of being and as the organisation something in and through its figuration, its 'being put into images'."

However, the importance of this primary image is not limited to how it is made by individuals to create meaning, but how it is also made by individuals in social collectives to create form, meaning and coherence and project actual institutions. Through this fundamental relationship between imagining by individuals seeking to make sense of a world shared with others on the one hand and by collectivities seeking to mediate between these, society and the institutions that constitute it and hold it together are not an *a priori* object or mode of being; nor composed from *a priori* forms or imaginaries. Rather it emerges from the conditions and capacity of its members to imagine it, or rather to make images that create meaning about a world shared with others. As he writes:

> "That which holds society together is, of course, its institution, the whole complex of its particular institutions, what I call 'the institution of a society as a whole' — the word 'institution' being taken its broadest and most radical" (Castoriadis 1997, 6).

Through the collective creative work of creating itself as an "institution in general (the institution as form) as well as the particular institution of each specific society" (Castoriadis 2007, 71) a society is moreover, made of wholly imaginary institutions — i.e., created by its members out of their individual and shared context; with these imaginaries instituted through what Castoriadis calls both "social imaginary significations" the meaning embodied by an institution ("taboos, gods, God, *polis*, commodities, wealth, fatherland" (Castoriadis 1994, 332)), and instituting social imaginaries, what is signified by those significations. Though instituting imaginaries, significations and institution are there to hold society together, but this also generates a closure: once created the imaginaries are also where meaning begins to "crystalize" or solidify", in what he calls the "*instituted*" social imaginary. This instituted nature was the subject and

object of Castoriadis' revolutionary / socialist effort, the driving force behind his philosophical project.

By centring creation, however, it is always possible to create new images, imaginaries or institutions. This is because, even it appears specific and traditional a society is nonetheless instituted: it is always merely-social historical institution: *no more no less* (Sheikh 2017, 127). Developing his radical ideas of institutions as a critique of both stable institutional logics (such as monotheism (Adams 2007, 79) and the determining factors of capitalism and communism,) in pursuit of a more robust, concept of self-government or socialism (Castoriadis 2005) (in which all societies can only have instituted themselves, rather than being given (Castoriadis 1994, 336)), Castoriadis put institutions at the core of the problem of social creation and self-altering (Kli 2018, 127). Like this, Castoriadis extends the essentially creative underpinnings of society through an ontological claim for the historical instituting of sociality: that since instituting is how a society is crated, it always possible to institute differently" (Sheikh 2017, 126). This process provides, for Castoriadis the core dynamic in the convergences of individuals and institutions as they create and potentially re-create a society.

Instituting is, thus, an act of creative "imagination, with very real effects, as it is through institutions of society that our [or any] reality is both produced," (Sheikh 2017, 127). How and why these effects are created is for Castoriadis key to how any break with what is already instituted is possible. That is, moreover, how an institution is imagined (conceptually and practically) as signification, signified and signifier and reproduced in practice, rituals, traditions is related to and defines whether it is naturalized and closed, or whether changeable. For instance, religion closes off the question the creation of meaning (which is not the same as interpretation within its texts); this closed is sustained and naturalized in rituals (such as sermons or prayers in a church) or practices that constitute the social function of an institution (like registering births or marriage) through which it can "constantly attempt to reproduce this instituted social imaginary, this version of reality" (Sheikh 2017, 127). Conversely, an institution like language has more flexibility. It contains within it, like ancient Greek democracy — which represented something like an ideal for Castoriadis — the possibility for self-creation in the ability to imagine and to institute the new (See: Castoriadis 1997a, 338–348); change that could nonetheless be realised in new versions of those social forms.

How does this help to re-frame infrastructure? In part, because Castoriadis asks: why *this* institution. And can be asked here: why this infrastructure? But also, because he asks what and how that institution is achieved, and how it can be achieved, repeated or changed. Moreover, by centring creation as core to the both meaning and the existence of institutions — and indeed

any collective form such as a society to exist at all and as such (Castoriadis 1997) — the first key idea that helps to differentiate the modes of infrastructural instituting explored here is that how something is instituted is connected to how it is imagined as a creative act. This defined the critical, political and philosophical task of instituting and the imaginary. That is to keep the social historical nature of institutions at the forefront of our practical, conceptual and, for Castoriadis, our psychic, relationship to institutions meant asking: are we aware that society is created and can be recreated; can society, with this knowledge and with these tools be self-created? The conditions for this were both philosophical, practical and a political horizon. As such, to frame the institution or instituted form in Castoriadis' terms, is to put this question of creation and altering at the core of the content, status and durability of that form.

### A change both from within and beyond

This question, of the possibility of changing society and institutions, relates to the second aspect that can be drawn from thinking through imagining institutions with Castoriadis: that is how he locates change *within* instituted forms, as well as within the *capacity* to institute them and how they are created. Placing the enabling and foundational concept of the creative, primary *created* image of the individual at the core of his work also implied a radical instituting imaginary could always surpasses the social historical. As such, though the problem of institutions was central for Castoriadis, of equal importance was that the "imagination is not limited to the social historical" (Sheikh 2017, 128); it was not limited to what is or can be instituted. The capacity of the imagination to find gaps, breaks, aporia in any instituted, identarian logic, offers, in this sense, the possibility of a break: "no matter how far and long a particular imaginary has been socially instituted, there is always a *before*, and well as a *beyond*" (Sheikh 2017, 128).

Specifically, therefore, to recognise the social historical nature of an institution turned on how its createdness meant that it always contained a beyond in that creative aspect within and which exceeds it.[126] For an institution to be changed turns on whether this could be accounted for by a practice of imagining and instituting. Crucially, this was based on the idea that, while transformation would come in some sense achieved through the new "bringing into being a form that was not here before" (Castoriadis 2007, 73) — because he saw creation as fundamental, ultimately creation *ex nihilo* — it was not creation from nothing (*cum or in nihilo*)

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[126] A creative act in this context is to rearticulate the use of the term *bilder*, the idea of invention, and not its more progressive or coopted sense often associated with artistic freedoms or neoliberal creative industries.

(Castoriadis 1994, 321–322). Creation was in and from context: moreover, composed from desires, dreams and the radically situated experience of any individual part of a collective, this context and what was created from it always exceeds the actually instituted and agreed collective forms of the institution. (To return briefly to configuration, to reanimate the figure is to recover that which is within and potentially beyond and which went into the figure that appears in any configuration.) That such a beyond exists implies in this schema that elements of a society can be configured and re-configured: not only making decomposition possible, but also that "no imaginary institution of society can ever be complete" (Sheikh 2017, 129). Moreover, the existence of that beyond suggests a schema in which there is a field from which it is possible to extract and create. Castoriadis termed this dynamic and additive field *magma* since it both comprises and yet comes before all possible interpretations and creations or forms. 'Magma' "precedes and exceeds" any received language (Sheikh 2017, 129).

To suggest that this creation is the ultimate basis for meaning and form meant, therefore, that change cannot be predicted or prescribed and not made through changes to base then applied to politics in the superstructure.[127] Rather, change is achieved for Castoriadis through discontinuity, "either in the form of radical innovation and creativity, in art or science, or in the space of symbolic and political revolutions that can never truly be predicted or understood in terms of determinate causes and effects, or an inevitable historical sequence of events" (Sheikh 2017, 128). As such, to use this frame suggests that a break, or rupture, must come with or through a form. That is where the beyond can enter in the shape or effect of a new form: this could break the 'institutedness' or naturalisation of a social-historical form, or its closure of a social setting. And though Castoriadis situated this break in an act of individual or collective will to break with what is naturalised (Castoriadis 2005, 373), which is not relevant or possible within the distributed, recursive and relational agency expressed in infrastructure, it is nonetheless useful insofar as it prompts the further question of where and how such a break *can* appear in infrastructural terms.

### Is infrastructure social historical?

While the imaginary has, following Rutgeerts and Scholts (2020) and Star (1999), offered a heuristic through which the disparate traces, structures practices and operations that are systemically cohered as an infrastructure can be recovered; and while its inventive dimension

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[127] Again, this is rooted in a critical response to Marxist orthodoxies, which Castoriadis thought could not account for or allow its own theory of historical change unless it corresponded to a Marxist analysis, thus limiting the capacity for that change and for self-government (See Castoriadis 2005, 9–36).

has also underwritten a proposal for imagining and instituting through pre-enacting (chapters one and two); by drawing on Castoriadis, it is possible to ask how the possibility and actualisation of infrastructural transformation might turn on how to create form as a break; and how this is achieved through the ways that *the beyond* (from which things are created can re-enter). At stake in rearticulating infrastructural invention and imagining like this is, then, the capacity to allow for this social historical awareness in infrastructure, for the beyond to (re-)enter, for it be realised in form and to conceptually and practically register this transformation and difference. As outlined in the introduction of this thesis, to figure infrastructure through this question of imagining presents a methodological and conceptual problem. This turns on how this necessitates a methodological and practical departure from the institution and psyche; to proposals for the repetition and distributed forms and figures of the cognitions, interpretation and creation of infrastructure.

Where it centres creation as both a mode of social existence and of transformation in the break and beyond creation puts into instituted form, the frame offered by Castoriadis not only posits the question of: what or why that institution, but how it persists as a form of closure and how — if we imagine new ones — does that form persist or change. To see infrastructure in these terms is to ask how that beyond can enter and how it is already and can be realised into its form. That is, to ask how is infrastructure social historical and how can it be made so? This means framing infrastructure as social historical insofar as a beyond that created it and which exceeds it can be reanimated at its core. It means articulating infrastructure as a form that contains its own possibility of rupture; as well as proposing it as if it contains *within* itself its own transformation and transformability. Using Castoriadis to frame these examples is not, therefore, to apply a model for difference, change or form, but to allow specific kinds of questions to be asked of infrastructure so that a model for difference, change or form *can* be developed through it.

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## 4. Test Case 3: Making infrastructure (more-than-) social historical

Drawing on Castoriadis' framing of the inventive and consequential nature of imagining through the figuring of the potential of a beyond at its core, the final section of this thesis seeks to propose a framework through which infrastructural forms can be reimagined and made public. To posit this frame is to suggest that infrastructural change can happen, but also that this

transformability might be made to persist in the capacity for self-creation embedded and embodied in it.

As well as registering the possibility and form of difference in the instituted forms of infrastructure, this also means asking if conditions are right and if that form can be made public or instituted. For Castoriadis the conditions for transformation were arranged towards the horizon in what he called *autonomous societies* in which the condition autonomy of individuals and collectives is that they are able to *wilfully* create and institute the world around them (Castoriadis 1994, 337). This was contrasted with so-called *heteronomous societies* "where *closure of meaning* prevails," i.e., those not able to self-create and self-reflect on that creation, in which institutions were fixed (Castoriadis 1994, 335). Since the question is of change that is possible in configuration that would already jar with this overly neat separation between autonomy and heteronomy, but this horizon and the particular mode of this beyond (the psyche) are not at stake here.[128] By returning to Castoriadis, we can, however, ask of infrastructure *what are* the conditions, forms and praxes in which inventive image are possible. Moreover, to answer this question of the condition particular to infrastructural transformation also helps to reframe the problem of how to not only imagine, but also register that difference. That is both, by making change not contingent on idealized, unlikely and Euro-Centric individual freedom (Mbembe and Roitman 1995); and by reframing these conditions according to the possibility of an infrastructural beyond as it is partially and problematically situated in the repetition and recursive operations that activates that infrastructure and any need, desire, drive to change it.

The question at stake in seeing infrastructure as an instituting imaginary is, therefore: how to realise the social historical nature and creative form and beyond in infrastructural terms? The difference in the condition reframes the question as: how pre-enacting can similarly be a sense of imagining as a well as intervention into the pragmatics and performative loops of strategic and partial closures that make infrastructural form possible. Firstly, in the terms set out at the

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[128] This is in part because it is by now clear that autonomy can only ever be relative to the conditions or intentions of a particular perspective, or according to the non-autonomy of someone or something else to make that possible (Sheikh 2017, 130). This can also be drawn though critiques of Castoriadis's work that have shown individual create on multiple layers and entanglements that critique the cultural abstraction of Castoriadis' notion of society, to see it as a transformable and organisable whole (Strauss 2006), and which have shown that meaning making and imagining operates in more distributed and multiple levels and entanglements of cognition that the consciousness (Strauss 2006; Hayles 2017). Moreover, practically, this is also because of creation happening in incoherence and contradiction (Mbembe and Roitman 1995); or because of Castoriadis's totalisation of the horizon of transformation to exclude forms that accommodate intersection or identity as modes of institutional transformation simply do not accord with the politics and reality of infrastructurally-mediated worldings (Castoriadis 1997a; Strauss 2006).

outset of this thesis, this means how the beyond and the break can both intervene in the continuity of infrastructural repetition and the performative and operational loops that produce it. But secondly, how that beyond can be situated as a constituent possibility *within* that form and that activation. The differences in the propositions for configuration point the way.

**Reanimation of the beyond**

To show that an institution is created, it is for Castoriadis more importantly to show that it can be re-created: that it is social historical and nothing else (Sheikh 2017, 127). Like the institution, these artefacts are not free-floating. Rather, they are constituted in a circular relationship with the context in which they are created and in which they are created to make sense of as instituted form. This, however, makes for a more complicated question of change. With its formal internal coherence and completion (Castoriadis 1999, 335) the institution referred to by Castoriadis, could be broken with in a praxis of reinvention of the content of the image it institutes and repeats social rituals and values with or within religion, for instance. Infrastructure, however, is distributed, systemic and performative, it changes through accretion and sedimentation and is realized in a practice achieved through performatively achieved repetition. Returning to the work of Thrift (who drew on Castoriadis in other work, see Thrift 1996) discussed in Chapter one, we can also sketch how this instituting imaginary is form/is formed in the 'whole' imagined and performatively conjured by the what he called the "technological unconscious" (2004).

The imaginary or technological unconscious can be seen as the meaningful scope or extent of the world that an infrastructure institutes; this 'whole' is only possible, however, because of the performative practices of repetition that activate an infrastructure as meaningfully anticipated and repeatable. These repetitions are guided by structures and systems (such as addresses or protocols), that contribute to the form of infrastructure (as Larkin describes 2018), but which, as Easterling clarifies is only form once activated (2016). To see this through the lens of the imaginary or what is anticipated is to show that structure can be active in an imagined sense too; i.e., structure becomes an active infrastructural form in anticipation of what it will do and according to the world in which that arrangement is meaningful. As the previous chapters indicated, difference in what is instituted is possible through how the boundaries of what is configured, or imagined in the context of those arrangements, and how they are shifted in what can be or is instituted because of that configuration. How is infrastructure changed — what is the difference of its rupture?

In Chapter one, for instance these differences turned on how the articulation of the Granby Four Streets into an infrastructural whole meant that it could, at different levels, be aligned with different actors and different ways of abstracting and deploying the potential of this infrastructure (from community, to financial, to curatorial value). This difference is less a break between distinct forms, but a rupture in the sense of continuity that an infrastructure both mediates and in a specific instance generates. That is through, for instance, the promise of a particular repeating outcome of housing policy, the gathering of evidence, or the sustainability of resource allocation or art funding. Hence, where interventions work on pre-enacting accretions or approaches to how the structures and systems which guide those performative practices come together in a shared form, these differences in the configuration of the boundaries of those artefacts indicate how form is created and is created as a break.

To begin with the imaginary is, in configuration, what is folded into that artefact: what is bodied forth; its repetition and the layers from which it is configured; what guides the infrastructural work that configures and goes beyond that configuration, or the wider assemblage of which it is a part. By reanimating what is bodied forth, what is naturalized as antecedent about the boundaries of an artefact and its enabling assemblage are shown to be social-historical. Following this, the question of how these imaginaries are formed, how they are instituted, and how this can be transformed to intervene on the worlds they make, turns on what and how difference can enter the continuity — or repetition — of that image they give form to and enact in a working, useable infrastructure.

### What is the infrastructural beyond?

As I have shown in previous chapters, position, pattern, are configured as an artefact and venue where meaning is created through how and what is brought together. For instance, in Chapter two the traces of information such as the shape of an explosion plume, the technical specification of a missile diameter or footage of an unseen officer used in the investigations cannot make sense as coherent patterns outside of the investigatory infrastructures they build. As an image is created to propose the terms of a world it holds together, configuration can be seen in more detail as an artefact which shows how that infrastructure is instituted and under what terms. Viewing instituting via configuration can also explicitly put at stake how imaginary is composed through forms of position, pattern and, here, configuration, that define the boundaries of that artefact as and in meaning, value, force and so on. For instance, in the way that, as Bratton writes a user is not an a priori sovereignty, but a relational figure (Bratton 2015, 251), EURO-VISION reanimates the figures of the CRMI, labour and fisheries to show the

relations that go into defining the boundaries that activate them — specifically as being within the orbit of EU economic sociality.

Viewed through the question of how an infrastructural instituting imaginary can be social-historical, configuration can be used to show that the beyond is in these infrastructural institutions in the first place. Through the re-animation of the artefacts figured by the infrastructural contexts at hand — the CRMI, fisheries, the art field, systemic issues — Primer and FRAUD, show that what was negotiated beyond the boundaries of a particular method of assemblage, can be both shown to exist within its broader instituted actuality, and potentially brought back into play or negotiation — at least in terms of how the surface imaginary of the EU as a coherent entity is understood, rehearsed and repeated. The propositional imaginary of each group is built around this possibility: for FRUAD this expansion of the figure to show what is beyond the artefact of the "resource" in ' extraction' both allows and demands the option of thinking *otherwise* to the figures and roles naturalized in the CRMI; for Primer, at stake is the potential for systemic integrations, collaborations and unknown scales and scope of the effects of integrating art into the field of water filtration — something that can only yet emerge — which is at stake.

Here, as proposition, a configuration is a conceptualization of how a difference can be conceived as an image, that image can be instituted in an infrastructural form that has already been or is yet to be excluded (deliberately or not). For example, as extractive gaze, a collaboration as systemic interfaces (such as impact schema), a promise or roadmap within broad, uncertain problem spaces. To define this beyond within the heart of an existing infrastructural repetition can therefore be seen in Castoriadis's terms to imagine an infrastructural image or form as break or rupture in what is already given, instituted or naturalized as fact. Crucially, if the fragility of infrastructure requires a certainty of operation and closure of the parameters of its repetition and use, it is negotiation, uncertainty, bumpy but ongoing alignments in its configuration that give shape to this rupture, not only a cut or break with it. Proposing this reanimated, negotiable configuration also generates a conceptual rupture in the naturalization and continuity promised in existing infrastructure. This is a beyond in the imagining of infrastructure; after being reanimated, the proposal of these re-configurations is that this (re-)negotiated artefact can also be folded back into an infrastructural setting practically. This generates a rupture in the *imaginable* promise of infrastructural continuity. For EURO-VISION this is predominantly conceptual, posed by the question: if we understand the CRMI as part of an extractive gaze, how can be belief this as a form of economic sustainability? For Primer imagining a beyond into infrastructure is practical and onto-epistemological, a means of exploring what organisational forms are needed to achieve large-

scale changes to current societal institutions (Hilmer Rex and Aamot Helm 2022). As a mode of pre-enactment, this proposition works in advance of and abstraction from the practical and dispositional re-configurations in Chapters one and two, in which an infrastructural form is staged back into the continuity of just working as expected (not least because these infrastructures serve specific operational purposes).

EURO-VISION and Primer reanimate what has been configured through the denaturalization of that configuration — showing that the infrastructures they address are social historical. As a conceptual or speculative question of what is imaginable, this re-animation and re-configuration proposed in these artefacts also makes it possible to rethink the possibility of creating change in forms of infrastructure. Yet, as is shown in this chapter, if configuration contains in its artefact the rupture of an already configured negotiation, how it is reanimated and proposed is key to how that beyond can be, or is brought back into the what subsequently unfolds. Moreover, and more importantly for the claims being established in this thesis (vis-à-vis the reposing of the curatorial into the generative and sustaining convergences of infrastructure), is how that proposition is made public. How this proposition is made public as a kind of break in the continuity of configured forms also allows for a different question of the possibility of imagining infrastructure.

While propositions for the reconfiguration and reanimation of infrastructural artefacts allows for the possibility of a beyond to enter conceptually and practically, the question which can be asked through the framing of a critical instituting imagining is: does this proposition close off the possibility of the entry of the beyond into that proposition by how it is instituted, or does it keep that open? The previous analysis of the partiality of the configurations has already provided a distinction between partial and complete configuration. However, by describing the specifically infrastructural terms by which that difference allows specific forms to be made public and to have different effects because of this, the next section offers a critical approach to how form is mediated as an effect of specific kinds of rupture and creation. This is key to working on and utilizing the balance between specific critiques and visualization and on the creation of open-ended thresholds and interventions. Addressing this mediation as part of an infrastructural proposition or imagining is key to the *ongoing* transformability of what is bodied forth and whether an infrastructure can stay open to change.

### Registering infrastructural transformation

Centring on the question of instituting, Castoriadis's concept of the imaginary can be used to frame the transformative possibility in recognizing the importance of both the institution of meaning, and what is beyond that image, to what it possible. This can be used to bring the inevitability of infrastructural anticipation and repetition as a mode and form of world making into question. The differences in the effects of how each proposition by EURO-VISION and Primer is made public is central to the argument made in this thesis about the transformation of infrastructure. However, more important to the possibility of a staging a critical transformation of infrastructure is how to work on the repetition itself. That is, how propositional forms can act as a break with what is already instituted into repetition and how this turns on the possibility of what Castoriadis referred to the possibility of *self-creation* as an ongoing mode of making infrastructure public and infrastructural public making. Using the questions prompted by Castoriadis's concept of instituting the central stakes of this chapter and its role in figuring the infrastructural into curatorial practices can be re-framed thus: how do the forms of imagining infrastructure set the conditions for transformation as a creation in itself (and for its own transformation) once it is instituted?

For Castoriadis what he called autonomous societies — those structurally able to break from previous iterations — were central to possibility of change; however, in the entangled, recursive and situated forms of infrastructure and how these are interlayered and interoperate, difference is layered into multiple existing forms, imaginaries and expectation. This break and the conditions for it are more complex. If previous chapters used the device of pre-enacting to stage a rupture into the repetitions of an existing infrastructure, the configure — as both artefact and method of creation through different kinds of negotiation — helps to reframe the terms of possibility of 'preenacting' as a balancing between rupture and continuity as a proposal is assembled into, and as, an infrastructural imaginary.

The effect of a configuration can be seen in how it mediates the repetition it is instituted into. That is, the difference in how that configurations extends its proposition or imaginary as the affective experience of being embedded into the present made in that repetition — what it means to be *being mediated* by it. The experience can be described through how Lauren Berlant uses affect to describe the relationship between experience and the present as a historical or differentiable form: affect she writes, is the result of "the body's active presence in the intensities of the present," it "embeds the subject in a historical field," it can, moreover "communicate the conditions of an historical moment's production as a visceral moment" (Berlant 2008, 846).

By offering a means of sensing both a collective and translocal experience, the affective dimension of infrastructure can be understood both in relation to the direct encounter of being configured into it and beyond it, to its outcome, in relation to its promise, or to what might exceed that moment of configuring. As a mode of analysis, it allows for an attention to the embeddedness of configures "in scenes that make demands on the sensorium for adjudication, adaptation, improvisation and new visceral imaginaries for what the present could be" (Berlant 2008, 846–847), or what she calls of the historical present, here of the conditions and experience of repetition. To draw attention to this experience of embeddedness is then to frame the making public of forms of infrastructural configuration as sites which balance the possibility of negotiation or completion: of being assembled into a partially shared, or closed imaginary.

In this respect, where configurations shape the present historical, how what Law calls the method assemblage of the two propositions as configurations of in and out, also defines the experience of being repeated in that balance. To put it another way the negotiability of Primer offers a model that mediates a historical present able to make demands for "adjudication, adaptation, improvisation and new visceral imaginaries for what the present could be" (Berlant 2008, 846–847) — in in which these demands can be registered in that configuration.

Framed like this, to ask how infrastructure can be imagined as a venue for self-creation turns on the capacity for negotiation assembled into that artefact. That is, how it makes parts and practices work together as infrastructure. How this proposal changes or repeats as it unfolds. And with this, together, how infrastructure is imagined as and through an experience of embodied and embedded mediation or being mediated. Seeing these artefacts as a configuration or method assemblages that mediate these boundaries in and as repetition differentiates the effect of this creation. This difference is registered in whether they are complete, or which are only partially-shared propositions through the experience they shape. Where, in other words, the form of the break persists in the experience of that form as changeable or not. What are the conditions for this transformation and can these be preserved?

This affective dimension finally points at an imaginary artefact whose proposition or imaginary horizon is what can be called, echoing the more than technical, more-than-social-historical. That is, where change and instituting occur in more dimensions than just a break between before and after, but are recursively experienced and staged in the repetitions and systemic dimensions of the present historical by which infrastructural instances are experienced. As an affective experience defined by being embedded into a scene that is configured with others, including, as this thesis has argued, infrastructural artefacts, this more than social historical

proposition also refers to an expanded sphere and assemblage of actors in which the effect from stage a form is registers and from which the meaning of a configuration is arrived at. The systemic effects possible for Primer are defined by the grid of the impact schema as much as their decision about which project are of interest. Similarity, the dynamics of the ecologies of the objects of study in EURO-VISION are equally as important to the framing of extraction as the economic imperative of the EU. As such, the idea of the more than social historical defined by the conditions of repetition as much as experience must also be registered differently to the anthropocentric frame used by Castoriadis. To open out the imaginary to the configurations of infrastructure, is also to open out the creation of meaning as it is mediated by what N Katheryn Hayles' calls the cognitive assemblage (2017).

### Cognitive assemblages and *the unthought*

Though explored in more detail in Chapter four, the cognitive assemblage nonetheless offers a frame for encapsulating the invention and proposition of meaning configured across and between the parts, actors and practices infrastructural assemblages. Hayles uses the cognitive assemblage to explore an expanding field of cognitive activity and systemic interrelation that comes with the "development of technical autonomous systems, … the spread of computational media into virtually all complex technical systems" (Hayles 2017, 3) and how these interrelate with human and more-than-human cognition and meaning. Coming to form what she speculatively calls a "planetary cognitive ecology" (Hayles 2017, 3) such cognitive interactions are key to any consideration of agency, power and information in contemporary, complex worlds mediated by infrastructure and other systems (like ecologies).

Primarily, this relationship depends on an understanding that, despite the potentially "profound differences" (Hayles 2017, 13), biological organisms and technical systems can share "*structural* and *functional* similarities" (Hayles 2017, 13). As Hayles argues, these similarities ultimately correspond to the interpretation of "information within contexts that connect it with meaning" (Hayles 2017, 22). Where the meaning of information is "given by the processes that interpret it" (Hayles 2017, 23), the radically different ways that contexts can be understood for different situations shapes the operation of each cognitive assemblage. Where these information, sharing, interpreting and mediating entanglements produce distinct (and infrastructural) forms and figures of meaning, cognition and resulting practice, what Hayles describes as cognitive assemblages are key to how infrastructure both bridges that gap in curatorial critique of instituting vis-à-vis the relationship between conditions and content and

more simply offers a particular form of creation in response to the challenge of Castoriadis — more specifically an assemblage of self-composition and creation.

The significance of the cognitive assemblage is, therefore, how it can be used to clarify how the particular modes and agents of meaning making in these assemblages — of which infrastructures are a key part if the analysis of the imaginary moves past the psyche (as in Castoriadis) and into 'a beyond' or magma constituted by the possible materialities, processes and ecologies converging in and around infrastructure, as have indicated so far. For instance, that is (as becomes clearer in Chapter four) where meaning is established by "interpretations performed by cognitive processes" (Hayles 2017, 26) and ruptures manifest in dynamics that unfold within environments "in which its activity makes a difference" (Hayles 2017, 25). Specifically, by placing emphasis on the "flow of information through a system and the choices and decision that create, modify and interpret that flow," (Hayles 2017, 116) the cognitive assemblage also draws attention to location of power and politics through what Latour called mediators objects modify behaviour (Hayles 2017, 35). How such assemblages allow for the particular systemic forms and interpretations, and of how those meanings are shaped based on how it forms conditions (and how it makes those conditions repeat) offers a framework for differentiating the *specific* points and connections in cognitive assemblages where information flows are initiated, modified or transformed in a dynamic system and form of meaning making like infrastructure (as opposed to the more static and stable form in Castoriadis' work, the institution). Such flow and mediation thereby determine "the kinds and scope of decisions possible within milieus and the meanings that emerge within them" (Hayles 2017, 117).

To begin with, the mediator helps to conceptualize how a configuration works to joint things together as a form for, and through which, meaning making is expressed in the unfolding of the multiple parts that make up, activate and which are configured by an infrastructure it also helps to focus and enact. And as being that which is produced by mediating context of the assemblage itself. But can, following Castoriadis, this also be a venue for self-creation? This is an important question for the curatorial in which constellations of meaning making, images and artefacts are stage in about the wider world as a kind of mediator in it, As the differences in how EURO-VISION and Primer reanimate and negotiate the configurations they pose attest, to propose an infrastructural configuration is also to imagine a practice, relationship, world making system mediated by the circular relationship between how a configuration (as proposition) produces and (as form of making public) is produced by its context.

As such, by opening up these bridges between cognitive processes, we can think about configuration as part of a productive movement or transition that both shapes mediators

towards the possibility of new relationships so that transformation is possible (Hayles 2017, 46) and as enabling particular possibilities (Hayles 2017, 55–56). Creating infrastructural meaning might, then, be thought of as a process of generating and fixing contextual relations and practices of mediation. In this sense the infrastructure meaning becomes a dynamic effect of relationships and decision that are made in an assemblage – such as in the case of configuration; and that which holds these layers and levels in place according to models or propositions for that movement and mediation.

Moreover, where the cognitive assemblage can also be used to show how forms of mediation or mediating forms are staged, made 'public' or instituted, the mediator can be used to show how configuration acts as a form which can contains a rupture or its possibility into the experience of that assemblage. That is to say as form which changes how repetition is established through the mediation performed by it, and how this defines the experiences of that repetition in a particular way. To stage a proposition for of a configuration is pre-enact that particular rupture in this mediation of repetition, to insert a rupture into the continuity of a mediation of a particular present. The rupture in continuity that allows for the invention of new infrastructural forms in Castoriadis's terms can in this sense be seen less as break and more a change, bumpy repetition or rupture in how the world is experienced and how this mediates the possibility of it; to imagine this, to institute it is to imagine these interactions and mediations.

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## 5. Cura-Infrastructural imaginaries and self-creation

To think of the device of configuration as a mediator in the wider assemblages through which infrastructure makes meaning and makes that public makes it possible to think about such configurations as a meaningful artefact whose formal differences are related to the effect it has on the assemblage when it is staged. Moreover, this shows how such propositions can be, not just open to possibility, but as in the case of Primer able to make an opening in what is practically possible in an assemblage by *how* it mediates the meaning it makes and stages. By allowing new meaning, relations or proposition to be folded into the repetition of that assemblage and infrastructure, that is, acting as a mediator that allows the beyond to enter into the way that assemblage is configured, operates or is performed as an ongoing or continuous relationship or active form (i.e., into how it mediates boundaries and relations). This is not a single break. *This* idea of change in the mediation performed by such configurations allows the

characterization of such cura-infrastructural artefacts as dynamic ongoing mediators aimed towards the re-configurability of an assemblage. As a cura-infrastructural artefact the critical role of such practices and forms of configuration can be understood through how meaning is made through making things work together and for repeating this relationship as a form of mediation. To move from performance as in Zaides' *Talos* (2017) described in the introduction, to a mediator as described here allows us to explore how the difference in the form that is preenacted makes and differentiates an *infrastructural* effect in and on the assemblage it is a part of, rather than just, as speculative model.

As the differences in how EURO-VISION and Primer reanimate and negotiate the configurations they pose attest, to propose an infrastructural configuration is also to imagine a practice, relationship, world making system mediated by the circular relationship between how a configuration (as proposition) produces and (as forms of making public) produced by its context. This capacity to change and adapt is key to articulating and differentiating the role and position of the curatorial in staging cura-infrastructural artefacts. Specifically, this change corresponds to the potential of curatorial actions, artefacts, knowledge or events, in transforming the alignments, tensions and configurations of infrastructural convergences and the meaning generated in, and instituted through them. The break in continuity achieved by staging a partial configuration can in this sense be understood and poses as a change in how the world is experienced, how this mediates the possibility of that proposal.

How this embeds figures, parts, practices into an infrastructural scene is also about conceptualizing the shared effects of experience and repetition across an expanded field of critical practice. This expanded field is taken up in Chapter four, but here it shows that transformability — in how present historical conditions for folding back change into the continuity of an infrastructure — might be contained between the artefact itself, the conditions for and the practices of meaning making and interpretation between them. Where infrastructural meaning is a feedback between context and interpretation, to self-create also requires the capacity to self-compose that context: here configuration provides that bridge. The object for articulate this possible is what has been posed already: cura-infrastructural artefacts as a kind of assemblage imaginaries.

As such, configuration can be read through curatorial practices that intersect infrastructural worlding as how models of infrastructural meaning are instituted in a cognitive assemblage defined through the shared mediation and interpretation of the promise or operation of an infrastructure. (This includes the constituent entities of an infrastructure, it users and

maintainers whose qualities are defined by how they are mediated by that promise and operation.) For example, the CRM produces con-figures dependent on or determined by how various parts, labourers, environments are conceptualised and processed in relation to, or for, EU economic and cultural stability, competitiveness and, more recently, claims of sustainability. As FRAUD attempt to articulate, however, this is different depending on how one enters and interprets these narrowly defined infrastructural parameters: with extraction and histories of political exclusion and violence baked into the repetition of these mediation structures and systems. They can do this because of the precarity of its complexity and abstraction. But as a mode of making public and critical transformation viewed in the context of the framework of expanded critical practice proposed in this thesis, it suffers from a lack of infrastructural agency and power — or complicity with that power and agency (cf. Forensic Architecture in Chapter two, who are well resourced) — vis-à-vis its ability to work on, disrupt or institute difference into the much more powerful economic and materially powerful infrastructural layers the CRM is interlaced into (namely the EU institutions, its deep legal protocols and policy, nations state legal integrations, cumulative wealth and military power, historical post-imperial structural and material advantages and so on).

Seen like this, as layers of creation and imagining in the assemblages of infrastructural meaning, materialisation and mediation, the potential as well as potential problems raised by practices that stich these different aspects of infrastructural creation together entails that infrastructure can be seen as a specific kind of artefact or image for any critical re-imagining and reconfiguration for the curatorial. It also prompts the question of how transformation can be achieved in negotiation, or critical antagonism with the other, systemically, integrated layers of the assemblages at stake.

Drawing on the combination of instituting as creation, and the cognitive assemblage as site and vehicle of complex interoperation and intervention, such a cura-infrastructural artefacts and fields *can* be come negotiable. By proposing a specifically *infrastructural* methodological approach to these multi-dimensional instituting imaginaries, the surface on which such configurations are achieved into which a difference might be staged and transformation might be articulated are the more-than-social-historical systemic imaginaries and Infrastructural approaches that arise from the con-figuring of many moving parts and decisions. Preliminarily, the cura-infrastructural might be thought of as a more-than-social-historical form and practice. Thinking of infrastructural meaning in these terms, helps to frame the concept of an infrastructural instituting imaginary more broadly. To negotiate infrastructural configuration through cura-infrastructural artefacts, the above-elaborated questions are key. That is:

- How is infrastructure changed — what is the difference of its rupture?
- How does this transformation register?
- What is the infrastructural beyond, what is its status and where does it enter?
- How does infrastructure become social-historical: what form does the rupture take and how is it articulated?
- What are the conditions for this transformation and can these be preserved?

To establish a break or transformation in an extant infrastructural world or reality construction is not a cut with what was before, but a pre-enacting back into the looping of infrastructural repetition; that is into the continuity of the present made by infrastructural mediation. This is balanced as a configuration that bodies forth a partial form or figure; but which is determined by the condition for that bodying forth, *and* if the terms of self-composition and creation are to be preserved, for the ongoing negotiability of that configuration. Balancing the entry of maintaining an infrastructural beyond with the achievement of the continuity of infrastructure is key to articulating the role and position of the curatorial in staging critical cura-infrastructural artefacts. To transform the alignments, tensions and configurations of infrastructural convergences and the meaning generated in, and instituted through them one critical role of configuration can be understood as how a meaning is made through making things work together. Secondly, is how this embeds figures, parts or practices into how an infrastructural scene is registered. This is about conceptualizing the shared effects of experience and repetition across an expanded field. As mediators, the importance of creative configurations is not just creation of novel accounts, but making infrastructural worlds of difference possible, negotiable and sustainable.

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## 6. Conclusion

In this chapter I have outlined a framework for critically re-imagining a transformable infrastructure. This allows a move from a recovery and pre-enactment of practical and operational infrastructural outcomes, to conceptualising both a transformative image of configuration and its conditions of its continued transformability. This extends beyond the representational and institutional images and of social-historical change to develop a concept of creation and self-creation that can be thought through the multiple dimensions of infrastructural realisation. Comprising a series of questions and modes of registrations, this chapter and model can be used to guide the imagining and making of infrastructural publics.

Framing this proposition as a more-than-social-historical <u>possibility</u>, this sets the conditions for inventing infrastructural worlds, in which, as Chapter four argues, particular effects and transformations in and of infrastructural instituting — that is materialising, mediating and practicing these configurations — can be achieved and opened up.

This imaginary has been implicit in previous chapters in the promise of provision as manifest in particular positions, or in the promise of coherence and 'verifiability' when pattern is used to register infrastructural effects and create them in how information flows, leaves traces and can be modelled around particular events, scenes and assemblages. In this chapter, the composition, construction and function of this infrastructural imaginary is developed and used as a more explicit framework and provocation within which to explore and develop the particular critical object of this thesis, and as a critical entry point for the curatorial into the infrastructural (as a meaning making, articulating and transformative form). Where it has been shown that the creation of infrastructure in which a break *follows* an intervention — in Chapter one and which is conceptually at least how infrastructural critique is rooted in the curatorial — is not adequate to how infrastructure generates form in repetition, this chapter has turned to Castoriadis for whom the creation of form *was* the social historical break. This asked how specific differences in form and in practice were necessary to invent a new affective, operational and meaningful world. Doing this through infrastructure is articulated as a model of critical imagining and invention. This can be thought of as both a provocation to the curatorial and as vehicle through which the question of how to reimagine infrastructure might be developed as a more than technical and more than subsidiary question to its realization.

While the kinds of difference possible in infrastructure do not correspond to that proposed by Castoriadis, being instead wrapped back into the continuity of infrastructure repetition, the different forms and negotiation of configuration provide a vehicle for the balance between rupture and continuity in which change can nonetheless happen. Moreover, fed through tensioning, what has been called bumpy repetition and negotiation configuration provides different frame for critically posing cura-infrastructural artefacts to reimagine infrastructure to that of open-endedness.

Specifically, this has shown that experience of repetition can be changed according to meaning it bodies forth and the experience of that and changed again. The change proposed here is in this sense more-than-social-historical: more than a rupture, but a rupture that is recursively folded back into the repetition that makes the present experienceable in particular ways (via infrastructure), and because it concerns the multiple agencies and layers of an infrastructural artefact and how this meaning is composed from more than one agency and positions. This

also changes how the curatorial might create or alter the artefacts that mediate and which are made public in that repetition.

Framing the infrastructural instituting imaginary in terms of configuration as articulated by Suchman allows particular kinds of questions to be asked of critical 'proposition' made through and by infrastructure and infrastructural artefacts. These include how its composition allows the break or rupture of 'the beyond' to be folded back into the imaginary of continuity. Or to put it more practically, is the boundary between inside and outside of configuration as both an artefact and a method assemblage shifted? Secondly, and of no less importance is how the curatorial is reposed at the convergences of forms, forces, practices and image from which infrastructural artefacts emergence as a speculative and critical actor. That is how does the mode by which forms of configuration can be made public — based on how they are composed, on the infrastructural work of realizing them — allow for the continued negotiation of that configuration and the context into which it is staged? That is, is it a partially shared or complete imaginary. Moreover, how such dynamic and unstable tensions and alignments become possible because of the only-ever partial configurations of cura-infrastructural artefacts discussed so far is central to this framework and its proposed effects.

This was achieved by comparing the work of FRAUD and Primer as configurations that could both reanimate and re-configure infrastructural artefacts. Seeing Primer, as infrastructural configuration enables a view of Diakron (the core group organising Primer) as exploring the possibility for art and hybrid organisational forms to work on complex and systemic issues (Hilmer-Rex and Aamot Helm, 2019). Within this framework, the programme serves as an active infrastructural form that interfaces between the two infrastructural frames of Aquaporin (space, funding, research context and technology platform) and art (conceptual framework for knowledge production, exhibition-making and viewing models and curatorial practice) to explore ways of understanding that relationship. Instead of simply relying on the production of curatorial or artistic forms to modulate the relationship between the organisational imaginaries — with the idea that this is instituted in to changes later down the line — the work performed by Primer might better described as a speculative configuration which seeks to change interpretations, modelling and patterning by acting as a *partially* con-figured mediator (per Veran in Suchman 2012). This can *bifurcate* what is practiced in an infrastructural repetition, creating the possibility of a parallel friction or threshold in that assemblage producing both certainty or intention and uncertainty or negotiability.

Producing situation-specific research tools, for instance (Hilmer-Rex and Aamot Helm, 2019; Hilmer-Rex, 2019) or by creating points of contact between organisations in exhibitions,

workshops, communications design and day-to-day proximity of the actors and users (Hilmer-Rex and Aamot Helm, 2019), configuration creates an infrastructural condition in which normally separate forms, figures and users can come to habitually interoperate. This creates the conditions for a different kind agency for each user to coproduce systemic effects in both spaces (Hilmer Rex, 2017): Aquaporin as a complex technology platform and Primer as a platform for artistic and organisational development (Hilmer-Rex and Aamot Helm, 2019). Primer make use of infrastructural capacities established in previous two chapters, of positioning and patterning, to integrate curatorial work into the infrastructural domain of Aquaporin's model, production and narrative. Developing a proximity with Aquaporin allows Primer to distribute the curatorial work within the realization of the company's open innovation processes, outcomes or (or aesthetics); re-patterning the expectation of curatorial work by shifting audience, duration of effects over timelines of company and patents, seeking to alter the research and development outputs of the company by entering its systems. This bifurcation can, thereby, shift the instituted forms repeating in and as that configuration. Where this intervention aims to have systemic effects on the assemblage of which it is a part, as in the case of Primer, it can also be seen as an attempt to *body forth* new forms and figures from this interface. This can however lack specific direction, leaving the group dependent on the capacities of Aquaporin itself.

In terms of changing the infrastructures it addresses EURO-VISION articulates a different proposition in which the boundaries are fixed, non-negotiable and closed. Yet, the value of this approach can be seen to return in the registering and reanimating the differences in the effects of different mediators. However, this work of understanding and definition is nonetheless crucial to the possibility of any negotiation. As Suchman recounts, for Verran, to negotiate the politics of the other side "needs to be on the table … and identifying those politics may require reanimating the figurations that hold particular relations of persons and things — with land or information — in place" (Suchman 2012, 52). Primer seek to learn this, but FRAUD draw this other side out in advance. This can change the terms drastically: attentiveness to these negotiations means addressing how the capacity for self-creation and composition is defined by the closures and exclusions of particular infra forms across these layers. Primer can engage with its context, where EURO-VISION cannot; yet Primer also set up a relationship in order that this was possible. The possibility of re-distributing this balance is crucial to "liveable socio-material arrangements" (in Suchman 2012, 52). EURO-VISION posits the unsustainability of a system of extraction in the form of a critique that the model of Primer's proposal for conditions of systemic openness cannot articulate. Thus, it is almost possible to define a model for critical infrastructuring through and using the approaches from the curatorial. The pressing question remaining is how to imagine and *stage* its unfolding so that specific changes in that systemic

and multiple-dimensional repetitions can unfold in the space and time that convergence of parts, practices and force makes whilst keeping partiality or transformation open too. The different kind of futurity to that of linearity, closure or entropy this modelling of infrastructure proposes is taken up in the next chapter.

# Chapter 4 – Infrastructural Narrative

Modelling a critical and ethical frame for differentiating the effects made possible by staging form and practice as repetition into infrastructural assemblages.

## 0. Introduction

How to move from configuration, of imagination, back into an infrastructural world, to institute that configuration? Moreover, how to preserve the possibility of self-composition and self-creation that made the transformation of an infrastructural instituting imaginary possible?

In the tools established so far, transformation is made formally, performatively and imaginatively possible. Previous chapters have developed approaches to re-thinking and re-making the practices and convergences of infrastructural meaning as well as its material conditions. These work on the circular configurations that generate infrastructural worlds by simultaneously imagining the meaning of the repetition and movement that comprise an active form, *and* by instituting and re-mediating the material layers which that meaning also holds together. These chapters used positioning, patterning and configuration, respectively, as dynamic critical and practical artefacts to establish thresholds and ruptures into the continuity of existing infrastructural reality constructions.

In this final chapter, the scales and scenes of intervention and instituting established in the preceding chapters are re-aggregated to address the specifically operational and durational forms through which infrastructure is activated and imagined as a promise of futurity. This futurity is a fundamental aspect of infrastructure. The chapter will, therefore, describe how relational interplays in speculative cura-infrastructural artefacts constructed in previous chapters might be able to institute the critical, durational effects of uncertainty and non-scalability, if understood as part of a multi-dimensional and disciplinary practice that constellates with the assemblages generated by those artefacts as well as others. These assemblages, the chapter will argue, can potentially break the closures, limits and accidents of homogenous or dominant infrastructure.

To do this the chapter asks how to navigate the formal and performative recursive and repetitious dynamics of an assemblage mediated by an infrastructural imaginary and how to establish a transformation of and in this mediating dynamic. The possibility of systemic transformation of the temporality of infrastructure is explored in this final chapter through the generative but recursive potential of narrative as a compositional and mediating device and scene. Through this infrastructural futurity and promises of, in particular, infrastructural or meso-scale models of planetary can be used to stretch, transformatively, across the threshold created between one configuration and another. Narrative will offer a cementing motor for

instituting fictive realities and differentiating the events of uncertainty they produce. This makes it possible to articulate the necessary terms by to change the future of infrastructure by how it acts out the present, but also evaluate the difference infrastructural narrative constructs. At stake, therefore, is how to maintain an openness to change and to difference as a quality of infrastructure and its transformation from the circulation of a form to experience and anticipation of an infrastructural genre to come.

### Scalable futures

> … post-pandemic politics is not a simple set of programmatic beliefs. It is not explainable by a … complete master narrative and source of identity…. What is required is instead an acceptance of how the rapid intrusion of an indifferent reality can make wholly symbolic resistance worse than futile. … We have to build a politics capable of engagement with the full complexity of reality. The pre-existing conditions that have now been exposed [by sars-Cov-2] clarify the need for a geopolitics based … on a deliberate *plan for the coordination* of the planet we occupy and *make and re-make over again*. Otherwise this moment will be an unnecessarily permanent emergency (Bratton 2021, 14 [emphasis mine])

> … with the projects of socialist universalism in the twentieth century *scale* became a surrogate for *imagination*. As the battle over scale appeared more despondent, an era of imaginative malady prevailed. The much-bemoaned lack of imagination could itself effectively be reframed as a symptom of the psychic dimension of planetarity. The pressing question for the Left, … is not only how to imagine the new scale, but how to do so not forgoing the requirement of temporal property prior to planning of any kind. How to reckon with speculation, in lieu of imagination, of scalable and universal justice? (Noorizadeh 2022, 259)

In these two excerpts are examples of the promise of infrastructural repetition and outcome. They convey narratives that set a particular claim and framing of the future in the reliability of an *infrastructural futurity*. In each case, it is different versions of the transformation and an expression of a specifically systemic and planetary imaginary *or promise* that unfolds a model of coordination and scalability. For speculative design theorist Benjamin Bratton, writing in the aftershocks of the first major waves of the 2019–ongoing sars-Cov-2 pandemic, this entails a positive biopolitics that can enact "population-scale self-composition and realist care" (Bratton 2021, 14). This form of coordination and repetition of making and remaking can, for Bratton, be constructed at the planetary population scale itself; that is, through the "biological aggregate" made in settlements, interdependencies and aspirations differentiated by, but interconnected and productive of, an emergent complexity and as a whole (Bratton 2015).

For artist and writer Bahar Noorizadeh (whose work builds platforms for tracing and staging the intersections of economy, time and scalable organisation[129]), the question of how to organise and self-create planning into coordination necessary for planetary governance (Noorizadeh 2022, 260), means to pick up how questions of planning and efficiency are part and parcel of retaining the capacity to imagine at such dimensions and the always social-historical setting for this. This means, however, situating this imaginary within and as a demand on the infrastructures and platforms of that speculation.

As such, these two excerpts also point to a systemic imaginary and creation, one in which a story and promise of systemic possibility is reliant on how the now is constructed to project that future forwards.[130] The question of transformability resides, this suggests in that translation from present to differently- 'infrastructured' future. However, as Noorizadeh cautions, scale can as an objective in and of itself can replace the speculative capacities of the imaginaries extended through it. As she writes (Noorizadeh 2022) (and as is explored in her work), the question of imagining scales must be tied to the processes and practices through which that imaginary is instituted, as a practical and situated programme for the future and as an effect with uncertain outcomes. If the proposal of infrastructural narrative can be used to imagine and institute the possibility of a desired future, this articulates a key critical stake into the speculative dimension of infrastructural futurity. That is how to pre-enact specific difference into the infrastructural composition staged now so that there is certainty — what infrastructure provides — of that future; but where the scalability of infrastructural narrative can mean the exclusion of the possibility of keeping that future open, an approach in which negotiating the connection between the form of that future and how it responds to the effects it creates is possible.

As this chapter will show, to work on this systemic imaginary will mean working on how infrastructural positional and patterning configurations operate as a mediator in the

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[129] See: https://baharnoorizadeh.com Last accessed: 30-6-2022.
[130] The term systemic allows thinking about the implications of effects and actions on social-material and cognitive assemblages, and beyond the individual level (Hayles 2017, 11), and about technical, biological and cognitive capacities for registering the more-than-social historical dimensions and affects of infrastructure. Though this lens might in some settings privilege functionalism, it does not, in the context of the assemblage detach physical presence and material conditions: context, including the technical and biological milieu in which infrastructural meaning and interpretation flows and takes place is central to the how infrastructural effects, instances and interactions of making public are not only registered, though this is a metric in this chapter (see Hilmer Rex and Aamot Helm 2019), but how they are produced. In this sense, to hold this relationship between systemic events and context in narrative allows for proposals that unfold these systems in time and across space, and differentiate them through this practicing and staging.

assemblages gathered to materialise these imaginaries. As has been shown this takes place over the duration of infrastructural pre-conditions, infrastructural work, us, experience and promise. As such, to work on or in infrastructural futurity will mean dealing with a two-fold problem: of how that mediator shapes a context; and how the flow of information through it materialises different kinds of durational experience and meaning. These composition and durational effects are combined as a cura-infrastructural practice by proposing narrative as a speculative frame and artefact.

To do this, the chapter proposes that these planetary futures can be seen beyond just imaginaries or speculations. Rather they are seen as modes of making and mediating the publics (or rather more than human/social collectivities) infrastructure assembles. By combining, fictive modes of speculation and a ground in which this speculation *can* be made reality (Konior, 2019), this making public operates through the duration of infrastructure: i.e., the integration of repetition as stable present and the temporality of the promise a future dependent on the transition it enables and makes predictable. Crucially, I argue these are not just technical possibilities, but artefacts through which particular imaginaries and their composition can be given form over and as the temporality of infrastructural futurity — and thus define the systemic agency of instituting or being addressed into such imaginaries as they infrastructure these future promises.

To articulate and work on these imaginaries as a cura-infrastructural artefacts, that is figured into and through a field in which making public is a central critical stakes (von Bismark 2012; Lind 2012; O'Neill 2019; von Osten 2007), the analytical and speculative device of infrastructural narrative is posed and deployed as a cura-infrastructural artefact by which previous frames are activated together. In this text narrative is used to explore how imaginaries are positioned and embedded into the anticipation, activation and recurrence of pattern in order to give meaning to as well as transform how the "cementing force" (Bal 1999, 104) of the imaginaries of infrastructural futurity. Further, that narrative allows that futurity to compose and mediate experience and use through a balancing between the fiction of its promise and the descriptive aspect of how infrastructure arranges to achieve that promise in the variable 'real-time' of experience; that is by inventing and creating an infrastructural possible in advance (that it can be narrated) and describing how (and by who/what) it is performed in use (giving meaning to transition).The task of this chapter is, therefore, to define terms by which that narrative can stage an imaginary of the future which would work on itself by how it is instituted and to differentiate how it describes itself and its users or parts into the present.

To achieve these shifts in scale and futurity, the chapter first explores *Feral Atlas: The More-Than-Human Anthropocene* (Tsing et. al., 2020) as a base from which to stage images of infrastructural futurity which contain within themselves a transformation and which retains a possibility of openness to their actual effects in the future present they create. This is used to think the compositional forms and practices of activation and mediation through which planetary futures can be both invented and instituted. By drawing on and beginning from *Feral Atlas*, which allows for an analysis of the effect of the cognitive assemblages created by the meaning of infrastructure, the chapter tests a distinct modality of infrastructural composition and its transformable transformation. Through this, specific models of futurity are staged and opened to change. In the ongoingness of such narratives, the tension and friction between and the promises and effects of these promises and the potential critical effects and thresholds of configuration, patterning and positioning, it is possible to generate and integrate infrastructural self-composition and creation with critical practices and artefacts of the curatorial. But to move forwards, it is first necessary to first move back into the pre-enacting of conditions for a transformation and an opening.

<p style="text-align:center">*</p>

## 1. Unintended futures

*Mnemiopsis leidyi* or "comb jellies" are walnut-shaped ctenophores — they are similar to jellyfish, but are stingless, moving by pulsing cilia along their length. They have also secured "a slot on the International Union for Conservation of Nature (IUCN) list of 100 World's Worst" invaders (Galil et. al. 2009).

Scientists' best guess is that they arrived on ships traveling west into the Black Sea at the beginning of the 1980s — released when the contents of the cargo ships' ballast tanks they'd been traveling in was emptied at port (Shiganova et. al. 2001). Comb jellies are native to the coastal waters of the North and South American continents. They cause relatively little harm in this native environment, being preyed on by several species of fish (Fach et. al. 2021). But in a dynamic familiar to many of the impacts of standardized and global infrastructure systems, the introduction of this quickly reproducing and adaptable species in many regions around the Mediterranean sets off massive ecosystem shifts.[131] The effect of the *M. leidyi* is two-fold. Able

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[131] As Galil et. al. have described, (2009) the vectors of invasion are quite complex, with transportation between the Black Sea and the Mediterranean Sea (a body of water that is particularly susceptible to

to capitalize on other environmental changes occurring after its introduction, such as excessive nutrient levels allowing the sea to support more biomass (or "eutrophication"[132]), warm summers and mild winter temperatures (Shiganova et. al. 2001, 431), as well as consuming the zooplankton as well as the eggs of plankton-feeding fish such as anchovies (which themselves had become the top predator after previous fish species depletions in the 1960s) many fish rely upon for food, the comb jellies exert a profound and irreversible "influence on the functioning of marine ecosystems" (Fach et. al. 2021). In the Black Sea, this precipitated a "major [fish] stock collapse" from the end of the 1990s, with ecosystems only very slowly and only partially recovering since (Ibid.).

This is just one account of the consequences of what Tsing et. al. call Anthropocene infrastructural imaginaries and their instituting and unfolding in various locations told in and by the *Feral Atlas: The More-Than-Human Anthropocene* (2021). A punctuation point in a five-year research and curatorial exploration of how "ecologies have been radically transformed by imperial and industrial infrastructure projects," *Feral Atlas* is an online research and case study platform. It is also generative and critical conceptual re-modelling of the Anthropocene. The platform explores how the human-made infrastructures of the Anthropocene "have unleashed a set of catastrophic *feral effects* that endanger life at a planetary scale" (Tsing et. al. 2021), Seventy-nine case studies in these "feral effects" are located on one of four scenes of human and more-than-human entanglement represented in the artist-produced quasi-maps / landscapes that incorporate the various scenes the platform examines, arranging these according to a series of key lenses or dynamics.

The first of these is a series of consequential infrastructure-projects or imaginaries that the Anthropocene has instituted or *detonated*. These 'Detonators' carry the labels Empire, Invasion, Capital and Acceleration. These imaginaries are made manifest through a second axis of so-called "tippers" — repeatable modes of state-change mediated by world-forming infrastructures such as "GRID"(s) of standardization and "ecological simplification,"[133] how "CROWDS" pack together population or object density to "further political, economic or scientific programs,"[134] or the "SMOOTH"(ing) and "SPEEDING" up of temporal and spatial

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ship-transported bio-invasions: with one fifth of the alien species recorded in the Mediterranean having been introduced by vessels (Galil et. al., 358))

[132] "Eutrophication" makes the system vulnerable to exploitation by species able to dominate through additional feeding. See Fach, Salihoglu and Oğuz, "Alien Species."

[133] See https://feralatlas.supdigital.org/index?text=isc-grid&ttype=essay&cd=true Last accessed: 30-6-2022.

[134] See https://feralatlas.supdigital.org/index?text=isc-crowd&ttype=essay&cd=true Last accessed: 30-6-2022.

rhythms. The third axis is defined by the qualities of these feral entities as they emerge from the ruins, edges, unintended consequences of planetary infrastructure projects and local ecologies or social relations that infrastructural tippers enact. Labels such as: "Accelerated by Climate Change," "Thrives with the Plantation Conditions," or in the case of the comb jellies, "Industrial Stowaways" offer a final axis summarized as "feral qualities." These axes or domains are used to conceptualize the more-than-human Anthropocene as a scene of meta-historical events and narratives and their intended as well as unintended consequences; infrastructurally-mediated and repeated configurations whose qualities are determined by agencies beyond the human actions and imaginaries that set these dynamics in play.

Each of these axes serve to both conceptualize specific layers of Anthropocene effect in a model of infrastructural mediation and construction, and act as one of multiple, non-hierarchical entry points through which these case studies are organized and accessed on the platform. Firstly, through the interaction of these axes, infrastructure acts as much to produce uncertainty as it does as a locus for world-making. Shipping, in the example I started this essay with "TAKE"(s) products from one place to another place, but also carries other cargo which is deposited or extracted by it — such as "INVASIVE" species being moved by accident, rendering an ecosystem degraded. Secondly, as a conceptual infrastructure akin to the patterns discussed in Chapter two, they are brought together as means of navigating its platform and conceptual frame — a platform user can follow, compare and explore case studies or the interactions of feral entities according to the category of detonation, tipper, or feral quality, or visa-versa. The intersection these axes enables a description of the complexity of the Anthropocene from the point of view of the non-uniform ways that the planetary practices of Invasion, Empire, Capital and Acceleration are disrupted by the feral practices of "other species, as well as nonliving things, [that] make it possible to be human"[135] and that are more or less attuned to the assemblages that the Anthropocene has gathered.

This is not a story of infrastructural success, but of a 500-year period of "ecological-transformation projects of long-distance conquest, governance and investment for the accumulation of wealth." By opening out narrative formation and interpretation to the assemblage in the creation of more than human meaning, uncertainty and unintended consequences become a ground on which to change the conditions from which metaphors and representations of organized inevitability such as those of Modernity and its understanding of time as linear or progressive are based. Yet, this perspective also provides a model for thinking

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[135] See: https://feralatlas.supdigital.org/index?text=introduction-to-feral-atlas&ttype=essay&cd=true Last accessed:  30-6-2022.

sustainable infrastructures: while "feral effects" can kill both humans and non-humans, the argument made by Tsing et. al., is that without feral effects humans would all be dead, "if human landscape transformation was as effective as modernist dreamers claim in replacing earlier ecologies, we might have no more forests or fisheries. [But] forests grow back, fish escape and reproduce."[136] As such, *Feral Atlas* argues that to understand the extension of infrastructure as a means of knowing and *re-making* the planetary, it is key to look to the more-than-human ecological patches of planned and unplanned or feral infrastructural effect to understand how this world is held together — from suburbs to plantations to plastic ocean gyres.[137] Like this, the *Feral Atlas* offers a potentially transformative image and effect of infrastructural collaboration — especially amid evermore images of the planetary scope of such unplanned effects including climate change.

### Narrating planetary futures

On August 9, 2021, ahead of COP26, a major international conference to limit climate warming held in Glasgow, Scotland, the Intergovernmental Panel on Climate Change (IPCC) Working Group 1 released another kind of ecological image in its Physical Sciences Basis report (part of the Sixth Assessment Report). The IPCC report states that the link between human-induced $CO_2$ emissions — spiking since the industrial revolution at levels unseen in two million years (measured in 2019) — is "unequivocal," with climate change already affecting every region of the planet (Masson-Delmotte et. al. 2021, 9).

In the report the classic graph of anthropogenic climate impact, a slow and steady level of $CO_2$ that kicks violently up like a hockey stick after the industrial revolution, is given context in each of these scenarios. Ever-darkening smudges on a series of atlases show the distribution of rising temperatures, sea levels and precipitation and scatter plots showing the increasing intensity and frequency of extreme and erratic weather events (Masson-Delmotte et. al. 2021, 21; 23). The shifts these models and visualisations describe include extreme temperatures, flooding and drought, storm intensity, air pollution, costal erosion, sea level rise and acidification (Masson-Delmotte et. al. 2021, 34). With a strongly correlated timeline for a range of highly likely scenarios this report embeds the planet in a reality constructed through infrastructure in which the reduction of uncertainty, through the development and application of and expansive array of sensing and modelling assemblages, becomes a prevailing narrative for survival.

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[136] Ibid.
[137] Ibid.

In this context — and alongside many others warnings — by synthesizing an unprecedented level and scope of observational data (Masson-Delmotte et. al. 2021, 5) as well as further updates to models used to predict climate trends, the IPCC report offers both a "reality check" and stages a guiding narrative in five emissions scenarios that establish with confidence the futures that are likely to unfold.[138] These range from the minimal impact of net zero $CO_2$ or reduction, to a rise of 1.4–1.8ºC and the apocalyptic impact of roughly double current levels and 3.6–4.4ºC increase by 2100 (Masson-Delmotte et. al. 2021, 15; 18).

*Feral Atlas*, the IPCC report, and the visualizations and representations of the effects and models it discusses each dramatize different ways to approach how to imagine and how to act with regards to the transitions or transformations provoked by human-induced climate change. That is, whether to scale up a common response dependent on fixing the infrastructures that will make any alternative future to one presently unfolding on the basis of fossil fuels, extraction, ecological unsustainability, or whether to address the creation of a planetary problem by scaling our focus in and certainty of outcome down. If images of flooding, forest fires and droughts can only visualize climate effects, adding to a real-time modelling of changes already happening, and targets are precisely organized to be nested into existing infrastructural-economic conditions, each of these examples pose a stark question: how to act in relation to the planetary demands of Anthropogenic climate change? What public realm does this take place in? Can curatorial practice or methods play a role in the scales of problem at stake?

### Making the future public

Climate models offer a particular kind of infrastructural image: a systemic image and promise which at the same time relies on a depth of existing information, an openness to both new information and the possibility that these predictions might not happen. One way to consider the speculative potential of these models is as ways of making public in which the future and present are bound into an infrastructurally-mediated promise.

With its targets and impactful graphs, scatter plots and regional heat maps showing ranges of temperature changes, desertification and sea level rise and $CO_2$ sequestration, the IPCC report not only prompts the question of how to make the infrastructural changes necessary to change the direction of travel of climate change, but also how to register and model them: physically in

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[138] https://www.ipcc.ch/2021/08/09/ar6-wg1-20210809-pr/ Last accessed:  30-6-2022.

terms of emissions mitigation and politically in terms of public will. Similarly, by exploring the both "wonderful and terrible feral effects" of the last 500 years of human-made infrastructures, *Feral Atlas* suggests that the models of infrastructural expansion that undergirded the Anthropocene, are either unsustainable or undesirable. It reads feral effects as both signs of unsustainability and of other modes of sustaining a system. In these examples an infrastructural futurity is established and manifest in narratives in which the future is constructed through speculations made real by being instituted in the form of infrastructures in the present that go on to interface and reconfigure the worlds into which they are staged. This creates both a necessary and troubled promise in which the public meaning and cultures of infrastructure are central.

### Real-Time Images

Where climate change is both caused by and causes a precipitous loss of ecological diversity, the planetary offers a site and conceptual frame for the changes necessary to mitigate its worst effects. [139] Climate modelling is, as Bratton notes (2021b), an achievement of an accidental mega-structure or stack of planetary scale computation and sensing infrastructure which "extend the planet's capacities to sense and monitor its own energy usage by augmenting its "skin" (Bratton 2015, 76). In climate models, planetary futurity has both been made knowable and narratable, but also made urgent and systemically relevant because of the effects of global Anthropocene infrastructures of extraction and deposition, movement, energy production, computation, logistics and so on. Yet, as Bratton writes on a different layer of planetary modelling instituted during the Covid-19 pandemic, how these infrastructures or stacks must as Thrift writes, know and be able to address themselves. This means that such processes of "pervasive sensing, calculation indexing and modelling of the real… attests to the role of governing simulations as a medium through which the whole makes sense of itself and acts back upon itself" (Bratton 2014a, 144). At stake for Bratton in this writing is an epistemic imaginary instituted and unevenly deployed to shape behaviours according to the more than human dynamics of the Sars-Cov 2 virus. However, the planetary and recursive mode of such governing simulations nonetheless indicates how such other planetary scale models are both increasingly systemic and relevant to the possibility of infrastructurally-imaginable futures defining that possibility can be thought of, not just as measurement, prediction or means of determining regulations and terms of transition.

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[139] The term planetary refers to the Gayatri Spivak's introduction of the in 1997, where she used it to advocate forms of life that in their non-abstract relation to a context such as 'the globe' were distinct from the imaginaries of globalization. It offers an embedded account of the multiple scales of thinking and cognition of being a part of the planet. See: Spivak (2013): 335-35

But where this model is an achievement of the conditions created and mediated through the deliberate as well as well emergent forms of planetary scale computation and infrastructure create: it also the means by which a "planetary society can deliberately compose itself" (Bratton 2021a, 12). As a narrative through which the future is composed, climate change is a scene where such shifts move the accounts of feral effects of human-sponsored infrastructure back to the question of the transformations that enabled them. Where they are posed as mediating regimes necessary but also contested by those interested in not changing, these models can also be thought productively through the curatorial frame of making public, that is the political cultural and materiality situated process of negotiating and composing meaning in the constellations and convergences of parts, practices and networks through which that meaning is activated and performed, gains significance and has consequence. As such, where infrastructure is not only a mode of imagining an articulating a futurity, but how it is achievable these two approaches to modelling the planetary and the effect and need for infrastructural transformation in it can be used to compare different kinds of speculative effect in relation to the infrastructural images and collaborations mediating the planetary.

One way to consider the speculative potential of the differences between these models, is to explore their implications as responses to the question of scale through what media theorist Bogna Konior describes as a particular kind of planetary-scale contemporary image simulation — analysing these against the collaborations necessary to stage them (Konior 2019, 55–75). How these images are produced, also sets the scene for a comparison of how speculative narratives of infrastructural futurity might be established and of their effects in relation to the particular operations and conditions in which they are produced, and, per Bratton, through which they might re-mediate the world they create.

Climate predictions, such as anthropogenic climate change, are statistical probabilities, and are, not yet as Konior writes, experiential fact. They may be understood as climate models of what Wendy Chun calls "hypo-real tools," tools for making hypotheses on an unfolding reality (Chun 2015, 678). Composed from multiple, often contested data models, whose effect is indexed to the various experiences and capacities of the infrastructures that make them possible, climate models offer images that cannot be seen in their entirety — be it spatially or temporally.[140] Rather than an experiential fact, they are instead paradigmatic of what Konior

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[140] A parallel might be drawn here with what Philosopher Timothy Morton has called *hyperobjects:* "things that are massively distributed in time and space relative to humans" (Morton 2013,1)/. Examples include, a black hole, an oil field, the Florida everglades, the biosphere or the totality and long-lasting effects of Styrofoam or plastic bags (Ibid.). For Morton, the extra-human dimensions of *hyperobjects*

describes as a contemporary form of real time, embedded images, composed and realized where "flows of data are carves into climate risk visualizations, [where] satellite monitoring produces pictures for both machine and human eyes […] and apps on our phones visualize for us the invisible pollution that permeates our bodies." This is a mode of image-making through which, "our planet has become a giant [composite] camera […] with which we produce simulations, predictions and visualizations" (Konior 2019, 56) that are made in and act on what happens now. What can be gained by working through these complex images and their application in the worlds they model as cura-infrastructural artefacts?

As was also discussed in Chapter two, the impacts of this kind of image is to more deeply enmesh what is being represented with how. Whereas what Geert Lovink has described as the "image as evidence" can be viewed as referring to a "somewhat nostalgic idea of a reality that precedes its representation" (Lovink in Konior 2019, 56), 'real-time' images do not simply represent an object, but should be understood as being "part of an operation," as Harun Farocki suggests (Farocki 2018, 660). Continuously and dynamically indexed to how it is infrastructurally situated and compos(it)ed, the contemporary image Konior describes is "no longer simply a moving still" whose representational claim is to be contested. Instead it constitutes "a running hypothesis" based what can be sensed, known and modelled in the present "that keeps re-actualizing and updating itself" (Konior 2019, 56). Accordingly, our contemporary surround of images does not represent a universal, or even global (albeit diverse) whole, but rather exists as multiple, parallel hypothetical presents. This is most clear in the complex models used to predict climatic shifts according to different emissions scenarios.

> the most outstanding fact about these complex models is that they are not initialised with pre-collected observational data. Instead, an artificial Earth is simulated and allowed to "spin up" from a resting state with the various forces driving the climate — solar radiation, gravity, evaporation, the Coriolis effect, and so on — generating the model's circulation" (Edwards 148-9). Only when an equilibrium is achieved in this artificial world is it possible to simulate climate change over time. The model is evaluated by checking its prediction against the available data to verify whether it predicted changes on our real Earth properly. While its referent is the real world,

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causes all sorts of problems for climate denialism and apocalyptic environmentalism by forcing us to engage with the physical reality of *hyperobjects* as at once phenomena and thing, wherein old descriptive languages are obsolete (Morton 2013, 2; cf. Bratton 2021). However, where for Morton the purpose is think *speculatively* through the ways that the *hyperobject* is "*not a function of our knowledge: it's hyper relative to worms, lemons and ultraviolet rays, as well as humans*" (Morton Ibid,), the rest of this thesis is interested in what happens when this beyond has to again become a function of human thinking, design and decision — specifically because infrastructure is the interface through which the extra-human dimensions of the ecological, technical, planetary or *hyper* are interfaced and in some cases made. This also allows a meso-scalar approach, to move between scales and dimensions outside the *hyper*objectivity Morton proposes.

computation is concerned with "simulating the entire Earth system, replicating the world in a machine" (Edwards 139) (Konior 2019, 65)

Climate models are not simply the application of data constantly drawn from its "augmented skin' onto a fixed model; but are simulations of entire hypothetical earths, a digital twin. Constantly updated and reconfigured (Konior 2019), as well as verified through processes of 'hind-casting' against data from previously observed trends (Konior 2019, 64), these models spool out such hypothetical presents in which the potential future of climate dynamics are made 'real' according to certain recorded environmental parameters. So, while the scale and complexity of these simulated images generates forms of representation that both consolidate a story of infrastructural conditions gone awry and exist at dimensions that put demands for action at individual, state and collection level in tension with the planetary scales they speak to and from, we could, Konior suggests, also look to a fictive dimension in climate modelling as a different mode of engagement. As a running simulation, the efficacy of climate models also rests, following Konior, on a form of *fiction*: a "prognostication […] in the form of complex simulations of the planet used to predict [climate change's] environmental consequences," grounded by what can be sensed and how this is constructed into a model in the present (Konior 2019, 57). Climate futures are inherently uncertain. However, seeing this openness as a condition of the compositional and propositional nature of contemporary image models, prompts for Konior the possibility of the fictive dimension of climate a kind of hypothetical, propositional realism; this both highlights "the place of the digital in our epistemology[ies]" and avoids restricting an object such as the future to its knowns while still aiming at "a knowledge of reality" (Konior 2019, 69–70). Instead, this composite image opens the future out to "fictionalizing," to making possible objects that do not yet exist, including the infrastructure that might make liveable futures knowable, possible and scalable (Konior 2019, 70).

### Making the future real

To stage a claim on a different future, the simulations in the construction of climate models can, for Konior, be brought into contact with the fictive dimension established most explicitly in so-called "climate fiction." Generally treated as a subset of science fiction … [climate fiction] was coined in 2008 by blogger and activist Dan Bloom to denote speculative novels that take climate change as their main theme," these imagine the effects of our inability to avert environmental collapse, as well as encompassing novels on various ecotechnological scenarios (Konior 2019, 57–58). But cli-fi is not a genre: but better seen as a participating in a wider cultural imaginary (Konior 2019, 58). Instead, it demonstrates the wider cultural implications of "the blurring of boundaries between climate fictions and climate facts" through

multiple layers of simulation, fiction and modelling in which "cultural climate fictions simulate social scenarios as indistinguishable from environmental scenarios, while digital climate models simulate environmental scenarios as indistinguishable from social scenarios" (Konior 2019, 58). In this sense the emergence of climate fiction indicates the vital need for alternative narratives to fill the space occupied by the uncertainty of climate futurity. That is to stage alternative modelling scenarios or simulations: a systemic futurity. These fictions attempt to change the composition and repetition of the present to reverse engineer alternative simulations of a future based on the present. Such narratives are therefore part of the shift climate futurity also seeks to avoid. By connecting to such infrastructurally mediated climate modelling to the speculative capacity of fiction to simulate reality from multiple forms of data, this literary form offers a link in the flow of information composed by multiple real-time simulations and cultural, sensual and semantic realms that expand possibility in the infrastructural worlds and collaborations that have both made and now shape the planetary.

As such, one impact of this mode of image-making hinges on the ability of these images to be known, and what such real-time images make knowable about the world, as itself a situated model. In the case of climate modelling, relevant layers, resolutions or facets — such as rainfall distribution — cannot be understood without taking into account the simulations to which they contribute and that they support: the connection between human-induced $CO_2$ emissions and climate change. As forms of making public, therefore, these models are both possible and necessary scenes for establishing critical claims, imaginaries and institutions. Climate fiction may, for Konior, be therefore how the implications of climate modelling are made *more* real.

The promise of what can be known and how it can be predicted is in these narrative futures, connected conceptually and practically to what needs to be done or altered, offering a mode of realism that seeks to catalyse change. At one level, and in contrast to the weight of evidence, the IPCC report's authors hope to catalyse a picture of the required scope and scale of collective action to mitigate the planetary effects of climate change (Chair of the IPCC 2017, 4). At another, the goal of the report is more straightforward: to provide the technical basis for agreeing the Nationally Determined Contributions (NDCs) to the remaining net-zero-carbon budget. This framework defines the distribution of substantial emissions reductions that signatories of the 2015 Paris Agreement will have to commit to in order to stay within the range of a 1.5 °C temperature rise, balancing this with continued economic activity, and the "international development agenda," through Sustainable Development Goals supported by the UN Addis Ababa Action Agenda (Chair of the IPCC 2017, 2–4; 28). This includes policy, targets and political address and claims; as well as a temporal aisthesis, a meaning embedded into the temporality of repetition, of the infrastructures that sustain the trajectories of those models

— i.e., current industrial, agricultural, energy and environmental management infrastructures — and how these interleave with cultural, political, social and other meaning generating infrastructures such as those discussed here.

This promise can be seen as a mode of making public; i.e., not only providing a representation or a compositional image of climate, but is used at different levels and layers to institute and mediate a reality construction built around it. Likewise, where climates models exist in systemic collaboration with the targets their predictions are used to set, climate fictions are also tied to the infrastructural layers they are built on. If the IPCC report is tied to the functionality of the NDCs, to see such models as of a form of infrastructural fiction, means that they can also be used to stage an alternative within or around these parameters. Within this relationship between the possibility of simulating and the possibility of fictionalising is a relationship between the speculative promise possible and enacted by infrastructure and its realisation; this indicates how structure becomes form as it is experienced and pulled together. This mediation and the conditions for it is key to how speculative models of infrastructure can be achieved, but also how that infrastructural plan engages the uncertain effects when it is. In the context of how the fictive or simulated aspects or outcomes of infrastructure are achieved and mediated through experience and activation Mieke Bal's concept of narratives (1999) offers a useful account for how the futurity of infrastructure of a promise met is staged beyond the technical and political operations of policies such as NDCs. It offers a wider set of possibilities for critical infrastructural futurities.

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## 2. A.S.T. and Feral Atlas: A case study in narratives as cementing force

Narrative can be seen, as Bal writes, to function as a "cementing force," (Bal 1999, 102) between structure and its being read and interpreted *as form*, as it is *experienced*. Writing of the insufficiencies of description to alone account for the experience of complex objects like artworks and how art instead prompts and pulls on memories and the sensing of being proximate to it. Narrative is therefore for Bal, how the *fictive* or *invented* gains form in relation to the physicality and context of its being performed and realised. In this approach, we might think of what narrative describes, articulates or puts into a specific context, as Bal puts it, as a kind of bridge that jumps forth from the limitations of what an object presents, a process offers or the experience of gaps in meaning, and that which is imagined, desired, promised or anticipated

into that space. As such narrative can be considered "a tool, not a meaning; a mediator, not a solution; a participant, not an outsider" (Bal 1999, 101). Narrative builds a "virtual reality" in through the function of narrative as a "motor in the present" (Bal 1999, 106) for the sensing and interpretation of an assemblage in which a *form* emerges, how it is read, sensed or interpreted (Bal 1999).

Where narrative is more than descriptive: "due to the participation of the viewing subject that any description, therefore, melts into the narration of the process that makes it possible" (Bal 1999, 109), it can be seen, in the sense used by Castoriadis, as inventive (also reflected in Thrift 2004; Butler 2018, Berlant 2016). Moreover, narrative, particularly when orchestrated within complex environmental-technical assemblages, is, as Konior argues, partial and situated within and by the assemblage that makes it possible, as well as its author. In as much as narrative facilitates an attention to the dynamic reciprocity between the unfolding of various "systemic counterparts" — writer and reader, diegetic and non-diegetic tense and information — rather than a stable "meaning" or "solution" (Bal 1999, 103) — doing this in time, temporality, memory and space that can build a productive tension for a viewer/reader. This is evident in the feral effects on the promises of the Anthropocene, The proposal of this chapter is, therefore, to expand this framing of narrative as tool, mediator and participant to the meaning in being mediated by the unfolding of infrastructure.

Further, I want to argue that by, as Bal suggests, moving beyond just the content of a narration to how it composes and mediates a movement through an assemblage to make certain imaginaries possible, the cementing force of narrative makes it possible to analyse the different ways that infrastructural futurity (the circular relationship between its fictive and materialised aspects) is both modelled and achieved by being made public into its temporality and repetition. This is to argue that is in how different modes of narrative or that cementing force act through and as infrastructure that different achievements and futures are possible in infrastructure. In terms of how it operates as an infrastructural artefact, infrastructural narrative might be seen as the staging of promise for how infrastructural parts and practices are cemented together through repetition. Narrative is in this sense, the dynamic, active artefact that is enacted through the performative anticipation and practices infrastructures conjures to exist at all. Narrative is how other artefacts, such as position, pattern, configuration come alive within infrastructural scenes, where repetition gains meaning and consistency. The stakes of the effects and capacity for transformation can be explored through both the abstractions and uncertainty in the relationships staged between structure and its being experienced. As will be explored, this relationship is also a frame for reading what happens when one — or something — performatively engages and enacts the meaning embodied in being mediated by the

unfolding of infrastructure. This is key to how curatorial practice and theory might meet infrastructural work more generally.

### Infrastructural narratives

Infrastructural narrative both composes and pre-enacts the conditions and connections of the infrastructural imaginaries it stages. It is, therefore, an important aspect in defining what becomes possible in the future — what is imagined and instituted through the futurity of infrastructure. Coming to work as a system and its flow, narrative can be understood as a kind of extended duration metaphor. Like metaphor, which as poet Mary Ruefle writes, exists as a perceptual event, as "the times it takes an exchange of energies to occur" an event it stages (Ruefle, *Madness, Rack and Honey* **2012** in Khan 2020, 133), narrative unfolds as a perceptual event used to define "the roles people imagine themselves in, and can take up," (Khan, 2020, 131). In this vein, writer Nora Khan recounts an imagined journey through the infrastructural transitions of a familiar city, slipping out of daily experience, because of Covid-19 lockdowns:

> I've lost a firm sense of an outside in which people live and move. In my mind, I try to order the nodes of my city, order its geography in space and time, realise how the highways cut around it and through. I try to follow the overpasses, into downtown, sweep through the plaza, … between highways, the new charter school, the public housing, …the addiction treatment centres and the rehabs. …, the yoga studio, the dying businesses, the start-ups, that salons whose signs have not changed since the 1970s. As I try to *recreate the city in my mind*, I have been never more aware of the sites of cognitive opacity, of mental blindspots I live with. The city, recalled, is a network of working, rare social gathering, consumption points and curated experiences (Khan, 2020 [emphasis mine])

For Khan, metaphors and narratives like sweeping through the city, cutting across rehabs and yoga studios, offer points of spatial and temporal consensus. They help to navigate uncertainty, a situation as yet un-narrated: *white boarding, levelling the playing field, being in the same boat, learning lessons, committing to*… are all examples of the patterning power metaphor to shape time and space. Within these is a promise that it is possible to move between these spaces of the unknown or uncertainty through the diagrammatic certainty of how space and time are to be traversed. They make that unknown addressable. In the flow and coherence of a navigable world the addressability of a metaphor is reality enough to move without full awareness of the realities made in that transition and its particular terms (Berlant 2016). But metaphor also make such dynamic realities, a specific exchange of energies, possible at the expense of others. Determining what appears as obvious and self-evident, metaphors become watch words by which institutions "mark" and "position their intention" revealing "hidden

infrastructure, with their affordances' and 'capacities'" (Khan 2020, 130). While there is much work that can be done to *see* the unseen organising methods and quotidian consensus infrastructure appears to make inevitable, and in which metaphoric bridging can "become a tactic for lingering in abstraction," (Khan 2020, 131) to more specifically look at this account as a reflection of a *practicing* of infrastructure refers to a different reality to the existence of infrastructure alone.

As a (fictive) description, Khan's text also writes into existence the embodied and embedded experience of being narrated into the meaning, capacities and affordance of multiple infrastructural layers through the metaphors of movement they propose, of cutting, sweeping, network; meaning is given dimension and duration. But, while metaphor "doesn't go so far as to name *how*" the system of which it is a mediator is formed (Khan 2020, 131), narrative must recount and indeed conjure more explicitly how that perception creates such a navigable city "of the spaces to go, where the civic discourse and living takes place, is already heavily shaped and compounded by technological mapping, gridding and platforming" (Khan 2020, 129).

Returning to Khan's extract, we, readers, follow the narrator through the spaces she conjures. Her 'I' positioned in movement according to patterns of infrastructural coherence that allow her, and us, to move across overpasses, from downtown, sweeping between highways and halfway houses. In this narrative, what is seemingly inevitable — infrastructural outcomes — are organised in time and (conceptual) space. Here, narratives of use as experience, of infrastructure as ground, constructs a reality in which infrastructure mediates that transition. As infrastructural meaning and form layered into various assemblages, narrative is also therefore a tool which helps consensus to glide as a surface from which to not see what is held together, by which to narrate the organisation of the seeming inevitability of an infrastructural narration. It is possible to 'know' a bridge that will allow us to cross a space or gap — and maybe there is a particular one we can each hold in our mind — because that bridge also represents a story that can be projected into the future of that journey. This must be done in advance of that bridge and using it, this is as Berlant would argue stored in anticipation of a particular genre of object, so that its story becomes a kind of fable and habit.

This projection which is held in the metaphors and narratives about an infrastructure does or allows is made possible because of the anticipation and performativity of actual infrastructural form. This projective and cementing force is also what is caught in the repetition of its realisation. If, as previous chapters have argued, this repetition can be put to different uses and indeed reconfigured, this projection and realisation of infrastructure in narrative, which is key to how it is staged at all, is how infrastructure might also be staged differently. Thus, a break in

that infrastructure is a rupture in the coherence (imagined, psychic and actual) of that story and its realisation in practice. In this way narrative poses that what is seemingly inevitable — infrastructural outcomes — is organised in time and (conceptual) space by how infrastructure constructs a reality in which that inevitability of that story is possible. Yet, where, as Bal indicates, narrative is also a constructive device, narrative poses what might be possible otherwise – another reality from the same pieces.

### Test case 1: Staging narrative as a speculative claim on futurity

As architecture theorist, Keller Easterling describes (echoed in Green in Gan 2021a; b), stories articulate where decisions are made within the construction or operation or maintenance of infrastructure and how these decisions are naturalised (Easterling 2016, 137–169).[141] These stories can also intervene on what narrative *does* in that assemblage (Easterling 2016, 149; 169). This draws attention to the way that stories can be used to institute meaning into recognisable practices or forms, or patterns. This turns on the instrumentalization of the constituent parts, events, actors, etc., narrative coheres through those practices or forms or patterns. How narrative cements the fictive in to abstracted, inscriptive forms and actions offers a first test case for how speculative models of world that could exist within ecologically-sustainable limits and preserve the possibility of self-creation and composition generate form. Here the interdisciplinary art and curatorial project "Protocols for the Phase Transition: Towards New Alliances" (2020), by the collaborative group the Alliance of the Southern Triangle (A.S.T.) (established in 2015, A.S.T. consists of Diann Bauer, Felice Grodin, Patricia M. Hernández and Elite Kedan), offer a first example of such a speculative narrative infrastructure which might be tested against such a proposal.

As implied in its title, Alliance of the Southern Triangle's "Protocols for the Phase Transition: Towards New Alliances," project concerns the development of a "set of protocols for the construction of twenty-first century alliances traversing borders, nation states and species."[142] As such the project interfaces well with the concerns at stake in this chapter. In the context of the 2020 edition of the speculative design magazine *Strelka Mag* "Revenge of the Real", the project stages these protocols as the conceptual and organizing tools necessary to building "strategic alliances, defining new terms of engagement between systems and societies; tools to

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[141] In particular this includes events such as a series of conferences held by the International Telegraph Union to set the terms for the mediation, multiplication, standardised disposition of telegraph infrastructure and those layered on top of it for years to come (see: Easterling 2016, 137–145).
[142] See: https://strelkamag.com/en/article/protocols-for-the-phase-transition-towards-new-alliances Last accessed: 30-6-2022.

repair and remake our cities and communities in the face of ghastly historic failures" on a planet increasingly in flux, fragmented and meso-scalar. The project rests on a conceptualisation of the world which is, in developed infrastructurally, viewing the models or technologies that define it epidemiologically and ecologically, i.e., in the systemic interactions *between* the micro and macro.[143] A.S.T. are assembled from the fields of art, architecture and urban design and have focused on the changing role of artistic and cultural practices in the context of climate change, as such they argue that such protocols are needed to meet "the multiplicity of health crises, missing social safety nets, climate change, AI, automation" — crises which express both the failure of collective operating systems but also the need for strategic alliances that can "define new terms of engagement between systems and societies" (A.S.T. 2020). And where the protocol defines as Eugene Thacker and Alexander Galloway describe it in *The Exploit* (2007: 28) a set of rules, standards and tendencies grounded "in the physical tendencies of a networked system…" determining how a network, organisation, infrastructure, assembly or assemblage unfolds, its hierarchies and operations, the possibility of the protocol turned on the scalability of cohering narratives that could move between "small clusters" to engage "assemblages of larger systems." (A.S.T. 2020).

Here, systematic proposals for practices of organising and world making were made through terms like "Adaptation," which posits dynamic processes through which any size body builds coalitions with its context are explicitly focused towards narratives of "agility in the face of contingency, a capacity to revise, to take on the feedback loop as a working methodology," or as the protocological narrative that "we are already synthetic. Adaptation is our only way through" (protocol _001). Alongside this, there is the intersection of climate change, geo-political entanglements, the cloud, pandemics, etc., which do not respect the territorial objects of Westphalian sovereignty – nation states, extraction, empire — meaning that the protocol for "Territory" is instead "defined by shifting urgencies rather than historical power grabs." Territory "is now a process. It is not a fixed state" (Protocol _002). Scale (Protocol _004) once, domination through standards and the optimization of constraints, is reconfigured as the necessity for "multi-scalar fluency." Elsewhere, "Navigation" (Protocol _003) is used to define movements and sense making through topological patterns of information; "Risk" is centred as an epistemic lens on social-historical, physical, ecological and cosmological scales and inversed, written into cross systems care; with "Translation" between alien worlds and

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[143] *Strelka Mag* was the imprint of the Strelka Institute a speculative design and urbanism think tank and post graduate education programme in Moscow, Russia. It was funded by the Russian oligarch Alexander Mamut in 2009 and sought to use the languages of architecture and design to intervene on public space with an ostensibly progressive agenda. It closed operations February 28th 2022, four days after Russia launched its invasion and war on its neighbour Ukraine.

conditions being the role of art, and "Alliances" defines the relational agent in filliping crises into transformation as an undefined, multiple "we".[144]

Alongside its first proposal in the magazine, the protocols are articulated in a series of digital videos, [145] framing texts and definitions,[146] and visualised in exhibitions (as part of *To Dream Effectively*, 2021, Focal Point Gallery, South End) [147] and on public digital displays (*Incident Report*, September 2020, The Flow Chart Foundation, Hudson New York).[148] As speculative rules for speculative and critical systems the group suppose are necessary in a world created by climate change, the articulation or staging of these protocols are suitably abstract: appearing as a list in an article in *Strelkamag* in Summer 2020 that enumerating the extended series of protocols and their organising rules in the context of an issue seeking to conceptualised what it called viable models of so-called 'planetarity'[149] — speculative approaches to real-time data speculation, ecological transformation and breaks in tradition emerging in the Sars-Cov-2 pandemic and which are mapped in the systemic planetary 'whole' of the *pan*demic. Otherwise they are video or listed in vinyl on the window of Indecent Report the storefront display windows of The Flow Chart Foundation (located at 348 Warren Street, in Hudson, NY) as part of the exhibition *Reports.*

In these propositions, the narratives baked in to these protocols act to cohere certain actions and characterises that are posed as speculative protocols whose linguistic and procedural definition of further actions aim to frame collective practices defined by the "protagonists as well as the spaces through which they navigate". As protocols staged as artworks and curatorial scenes, they also seek to initiate a conceptual-practical framework through which such adaptations might be organised and, importantly made public through publication, exhibition displays and research by the group, each setting a distinct use category and possibility. Specifically, these protocols are envisaged as "conceptual and organizing tools to build strategic alliances defining new terms of engagement between systems and societies; tools to repair and remake our cities and communities in the face of ghastly historic failures." The purpose of the protocols is also internal to the A.S.T. group, who state in their framing of the project that they will "continue to research, expand and adapt the protocols to reflect the

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[144] See: https://a-s-t.co/projects/protocols-for-the-phase-transition-towards-new-alliances/ Last accessed: 2-1-2024.
[145] See: https://www.youtube.com/channel/UCAK5YFf-vrMWrDHBwfIXK5Q Last accessed: 30-6-2022.
[146] See: https://weirdeconomies.com/fixes/coastal-alliances-submerged-defiance. Last accessed: 30-6-2022.
[147] See: https://www.fpg.org.uk/exhibition/to-dream-effectively/. Last accessed: 30-6-2022.
[148] See: https://www.flowchartfoundation.org/incident-report. Last accessed: 30-6-2022.
[149] See: https://strelkamag.com/en?topic=the-revenge-of-the-real Last accessed: 30-6-2022.

plurality of demands and solutions required to address issues such as climate change, AI, automation and risk".[150] Thus, the protocol defines a systemic scope to the practice internally and externally

### Narrative imaginaries

The curatorial, as a set of practices, artefacts and discursive parameters has been used to frame the question of how speculative infrastructural narrative is made public as a mode of instituted futurity. One way to understand how meaning is constructed into and through the reality construction posed by these protocols in this framing is by the role and operation of narrative as posed *infrastructurally*. As the artist Bahar Noorizadeh suggests, the protocol offers regulatory frameworks or educational tools more fine-tuned in its ability to infiltrate a field such as contemporary art.[151]  In this context, the protocol offers a tool by which this mass of informal and often nepotistic "terms of participation and engagement" which extend geographically from nationally-bounded institutional contracts to global travel, to localised dynamics of gentrification and to international discourse production to be reconfigured. Yet the protocol in its procedural abstraction is not limited to one field or instance if its processes can be replicated elsewhere.

Central to the protocol is the ability to break down tasks, information or ideas in to repeatable, addressable and containable parts, actions or data, in order to set practices for how an outcome or objective is to be reached in a pre-agreed, systemic or multi-dimensional manner (Galloway 2004). For instance, Internet Protocols allow that any kind of content (images, videos, text, etc.,) can be broken down into data encapsulated with specific identifications and sent with a common map to any address in the internet; similarly, the 1997 Kyoto climate Protocol sets the operating mechanisms of a carbon emissions market so that participating countries can trade permits for levels of emissions according to collective targets and flexible and differing responsibilities and capabilities to meet them.[152] As such, the systemic, scalable nature of the protocol is, for Noorizadeh, well suited to this meso-scalar and often trans-local condition of the contemporary field of art which has presented a problem for localized modes of unionising, organising or individualised positions of critique. Similarly, the protocol has been

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[150] See: https://a-s-t.co/projects/protocols-for-the-phase-transition-towards-new-alliances/ Last accessed: 22-12-2023.
[151] See: https://youngartistsinconversation.co.uk/Bahar-Noorizadeh Last accessed:  30-6-2022. http://johannabruckner.com/site/assets/files/1204/blocc_print_jb.pdf. Last accessed:  30-6-2022.
[152] See: https://unfccc.int/kyoto_protocol Last accessed: 30-6-2022.

used by A.S.T. as a means of re-imagining staging and navigating speculative relations posed by systemic models and changes which cannot be detached from given economic, cultural and environmental forces. While the abstraction of the protocol can be critiqued for its ability to make particularity or locality fungible or standardisable. Its embedding into its context also makes it a powerful tool for changing the scenes in which it is able to operate.

To return to the argument at stake in this chapter, the cementing force of narrative can be used here to indicate how protocols stage infrastructural expectation, performativity and realisation, as well as particular effects when infrastructure is used to stage the narrative of its futurity such as with climate change. Abstracted into written and unwritten concepts, protocols operate systemically across natural and computational languages (Galloway 2004, 3) to guide the procedural and political formation of technical and biological networks, systems and other media, creating through this cultural objects that merge technologies with forms of life (Galloway 2004, 3–7). In the realm of distributed and embedded informational infrastructure protocols are therefore a central apparatus of control (Galloway 2004, 3), shaping what a system generates in its processes, according to its infrastructural, material and relational context. As was discussed in the previous chapters, this raises the critical problem at stake when thinking of alternative infrastructures that seek to break with extant, hegemonic, violent or unsustainable infrastructure: namely how to counter its effect at scale without repeating the closures and exclusions of such scaling. While it engages the problem of how to stage systemic promises into and as abstracted infrastructural narratives and metaphors (as spooling out), *Protocols for the Phase Transition* also, therefore, offers an example of the problem of staging an imaginary or alternative infrastructure at scale as both a critical image and as a model of mediation. That is, how alternative imaginaries stake a critical claim on their difference being taken up systemically into existing infrastructural operations and, thus, engage, reinforce or support hegemonic power in infrastructure as well as challenge it.

Here, narrative is instrumental in configuring meaning and materialization as an instituting imaginary. It allows users, constituent entities and infrastructural wholes to undertake acts of composite self-sensing, modelling and composition that transforms its object by making it public, by staging that object or artefact into the dynamic, relational, mediative meaning offered within that narrative. If in Konior's radical rearticulation of the future-oriented reality of climate change, where climate change is "ontologically already a simulation, a hypothesis, a prophesy, an object modelled by scientific and cultural fictions alike", the question that emerges for Konior from the problem of how to represent climate change adequately "*so that* we act appropriately" is: what is the reality "'out there' that we want represent"? The protocol presents a claim on that future, arguing for how we use the infrastructures in which the future is realised and is changed

now, even as it doesn't say much about the infrastructures that will operationalise those futures themselves.

*Protocols for the Phase Transition* can therefore be seen to line up with a fictional openness to the future proposed by Konior; that is as a hypothetical future, whose claim to realism is modelled as well as enabled according to its ability to index and be embedded into the operational infrastructures in the present. While allowing different kinds of fiction to be scaled up to meet the climate crisis, this mode of staging speculative claims — as protocols acting within a problem space — also suggests that, a means of differentiating or articulating the effect of these images as alternative systemic models of climate future, the greater the claim to realism, the greater the need there is to rely on the systemic assemblages through which they may be narrated, become possible and have effect. To pose this another way: as was discussed in Chapter three to be configured into the scenes in which these protocols could be legible and take effect can require too much alignment with the limitations of those scenes. This could be case for their operation in both the field of art and wider public space of climate futures and the practices that constitute various outcomes.

Though it imagines (see Chapter three), configures and prompts the possibility of counter practices for others to implement, the abstractions enabling the protocol does not *alone* also offer counter forms or tensionings (Chapter two) in its instituted form or a means of measuring this (per systemic agency). This suggests a similar problem to that proposed in Chapter one: the speculative dimension of its critique is in fact a critique of its own limits vis-à-vis the scalability of that speculation. The work's high-level abstraction allows for expansion within the regimes of mediation of the art field, but can it articulate the kinds of transformative tensions discussed so far within itself and the infrastructures through which it is nonetheless realised in, and allow for the changes to that expansion?

In speculative reality constructions such as Khan's climate fictioning or A.S.T.'s protocols, there is a risk however. The strength of its claim as a hypothesis rests on both the present and future — to stage as terms of transition — is based on its ability to expand what can be known now based on material infrastructural layers, into a predicted, plausible future. In many ways the content of an infrastructural speculation such as A.S.T.'s protocols turn on an intervention into the repetition of a particular infrastructural formation as a genre or world that can scale up for all the potential users of that infrastructure. Its speculation is that the effect of scalability can be changed by emphasizing what is scaled, more than what scaling means. To use scalability to analyse protocols and A.S.T.'s project is not to equate them with the logics of modernity as per Tsing's critique of unchanging imaginaries of scale (2012). They are aligned precisely against

this. But if this means expanding without change to the terms of what that scale is or for whom, the model of the future can overdetermine the practice of the present in the service of a futurity built around such situated protocols. Rather, in the context of infrastructuring, the scalability of the protocol suggests that without a simultaneous ability to re-compose the infrastructures through which the protocol is made public as practice, such scalability can occur in that protocol. This is a question of how to change not only practice, but also the apparatus that shapes it requires a differentiation of the relationship between these two factors. That is how, can an imaginary be instituted into practice and repeated through the durational question of the narrative of that transition, the components and relationships in the story enacted in form and mediation.

The answer to this question turns on how the agency imagined in these propositions is figured (literally and speculatively) into the forms through which that proposition is imagined. As Chapter three indicated through its framing of configuration, the consequence of this intervention is based on a shift from a radicalisation of the individual or institution in a concept of transformation, instead centring an agential relationality. How this shift might be analysed in and articulated into narrative is developed in the next section.

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## 3. Test Case 4: Systemic recursion and flexibility

Infrastructure already serves as a venue for speculative formations and social prognostications. There is, however, in this proposition a more fundamental problem in the circular relationship between articulating a speculative future and its manifestation in an already-planned infrastructural form. That is, how to allow for a future that can be different to the one used, and relied on to imagine and institute that transformation? How to change the infrastructural layers that sediment this re-configuration into the repetition that narrates those parts and practices into infrastructure? The circularity of this problem for infrastructural speculation can be articulated, as curator Victoria Ivanova writes (2016), through the creation of active forms and figurations of what she articulates as systemic agency. This formulation first comes out of Ivanova's discussion of the bind of what Avanessian and Malik call the "post contemporary" (Avanessian and Malik 2016).

The post contemporary describes a temporal logic extended through the interweaving of speculative forms of governance with the infrastructures that have come to underwrite and institute the various entangled planetary techno-social collectives after neoliberal globalisation. Primarily, this comprises forms of governance including financial and insurance vehicles; but this also extents to, personalisation and recommendation engines, predictive policing (Avanessian and Malik 2016), as well as supply chain logistics organization and, here, climate futurity. Through these devices, the future and speculation on its events become tied into the economic infrastructures and conditions for contemporary experience; this is whether by literally financing it or delimiting acceptable parameters of risk and thus possible activities (insurance), or by leveraging the most from future gains by simultaneously minimising individual costs and risk and maximising coverage of these terms in the present as with asset management or mortgage market derivatives (Christophers 2023; Martin 2012).

In the temporality of such infrastructured speculation, "the past, the present and the future enter into an economy where maybe none of these modes is primary, or where the future replaces the present as the lead structuring aspect of time" (Avanessian and Malik 2016). For instance, in financial markets, future events are speculated on by contracts written about them so that when they arrive into the forthcoming present the uncertainty it represents can be adjudicated and, thus, arbitraged to extract value from the differences between planned and actual futures and according to that prior, future-oriented decision. This leaves the present as no longer a site of agency (for those not authoring such forms). The present is instead a function of the of realization of already established systems to operationalize the present from outside itself. Instead, Avanessian and Malik argue, speculative systems hold a privileged status. In the speculative regime of climate modelling, the predictive model and NDCs perform a similar role: setting out how a future present of reduced but fair emissions is to arrive. As such, *how* speculation is composed and extended, and how this is applied as the structuring of an always arriving present is central to locating where a) power lies and b) the active forms that enacts this circuit take place (for example, in the plurality and timelessness of the contemporary in contemporary art (Ivanova 2016, 7)), and c) for identifying the regime of mediation which hold the parameters and protocols of those active forms in place (Ivanova 2016, 5).

For Ivanova at stake here is the systemic agency _within_ rather than apart from these economies. That is, the capacity to define the terms of the operationalization of the present from outside itself in different mediation regimes and how someone or something is addressed into it (as seen in Chapters two and three). This is a function of the complexity of the abstraction of the active forms that hold the post-contemporary regime up. At stake for infrastructural narrative is how it might allow for the de- and re-territorializes those or that which

has been figured as that active form in the futurity an infrastructure determines. The key task, Ivanova argues, is, therefore, to recapture the future through praxes that devise and embed systemically oriented active forms (Ivanova 2016, 2).

However, while the abstraction of the active form allows for the capacity to control a future by mediating the disposition in which it arrives (Ivanova 2016, 5) there is also, as Easterling has made clear in her articulation of active form (Easterling 2016), a tension with the actual effects "which can become detached from the presumed intention of its engineers" (Ivanova 2016, 1–2). By locating this analytical task through the contextual realization of active rather than static forms and figures the question of systemic agency can be explored through how that abstraction functions to allow for or re-capture these moments of slippage from the plan, speculation or promise. Reflecting on the arguments made in Chapter three, focusing on this slippage, speculation or promise also helps locate that agency in the regime of mediation, or those addressed by it and how this might be employed to make an alternative infrastructure 'go public'.

For instance, using the frame of systemic agency, Ivanova writes, despite its intentions as a critical revisioning of the present, contemporary art can be both critical and reproductive of the underlying infrastructural reality that supports it: creating images of difference is a challenge to the pressures of performative standardization that come the infrastructuring of the global contemporary (see Osborne 2014; Chapter one in this thesis). Providing a speculative claim on an alternative worlding is a claim of contemporary art according to theorists such as Kwon, Smith and Osborne (2009; 2012; 2004), yet at the same time the structures which support the field (the market and the institutions of art) can recuperate this difference by providing the terms of its existence and circulation as art (Lee 2012; Malik 2013). Claims on the contemporary, are bound by the economy of their speculative realization as contemporary because they re-imagine those conditions by taking a distance from it, to work on the contemporary from its outside.[153]

To analyse the extent of systemic agency in a mediation regime is to trace how the abstraction of active forms (in contemporary art this refers to the its claims as forms activated by the disposition of its institutional context) is used to mediate the future of those figured and formed

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[153] This is a key difference between institutional and infrastructural critique; with the latter seeking to change the terms of that realisation: yet the fact that the difference between intention and actual effect is mediated by speculative regimes such as the institution of art, something which is ambiguous and incorporated into the proposal of infrastructural critique, makes it necessary to redefine the terms and scope of that mediation as in this thesis.

by it; that is how these forms channel the unfolding of that plan in its disposition, its version of the future, despite the entry of other realities. In art, this framing allows a critique of institutionalization that goes beyond the argument of complicity or capture. It suggests that this arrangement allows for the support structures (see Condorelli 2009) to state an intentioned interest or acceptance of transformational forms, but also work (deliberately or indecently) to contain the agency of that speculation or claim within the systemic frame or infrastructure it articulates — this is the specific point of entry A.S.T. seek to make when they use the protocol as a *real* speculative device. The point is that it will do something to the socially-performative practices of using infrastructure; that these protocols will offer a different imaginary, pattern of action or meaning, positioning and configuring these worlds differently and systemically. For instance, *Navigation* becomes less a function of territory. But, where territory has less and less meaning because of climatic-scale contexts or collapsing international rules, it is a practice, rather, of differentiating and interpreting spatial information in indeterminate meso-scalar scenes or planetary encounters defined by data and increasing noise (such as the spatio-temporal imaginaries of climate change defined futures or mitigation measures).[154]

Locating this mechanism of future binding in the circularity of the post contemporary shows how the abstraction of the active forms are mediated through that regimes' infrastructure. To read these examples in this way also indicates how speculative claims to transformation mediated within these regimes (such as contemporary art or finance) can shore up that regime, because this is where the systemic agency lies, rather than allow for its transformation for and by the those or that which enters it, unexpectedly or by design. Moreover, as the infrastructures that make this possible (rather than the institution that authorizes) this operates on a different imaginary and institution to that which can be critiqued through representational critiques; that is the meaning expressed through the systemic and recursive repetition of these configurations, pattern and positions.

To describe narrative as a site of organising and constructing practice is, then, to map and to hold open how position, pattern and configuration are held and reflected in the duration of infrastructure, and how infrastructure narrates that reality through putting parts and processed in place and in relation to one another. In this sense to read narrative to is to see description and content as a record and as the recreation of an effect in the infrastructural assemblages in which a narrative written and in which it is re-enacted as an active form of temporality.

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[154] See "navigation", available at: https://a-s-t.co/protocols/. Last accessed: 22-12-2023.

Could these fictions change the conditions from which they emerge and in which they are relevant? How would these fictions make a difference in the mediation of planetary scales that make part of their reality — anthropogenic climate change — possible? To answer this means breaking through the ways that in order that a claim on climate futurity to be realistic the status quo must both persist — in images and videos that document and thereby add to, but do not change, the timeline of events — and be able to be further nested into emission reduction frameworks, that is able to connect the reality of now to a negotiated target? This is not just about difference for difference's sake. When IPPC findings are bound to targets that can maintain currently infrastructural conditions, dialling down $CO_2$ output while also continuing to scale up growth, an important problem is how to scale down certain industrial and extractive processes (especially around fossil fuels) while also reflecting the planetary scale and distribution of the problem and this transformation. If the *Feral Atlas* can already offer one lesson, it is that the assemblages in which such fictive infrastructural realities are nested must remain adaptable.

As previous chapters articulate, the fictive, invented dimension of the instituting imaginary is — if it can be instituted — no less real than reality (Chapter three); the question here is, then, how these imaginaries can remain as transformative and as sustainable, repeatable infrastructural propositions once instituted into the infrastructural form of what can be predicted and show up as expected (Thrift 2004). In the remainder of this chapter I want to suggest that to think of the simultaneously speculative, projective and present tense enacting of meaning into the materialisation and mediating operations of infrastructure can thought of as a form of making public readable as narrative. That is, pulling together in transition of parts to generate a world, while also setting this into an abstractable form that can be imagined and articulated beyond and before its articulation in reality: but now wholly detached from it.

While this in itself is not a big leap from the description of activation and performativity in chapters one and two, using the compositional and enactive dimension of narrative it is possible to trace the differences in configuration and its systemic effect (Chapter three) as it is staged and unfolds into the speculative and real forms and protocols of infrastructural futurity. Re-hypothesising infrastructural futurity can, in this sense, be analysed as a proposal for transformation imagined in, through and as its materialisation and staging the repetition, form and activation (or the cementing force of narrative) that makes it possible. At stake in this analysis is, more specifically, how this imaginary is conceived in relation to the "centrifugal" nature of that narrative. That is, whether that narrative escape is re-captured by the abstracted and free-floating closures of a dominant infrastructural model, or it if can be recursively generative, i.e., able to change within itself as a splitting of simultaneous narratives within the

repetitions that 'conjure' infrastructure. The stakes of staging speculative or fictive infrastructure, therefore, is in how to avoid enclosing possibility in the version of the future modelled or in the conditions that transformation seeks to leave behind is how to institute specific difference into the recursivity of infrastructure. Can that change and difference emerge both predictability and unpredictably (partially, with bumps, as a beyond) within the forms that achieves the anticipated and actualised dimensions of this promise? How to get there can be modelled and thought through the twin dynamics of scalability and non-scalability enacted in *Feral Atlas*.

### *Feral Atlas*: Scalability and Non-Scalability

As Malik argues (2013) in relation to the settings of the post-contemporary, the problem of the systemic effects of the infrastructural tendencies in the production and staging of images and artefacts within a nonetheless heterogenous field such as contemporary art can be thought through what the systemic form of that field repeats as its constituent protocols and parameters.[155] In the context of this chapter, therefore, (and drawing on previous chapters) this relationship between *systemic* form and *systemic* effect can be used as a lens to explore what narrative (as active form) does to the possibility of an invented futurity. This relationship also allows a comparison of how infrastructural narratives might create tensions in its activation. As will be shown, this difference between intent and actualization in the binding of future and present allows for an analysis of whether such narratives enclose the change they pose, creating feedbacks (something which can be explored through Tsing's concept of scalability (2012); or, do these narratives create and respond to thresholds, moments of systemic halting and state change (something which will be explored in the *Feral Atlas* and N. Katheryn Hayles' discussion of the cognitive assemblage) (2017).

To read infrastructure as the outcome of a particular assemblage model is also to trace how, why and from where we enter, know and interact with that infrastructure. Another way to image the planetary would be to see infrastructural collaborations and how they mediate their internal and external context as dynamics in more unstable and uncertain assemblages. As points of convergence in assemblages constructed by Anthropocene infrastructure, feral entities in *Feral Atlas* — and the intersection of the three axes of Anthropocene imaginaries, infrastructural tippers and feral qualities of those entities in this context — invoke altogether different

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[155] Indeterminacy, being key in the genre-characteristics of a deliberately plural field of contemporary (Malik 2013).

interpretations of how infrastructure might be brought together to mediate alternative models of possible scale in these assemblages.

One reading of *Feral Atlas,* which could offer an answer to how to key infrastructural questions around scaling down ecologically and climactically disruptive processes, is that by disrupting the scalability of Anthropocene infrastructural plans and realised forms, feral entities enact the transformative possibilities of what Anna Tsing has already developed with the concept of "non-scalability" (2012). As expression of infrastructural imaginary and the collaborations that make them, qualities such as scale are not just technical achievements, but are used to mediate the world as a consequence of the logic of infrastructural organization at stake. In contrast to the feral, the scalability of infrastructure, Tsing writes, seeks to expel what is seen to be redundant and different so that a system of production can be scaled and expanded without having to change basic parts (see Carse 2012).

Basing her analysis of scalability in the establishment of the Portuguese colonial sugar cane experiments, scalability began as an infrastructural accident of the plantation. Organized according to the grids of irrigation canals that made growing sugar cane possible in non-native sites such as Madeira, plantations also meant that cultivation of cane could be standardized, making it both easier and "necessary" to manage all other areas of the environment, labour and resources. The plantation became, Tsing describes, a model for scalable (predicable and controllable) expansion that nested regionally distributed, but highly standardized and controlled, plantations into an expansive colonial logic and infrastructure of trade. One of the main ways it did this was by banishing the "meaningful [ecological] diversity" that might "disturb the design of the system," (Tsing 2012, 513) but which supports life in the various locales cane was (often inappropriately) grown and by cleansing the transformative social relations of its labourers who might "change things" (Tsing 2012, 507) in the deeply standardised agricultural practices applied to grow cane through the violent social and cultural displacement of enslavement and the Atlantic Middle Passage. Like this, scalability provided colonial projects with an infrastructurally extractivist, imperialist and expansionist logic for (more) reliable economic growth. This meant, conversely, that it was supporting resources, dynamics and contexts — labour, soil ecologies, regulations, etc. — which must be changed, be displaced, exploited or eradicated.

As Tsing argues, built on colonial economic infrastructure, global supply chain capitalism expands and entangles the plantation logic into myriad locations. One effect of scalable infrastructure is to enforce a slow violence to keep those worlds repeating: the exclusion, extraction, displacement of other relations (social, ecological) that may organize its parts

differently or slow that violent erosion. However, to reiterate Reed (Chapter one) this continued expansion without change, of exclusion of the transformative dynamics that sustain the adaptability of system, also creates uncontrollable edges and breakdowns. Whether in the collapse of markets due to lack of demand, like in the case of timber forests, the expenses of sustaining degraded soil, or in the organizing of labour against control, when a system or ecosystem can no longer be supported without change, the accidental or exploitative introduction of new relation by a feral entity or uncontrolled actor (a vine that swamps former cotton plantations [kudzu];[156] a corona virus that moves by air transport, later keeping populations in lockdown [sars-cov-2]), means the flow of an infrastructural assemblage can be drastically changed. In the unfolding of scalability and the bumpy repetitions it inevitably meets, also resides a consequence in its opposite: non-scalability.

Drawing on the matsutake mushroom blooms and harvests that emerged in the wasteland of abandoned industrial forestry in the Pacific Northwest of the USA, Tsing establishes the counter concept of non-scalability as the tracing and production of relations that are highly situated and localized — mushrooms that can only grow around certain trees — and are disruptive to scalability — these mushrooms cannot be cultivated industrially.[157] Non-scalability is for Tsing both before and the epi-phenomenon of scalability. Neither good nor bad, it is simply the absence of scalability. But since "relationships are a potential vector for transformation" (Tsing 2012, 507) non-scalability is also, therefore, a measure and staging of the capacity for diversity of relations and transformation in the system ((Tsing 2012, 515).[158] By tracing the relationships that cohere around the ruins of scalable effects, in what might be called the bumpiness of the unfolding of these infrastructures Tsing argues that the possibility of non-scalability — transformation in relation — can be found. Can non-scalability be seen as a transformative, systemic effect possible in the world-making force of infrastructural narrative?

### Narrating non-scalability

If narrative facilitates an attention to the dynamic reciprocity between the unfolding of various "systemic counterparts" (Bal 1999) then doing this in time, temporality, memory and space can build a productive tensions for both narrator and viewer/reader as they are pulled together into the futurity of an infrastructural promise as it is manifest in its promise, performative anticipation

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[156] https://feralatlas.supdigital.org/poster/kudzu-pueraria-montana-history-physiology-and-ecology-combine-to-make-a-major-ecosystem-threat. Last accessed:  30-6-2022.
[157] Although they can be made addressable as they are loaded into the belly of aircrafts in global trade (Tsing 2012).
[158] Cf. the thick and thin connectivity or coherence discussed in Chapter two.

and mediation. It is possible to explore this particular convergence of promise, mediation and the convergence of infrastructural layers that make it possible, through Konior's description of "hypo-real" forms of image making. These are, to reiterate Konior's claims, images that both simulate and index multiple, complex layers of the world in reality propositions tied to the operation of infrastructure, the fictive dimension that can be built from out of the models that guide them and the complexity of the infrastructural assemblages against which their claims are indexed (see: Konior 2019). This capacity, as it is related to the unfolding of practices, composition and repetition, can also be seen as working on the function of, and to result in the *emergent complexity* — the depth and interconnection in the compositional qualities and processual capacity — of an assemblage.

For literary theorist N Katheryn Hayles, emergent complexity refers to complex, system patterns or forms of behaviour, meaning or interpretation that can arise in, and as a condition of, the relationship between the information in an "environment's structured specificities" and actors interacting with it (Hayles 2017, 105). Drawing on an analogy made by a character (Siri) in one of two novels used to directly explore the 'cost' or limitations of consciousness on the development of other cognitive capacities (Peter Watt's 2006 novel *Blindsight*), Hayles posits honey comb, made by bees, as an instance of the ability of an environment to enable the emergence of complex forms. In making the comb, explains Siri, "no bee has an overall plan for the honey comb in its head; all it has is an instinct to turn in a circle and spit wax while adjacent bees do the same. The wax lines press against each other to form a hexagon, the polygon with the closest packing ratio" (Hayles 2017, 105). The honeycomb is the emergent result. To begin with, Hayles' use of emergent complexity helps to illuminate and compare how particular forms and manifestation of agency and power cohere as a result or outcome of being operationalised in the dynamic, repeated relationships between cognisors and environments in an assemblage.

If infrastructural narrative can be seen as an active form for making infrastructural transition, relation and operation in context, sensible and *specific*, infrastructural narrative is an event through which a reality is constructed in the emergent complexity of that assemblage. As Hayles clarifies, the conditions of emergence for a particular regime of mediation can be seen to define the particular mode of making public the configuration of that active form or narrative allows. That is to say, the complexity of the particular settings, parameters or affordances, from which a form, information or a regime of mediation can come into being defines the attendant complexity of that outcome (see Hayles 2017, 105). The translation of futurity into the narratives an infrastructure repeats, performs or challenges could also be read through this lens. Is the model of an infrastructural future relationally complex, subject to change or uncertainty (i.e., non-scalable and partial) or is it simple, seeking to determine that future

towards narrow, though scalable, outcomes? The complexity of those emergent conditions both encapsulates and enacts the transition and exchange and infrastructure stages.

Posing that complexity as the dynamic through which an infrastructure becomes meaningful to and in its context; a reality in whose meaning is the completion of the transition that negotiates more or less complex assemblages (realising its inevitability), we can begin to understand how narrative acts to mediate and maintain different kinds of infrastructural possibility. Registered in the circular temporality and practice of infrastructure, the realities constructed by and through infrastructure (qua Khan (2020)) both narrate the *experience* (later affect) of an organised inevitability (Berlant 2008) and therefore anticipated as a dependable ground; *and* model the specific qualities of this narrative as an experience of being in infrastructural time can be understood in advance as a narrative where cause and effect will unfold a meso-scalar pattern, predictably. The emergent conditions in which such narratives are possible, as such, define the transformation that might be contained within that narrative as an active, infrastructural form of narrative. They, moreover, define the capacity of a narrative to effect changes as those parts are cemented and experienced (cf. the effect of the Big Society in easing in conditions of disinvestment, but also for alternative cultural / social infrastructuring in Chapter one).

The frame of systemic agency, or in this case the systemic effect of different infrastructural narrative allows for the tension between intention and actual effect to be considered. For Ivanova, there is also, therefore, possibility in prototyping forms whose intention is to articulate and work on the transformative capacity of the instability of that link and the conditions within which such systemic or infrastructural links are made. Rather than enforcing that link as the only means of mediating the achievement the future, for Ivanova, one approach is to redeploy the openness of an aesthetic, epistemic and operational regime like contemporary art to the abstractions of the active forms that mediate their relationship between speculation and realization. This allows a speculative future to present in itself the desire for transformation (Ivanova 2016, 10), to embed within itself a disruptive over-determination of the context in which it is staged. This enables a transformation and difference that as an active form cannot be contained by the logic of achieving that transformation. By staging such prototypes as active forms, with this tension in mind, the self-reflexivity of the institution of contemporary art retains a responsiveness and reflexivity, an openness to the actual manifestations of these form in the present future might be instituted as a mode of "selective (self)sabotage and reinvention" (Ivanova 2016, 10).

This capacity for conveying a transformation and for responding reflexively generatively to the unexpected effects of the transformation possible when inserting open-ended prototypes into a

system are key traits for mediation regimes that deploy systemic agency towards other aims than their own reproduction. Transposing this idea of active prototyping and reflexivity in infrastructure, we get the possibility of an infrastructure, but an erratic one, a non-scalable potential. This erratic, 'bumpy' repetition provides a model for thinking infrastructural narratives might not only pose a transformation and create the threshold conditions for an alternative to co-exist in a particular assemblage, as described in Chapter three, but also create a bridge which enacts a transformation while simultaneously preserving the formal and figurative possibility of self-re-composition and re-creation of a desired transformation within itself and within the artefacts and modes of making public that enabled it.

The implication to be explored here is how the examples of publicing discussed allow for that transformation and change. Moreover, if this transformation is a function of the complexity, or scalability or non-scalability of the specialized assemblages they stage and realize can the potential limits in the abstraction of *Protocols for Phase Transition* might be productively compared with the staging of *Feral Atlas*? As previously discussed, each axis in *Feral Atlas* describes where a model of infrastructural collaboration mediates the assemblage discussed, according to models of scale that exclude diversity, but also operates as a locus of relational diversity. These are established as feral interventions that produce the conditions of alternative interpretations of that locale. If the effects *Feral Atlas* discusses are feral "because they emerge within human-sponsored projects, but are not in human control,"[159] non-scalability introduces the possibility of intentionally creating feral effect in the infrastructures of the present, can these models of non-scalability be used to mobilize a different kind of emergent conditions of an image or effect to that of real time simulations? Can it mobilize a more generative relationship to the scalable infrastructural operations that enable them? This means examining how the *Feral Atlas* platform achieves this effect.

### A Non-Scalable Platform

*Feral Atlas* describes the unintended consequences of the intersection of Anthropocene imaginaries and infrastructural design in a kind of assemblage whose dynamics are shaped by the exploitation or interpretation of these conditions by various feral entities. Seeing these dynamics as embodiments of different models and interpretation of scalability and non-scalability, feral processes also re-mediate the practices that hold together, pattern and make knowable the intentional and unintentional worlds generated by the Anthropocene. These feral

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[159] https://feralatlas.supdigital.org/index?text=introduction-to-feral-atlas&ttype=essay&cd=true.  Last accessed: 30-6-2022.

processes each enact images of scalability and non-scalability. In the platform, this is also practically manifest as a tension between non-scalable and scalable dynamics; beginning on the conceptual axes it is built around (i.e., between the promises of infrastructure and feral effects, between shipping as logistical achievement and invasion propagated as its edge. This tensioning is used to invert infrastructural intention and imaginaries — seamless interoperability, invisibility to outcome, exclusion of indeterminacy and the political). How this might be staged as a speculative infrastructural image is reflected in the architecture of the digital platform itself.

The research collection at the core of the *Atlas* is built around Contentful, an online content management system that allows the creation and storage of digital information (and associated metadata) and pulls it into a variety of platforms, devices and uses through an application programming interface (API).[160] As a so-called headless database tool, Contentful is not tied to a front-end webpage that displays content according to predetermined rules such as how a tweet or Facebook post always looks the same. This means that the relationship between entities in the database — such as, in this case, which tippers and detonators are relevant to the emergence of a feral entity, or how a number of entities emerge through a similar mediation of state-change like "INVASION" — can be designed more thoroughly, as can how this content be displayed and therefore used according to these relationships. Or how the platform is used and therefore its logics and proposals are made public and understood.

Where the organization of entities is defined by the convergence of axes used by researchers on the one hand and by users exploring the platform on the other, the parameters of entities can be, in this way, both descriptively non-scalar, and prompt non-scalar narratives in their reading. Access of information is driven not by scalability of carefully hierarchized categorization — such as Wikipedia and traditional encyclopaedias — but the comparatively erratic scaling of navigation by relations and parameters set by each user as they navigate and visualize and manifest patterns in its database. This allows a horizontal view of each layer of importance. But by simultaneously jointing these layers in a platform that must be navigated through clicks, hyperlinks, scrolls and location — as well as reading, watching and listening — one must reconstruct the feral entanglements of these assemblages through decision trees of how to approach each case study: the use of this platform therefore mimics the chaotic but conditional unfurling of the feral effects themselves.

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[160] Email correspondence with Lukas Eigler-Harding, a developer on the platform (April 2021). An API allows data from one source to be pulled into another platform without having to copy it over or for the ownership to be transferred.

However, opening up the constraints of one infrastructural layer — a web platforms which host relatively traditional content forms — creates a relationship to a different kind of infrastructural layer and thus impacts the claims of *Feral Atlas* accordingly. The platform of *Feral Atlas* itself is itself built using React, an open-source application builder developed by Facebook for the design of interactive user interfaces. React is a code library established and maintained by Facebook.[161] Contentful is hosted by Amazon web servers (AWS).It delivers its managed content using Content Delivery Networks (CDNs),[162] including Fastly, to distribute copies of the source information to users held on CDN servers around the world, and closer to the user.[163] As a result, the architecture supporting *Feral Atlas* is both technically scalable, efficiently pushing content out to multiple users and platforms, tessellating with a powerful and dominant infrastructure,[164] and conceptually non-scalable.

Reflecting the claim that the Anthropocene must be understood through local ecological patches, this construction creates a tension between platform user and its content — as well as between the non-linear parallel routes possible to be explored between multiple possible axes and entities and the multiple intersections caused by the Anthropocene from which these case studies and frameworks emerge. However, the confusion enabled by the composition of this platform (and enabled by its underlying architecture) about what aspect is most important; about what direction of cause and effect is relevant, not only reflects the epistemic role of digital media in the understanding of assemblage imaginaries like 'the planetary', as Konior would argue. It also means that these effects must be pieced together and re-assembled through the relationships, dynamics, mediators that cohere in each case as conceptual, critical devices in the use of the platform. It is possible, finally, to clarify the site and operation of this scene of tension in these feral narratives and flows by returning to what N. Katheryn Hayles would refer to as choices or interpretations cohering in what is discussed below a "cognitive assemblage"

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[161] https://opensource.fb.com/projects/react. Last accessed:  30-6-2022.
[162] A CDN serves content copied and cached on distributed and localized servers where and when it is needed rather than all users downloading from a single hosting server. Though making things faster and therefore scalable, with many content and user-heavy services using CNDs, this reliance and complexification can make the infrastructure more precarious as happened when Fastly suffered an hour-long outage in 2021, causing a large portion of the web to go down. See: https://www.cloudflare.com/en-gb/learning/cdn/what-is-a-cdn/. Last accessed:  30-6-2022; https://constellix.com/news/fastly-global-outage-2021. Last accessed:  30-6-2022.
[163] See: https://www.contentful.com/legal/faq/. Last accessed:  30-6-2022; https://www.contentful.com/security/. Last accessed:  30-6-2022. This interface is however, key to the construction of an inter-layer infrastructure stack, whose meaningfulness is derived from its entanglement and integration with its context.
[164] Indeed, Facebook intersects the Anthropocene not only in the energy it uses for its vast data centres, but also in how it is rewriting subjectivity in relation to its communication and economic infrastructure, whether demanding that legal identity is transparent to profile identities https://en.wikipedia.org/wiki/Facebook_real-name_policy_controversy.  Last accessed:  30-6-2022.

(2017). In this case, a cognitive assemblage established between each individual user, the platform infrastructures and those of whatever feral effect it refers to, makes it possible to read the effects of narratives staged, interpreted and transformed between these scales and scenes of meaning-making, and, uncertainty.

<p align="center">*</p>

## 4. Non-scalable narratives

As Hayles describes, the spread of computational media into virtually all complex technical systems, as well as the increasing integration of human and non-human actors in complex societies, ecologies and technologies has vastly expanded the sphere of cognition and meaning. This has opened up interaction between "[biological,] human and technical" conscious and non-conscious cognitive actors or "cognizors," systems and processes to produce multiple kinds of "cognitive assemblage" (Hayles 2017, 1–3). Accordingly, the cognitive assemblage describes how, despite profound differences, functionally similar biological and technical cognitive processes can become enmeshed with actors able to sense and interpret information shared in these systems also produce and mediate distributed and relational meaning made in the dynamic arrangement of information flows and cognitive interactions (Hayles 2017, 11) that occur therein. The cognitive assemblage offers a framework for tying together and testing the convergences of contexts, content and participants posed so far in this thesis, and which this chapter seeks to mobilise in an expanded understanding of narrative,

Focusing on the mediation, recognition and interpretation of "information within contexts that connect it with meaning" and where the meaning of information is "given by the processes that interpret it," the effect of meaning made in the cognitive assemblage can be boiled down to the complex interrelations in the flows "of information through a system and the choices and decision that create, modify and interpret that flow" (Hayles 2017, 116). Systemic agency would refer to the capacity to respond to this flow actively, productively and generatively. Outcomes vary from low-level choices or responses to changes in contextual information and consequentially very simple cognitions — for example, where plants release chemicals to warn others of predators, or to lure back pollinators — as well as higher cognitions and interpretations — such as the interaction between a trading algorithm and human regulator, and between technical autonomous systems, such as self-driving cars or traffic controls,

regulatory and legal frameworks and actors not in its control such as pedestrians (Hayles 2017, 20; 13).

A decision based on the interpretation of information in a variety of cognitive processes, choice does not imply individual free will here, but is the result of a dynamic that unfolds in the conditions of the assemblage mediating it, and by comparing incoming information against known and simulated models (Hayles 2017, 22; 23; 26). The qualities of this meaning are therefore not based on what they represent, but on the kinds of systemic effect they (are able to) have on the assemblage as a whole and established as a flow of evolving relationships. A systemic concept of meaning refers, in part therefore, to the *specific* points and connections in cognitive assemblages where information flows are initiated, modified or transformed by what Bruno Latour called mediators (Latour 2002). These determine "the kinds and scope of decisions possible within milieus and the meanings that emerge within them" (Hayles 2017 117) at the point in which they hold together a cognitive process. The idea of cognitive assemblage therefore offers an intersection at which patterns of information, affect and signals moving through infrastructural collaborations and which are given meaning by this context — the context "in which its activity makes a difference" — can be described, simulated and tested (Hayles 2017, 26).

### Test Case 2. Cognitive Assemblages and Feral Interpretations

In this context, *Feral Atlas* describes in feral effect examples not only non-scalable relations, but what can be read as relational modes of interpretation and choice that express non-scalable patterns and effects in the information flows, distributions and models described by the infrastructurally mediated worlds of the Anthropocene. By mediating feral effects through both nonscalable and scalable infrastructures, the platform itself offer a speculative mediator that temporarily joins together feral entities and users in scalable infrastructural conditions and local relations in speculative interpretations that could transform the kind of infrastructural collaboration possible. Returning to the opening example, for instance, *Feral Atlas* underlines that when comb jellies enter into a new location, industrial shipping composes a cognitive assemblage between them and Black Sea ecologies. These industrial stowaways interpret the changing flow of resources defined first by this infrastructurally mediated assemblage — created by shipping, taking invasive species from one location to another — and then by their ability to sense, model and generate new systemic relations between the ecological, infrastructural and climactic factors in the interpretation of this assemblage.

The introduction of non-scalability into the cognitive assemblage opens up a distinct ethical/aesthetic framework in the analysis, making and instituting of infrastructural images such as those staged by *Feral Atlas*, in which the question is not only which actors are given agency in this frame (Hayles 2017, 116). Rather, an additional question is: What interpretations of pattern, narrative or meaning are possible, given the various conditions and mediators of the systems dependent on perspective? This puts into question the particular mediating arrangement in each, and whether alternative actors have agency in this flow. Reading the novel situation in which they landed as both viable and devoid of predators, the comb jellies could become top mediators in the assemblage detonated or set into play by the Anthropocene imaginary of invasion, taking it from an ecologically balanced assemblage to one less adapted — but this is not immutable. The changing dynamics of an assemblage can mean that a once non-scalable feral entity can become too powerful a mediator; a non-scalable, feral interpretation can also be to scaled up to, again, limit the possibility of further change. In the ecology of the Black Sea, the comb jelly came to dominate the conditions, until a new predator entered (Fach et. al. 2020). The continued production of diversity of mediation is then key to an infrastructural collaboration being transformative or not.

Like this the cognitive assemblage offers a different mode of imagining and staging change. Scale is not an achievement of the *Feral Atlas*, but is put in tension by feral effects and by the platform: as an interpretive non-scalable effect or by acting to mediate a non-scalable flow of information. While there is agency in making an interpretive choice in using the platform, by assembling what can be described as a cognitive assemblage, it is more evidently conditional and constrained by how these feral effects, and feral-like user journeys, are mediated. The platform uses this inversion of scale to show how tensioning an assemblage — making new relations that cannot be contained by the existing system — can create tipping points in that system. This is whether in how the cognitive entity interprets it (comb jellies, for instance), in the ability of mediators to shape systemic effects (ballast tanks carrying and releasing invasive species) or it the arrangement between the platform itself, its content, the delivery of this content and its users. This offers a model of infrastructural making public, which though abstract allows for different kinds of movement as well as composition between the constituent parts of an infrastructural convergence and artefact.

By staging such tensions between the extensive scale of access and complex content delivery using dominant infrastructures, and the complexifying relations of non-scalable axes and user journeys through the infrastructural conditions and organizing frameworks of its platform, *Feral Atlas* enacts a different kind of hypothetical realism to those discussed earlier. This understands the epistemological role of digital images but isn't determined by this. Although

only speculative, built into the platform is a tension that allows it to link between multiple (both scalable and not scalable) contexts by extensive software infrastructures and the errant mediations and user journeys it enacts. The platform and the conceptual infrastructure it supports are not mediating a response to an apparently real-time image, but entangling the user in the uncertain dynamics of feral response to scalable infrastructures and imaginaries extended too far. In this sense, *Feral Atlas* also offers speculative frame that stages a different relationship to the uncertainty of environmental future. Like this, narrative (specifically infrastructural narrative) can become a non-scalable event in the flow of information and performative practices; posed as a feral narrative it can might also be thought of as a partial or open-ended prototype transforming the infrastructure that supports it. Here, the infrastructural collaborations from which they emerge are unstable, but relationally generative. This shifts emphasis from expanding what is thought possible (as in fictioning), to realizing, in the performative narratives of infrastructure, an alternative image that can enact different kinds of non-scalable effect in the flow of information of which it is a part (or becomes a part) and therefore the meaningful infrastructural world this creates. What are these differences?

**Feedback and tipping points**

For Hayles two emergent effects are possible given the complexity of the assemblage. These can be mapped onto the scalability or non-scalability of an assemblage; but can also be used in the planning or composition of an assemblage. In particular, at stake for Hayles is how these emergent effects shape interpretation and interaction from the perspective of whether they cause monocultural assemblages of scale or transformative emergent complexities. Firstly, are the feedback loops created by, for example High Frequency Trading, which purposefully exclude human actors for speed. By standardising and thus deeply exaggerating how the system is mediated, the flow of information through it and the capacity of a single algorithmic actor to recognise pattern and act on it, the scalability of that complexity is able to create negative feedback loops which can lose billions of dollars in sub second speed (Hayles 2017, 163). This can lead to catastrophic effects for those non-mediators of the system (this might be compared to the introduction of invasive entities or modes of gridding seen in the *Feral Atlas*). As Hayles argues, the question of the emergent complexity or monoculture of an infrastructure or narrative such as scale, becomes a key speculative determinant of where humans can enter in order to create complexity or to design its opposite.

By exploring a different approach to the cementing and bridging of systemic parts and practices or what I have called infrastructural narration through the *Feral Atlas* and the cognitive

assemblage the previous section has offered an alternative to speculative imaginaries that can be scaled up, but do not offer an account of how or how this change in scale would change the conditions of its emergence or how it mediates the world it creates. That is, *Feral Atlas* described how narratives clash as they are enacted in contexts that can be interpreted and practiced differently. Reading this through the cognitive assemblage, moreover, these differences can be posed as specific systemic events that are a condition of that interoperation and of the complexity of a particular assemblage. As Tsing describes in non-scalability (2012), this complexity is key to transformability. The questions that can be posed here, and in which the curatorial can also be centred, is how can complexity be created in which transformation is possible? How can the specific interactions of and across a cognitive assemblage be used to make specific changes — that is to stage a practice of critique, ending one repetition in favour of another?

As a mode of critical transformation this capacity to include *the beyond* of infrastructure (what is both contained an excluded in infrastructure, see Chapter three) is powerful: This can shift the balance of mediation and thus the flow of information and narrative possible; if enacted as a systemic event such a shift can make an existing narrative or infrastructural promise impossible. Such an interruption is not necessarily a zero-sum game, however, and can indeed be the basis of an ethics of relation and relational transformation — especially as compared to feedback. Hayles arrives at this description of the systemic effect of halting on the flow of information and interpretation — what I'm calling narrative — through her reading of *The Intuitionist* (Whitehead 1999). In it, Lila Mae, the only African American elevator inspector in the city is confounded by the unexpected catastrophe of a failing elevator in the Fanny Briggs Memorial Building she only inspected the day before.

One of the main narrative motors in Whitehead's novel is that, though she is often disparaged for her intuitive, extra-sensory methods by the more rationalist *Empiricists,* Lila Mae is — until the fateful day of the Fanny Briggs accident — never wrong in her elevator inspections. Lila Mae's approach to *intuiting* the workings of an elevator relying on sense and synesthetic visualisation, rather than, as the *Empiricists* do, on data read outs is already disparaged, but the elevator crash reveals that any expansion of knowing or imagining of that infrastructure in *intuitionism* is ultimately fed back into a system that is indifferent to anything but its own precepts. Where the elevator provides for Whitehead a motif for the racist promise of uplift in modernity (Tucker 2010, 150), the crash is a halting not only of the infrastructure, but of both logics of empiricism and intuition as they both imagine its promise of a perfect model of uplift. This halting, and shift in how the information of the elevator is mediated, is the point of transformation for Lila Mae. It is also how Hayles seeks to articulate the possibility of a break in

the closure of a system when new variables, or mediators (the elevators itself) enter. As Tucker writes, moreover, it is by learning to read the racism of uplift whatever the approach, a recurrence of Fanny Briggs' "a fictional salve who taught here self to read" (Tucker 2010, 150), that this halting is registered.

As literary theorist Tucker makes clear it is this new practice of *reading* that infrastructure, of that shift in mediation, which makes it possible to move beyond that infrastructure: learning to read is what bridges out of one narrative to another. As such, another imaginary can continue in its place, using many of the same parts, but rearranging both the resulting form and the (more than social) imaginary sustaining and sustained by it. This same halting and bridging, is I want to argue is how the *Feral Atlas* can be read to provide a model for infrastructural transformation. Here, we can read the feral effects on the infrastructure projects of the Anthropocene as such a splitting, interruption and bridging: a bifurcation in the assemblage in which another kind of model or simulation is run on it, causing an end, friction or threshold in of one imaginary of repetition and a tipping point of other dynamics toward the instituting of another through that threshold (see chapters two and three).

The introduction of non-scalability into the cognitive assemblage between the elevator and Lila Mae opens up a distinct ethical/aesthetic framework in the analysis, making and instituting of infrastructural images such as those staged by *Feral Atlas*, in which the question is not only which actors are given agency in this frame (Hayles 2017, 116). An additional question is what interpretations are possible given the various conditions and mediators of the systems, and dependent on perspective. This also puts into question the particular mediating arrangement in each, and whether alternative actors have agency in this flow. The interaction of tensions, thresholds and intentional tipping points in the positions, patterns, configurations and narratives in these assemblages make halting not only possible, but inevitable. For a halting to make another kind imaginary possible however, the transformability of the threshold in the existing model must persist; it must be possible to move through a narrative infrastructure into the uncertainty of that new view and for that uncertainty to be carried through.

This transformation requires new modes of reading; but, also, a vehicle, practice and form to articulate that difference into the repetition that makes a new kind of infrastructural repetition and promise. This is what can create tipping points in the thresholds made by configuring *in* new frictions. This mode of narrative as a splitting between proposal and transformability re-articulates narrative as an artefact of the infrastructural meaning in the context of the assemblages it enacts and the change it holds onto or standardises. Differentiating these dynamics allows difference in the possibilities of composing, staging and mediating through

narrative, having implications for the role of curatorial composition, and staging in the mediation of the cultural, political and social planetary imaginaries infrastructural narrative increasingly mobilises. Tying this into the production of Tsing's scalable and non-scalable assemblages offers a means by which infrastructural (re)composition can be used to create new configurations and whose systemic effects change how that assemblage mediates the world it creates. This double difference — of the sabotaging effects of uncertainty possible because of non-scalable transformations — is key to thinking how forms and artefacts of cura-infrastructural making public such as protocols (A.S.T.) might enact the transformational promises in the substrate they build on and which is called upon by climate futurity. Or, by imagining infrastructural futures in general whilst allowing the necessity of transformation and agency in whatever unfolds. At stake, then, is in making a claim for such kinds of cura-infrastuctural practices of making critical infrastructures public in this thesis is learning to read, whilst at the same time doing something else in and with that flow, circulation or activation; splitting it, making it partial and multiple, creating bumps and frictions and, thus, new worlds.

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## 5. Conclusion

This chapter has shown how the keys to an alternative infrastructural futurity lie in the non-scalability of the present infrastructure unfolds as its ongoing promise; that is, in the generative impossibility of the double activation of halting and bridging to other repetitions and configurations in feral processes. Here, in relation to the narration of futurity into infrastructural form and practice, this is achieved through an analysis of *how* such forms are articulated and practiced; specifically, this is read according to the constraints or configuration of the infrastructural form and patterning in which it takes place and how this form results from or is bodied forth (Chapter three) from a certain kind of imagined repetition; and how, through this repetition, emerges from a particular arrangement or convergence of forms with or without the capacity for ongoing transformability.

The starting point of this exploration was the question of how infrastructure is known and makes worlds known by holding together traces of effect, layers of sensing and relations between things into certain kinds of future. The expansion of infrastructural collaborations discussed here — through platform, integrated data-driven, mobile locative technologies — show how infrastructural work is performed and maintained in real time; not only as a condition

of infrastructural access and operation, but of particular modes of meaning formation too. However, while what Konior describes (2019) as the fictive dimension of narrative that enters in the composition and enactment of infrastructural futurity allows for degrees of invention and creation in what is already given, the real effect of the hypothetical nature of composite images, such as climate models, manifests in the performative dimensions of infrastructure — what Simondon calls the "circular causality" of infrastructure (1980). In this sense, infrastructure is (a set of) cognitive relations and flows that create the object on which it has an effect, such as a user, a climate model or a feral entity on its context. Infrastructure is constructed in advance to make what it can make known known. The real-time image described by Konior, and those models that emerge in the relationship between feral entities and the assemblages that contextualize them, can then be seen as the patterns, thresholds, feedback loops and transformations mediating possible choices in the subsequently repeated and systemic flows of information assembled by infrastructure around certain climatic conditions or feral qualities.

A different way to pose the question above for the expanded cura-infrastructural practices at stake here is, therefore: How to make a cli-fi work on the present, whilst the also keeping that narrative motor open to change? This is as much a question of staging those claims for a re-composition of infrastructure (and configuring more than social collectivities into the infrastructural forms and imaginaries that articulate the future through repetition), to how these are pulled in to a present. As such, this chapter argues for modes of critique in which speculation allows for, registers and is differentiated by the forms and modes of instituting and performing that imaginary and how they are folded back into the achievement of that infrastructural repetition. These two factors are, when posed through infrastructural regimes of mediation, connected. And while Ivanova, leaves open the actual realisation of such prototypes to question here,[165] the proposal of infrastructural narratives articulated by and as a mode of future-oriented making public can be productively explored as an attempt to establish such an openness in the staging of forms of infrastructural futurity.

By using narrative rather than fiction as the frame for articulating and analysing the effect of staging and realising infrastructural speculation, it is also possible to ask what and how the operation makes an image does and can achieve as it composes in the 'real-time' of narration. This compositional as well as imaginative quality allows the speculative possibility of an infrastructural narrative that carries and is articulated through the critical layers of materialisation and mediation established in this thesis. Moreover, using the framework

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[165] Though this is taken up in her doctoral research and work with Primer and New Art Ecologies (see: Vickers et. al. 2020).

established by Ivanova (of developing systemic agency within a setting through prototyping open-ended active forms) to determine both the abstraction that enables an infrastructural repetition and mediating regime which maintains that abstraction, it also possible to locate the power, agency and contestation as it relates to the possibility of transformation and of difference within the conceptual and actual realisation of infrastructure. Or, here, promises of futurity.

By seeing that unfolding as a mode of infrastructural practice staged into both the not-yet of speculative modelling and into specific infrastructural collaborations in which its speculative propositions come and have effect, can infrastructural models of scale learn from the feral, to be relational and adaptive rather than extractive? In the terms set out here, one way would be to adapt the specific patterns of infrastructural collaboration through which real-time images of scale mediate the world they simulate. That is, to create the collaborative conditions in which a non-scalable interpretation could emerge, able to mediate and transform the assemblage these speculative collaborations pose. Alongside other infrastructurally mediated images of climate impact, a series of gardening, community and planetary design projects have recently emerged in the field of art and design to address this assemblage-making (see, for example, the Growing Project, Grand Union gallery, Birmingham; Civic Square, Birmingham; and Dark Matter Labs). In some ways picking up on legacies of participatory or community arts, they can be seen to position themselves as interventions to highlight a present concern but can also become just another representational or abstracted artefact — something which is risked in applying speculative images such as those developed by *Protocols for Phase Transition* (A.S.T., 2021) at face value.

In the frame established here, however, where such interventions can be interleaved and situated as part of the cognitive assemblages they reflect, these proposals might also be seen as a series of non-scalable, contextual flows to join up — practically and conceptually — a composite hypothesis in which the relational temporality of local as well as planetary ecological conditions for life are key to any meaning of reality — whose impact is aesthetic as well as non-aesthetic. Making such connections a systemic effect in the flow of infrastructurally mediated images of climate may be one task for the kind of bumpy emergent conditions made in the infrastructural meaning articulated by the assemblages created and represented by *Feral Atlas* (Tsing et. al. 2020), climate fiction and the infrastructures of image-making in the expanded artistic and curatorial practices discussed in this thesis.

This speculative shift both consolidates and questions propositions made in previous chapters. by reflecting on what infrastructure meant across this thesis, Chapter four also responds to

changes to the curatorial space of mediation and staging in which it increasingly becomes a site for composing and mobilizing the durational and temporal possibilities of modelling (see Chapter two and three, introduction and context in this chapter), and which are tailored towards the addressing the speculative and practical urgency to change the outcome of infrastructural repetition — i.e., the promise or futurity of infrastructure. This is a shift in focus enabled by the expanding field of what can be known now, and understood as interwoven into human activity (what is made possible and can be mediated through, by and as infrastructure — as discussed in previous chapters). Infrastructural narrative is adapted to articulate the multi-layered, meso-dimensional and distributed motor and cementing force in which assemblages performed meaning making that is operationalised into infrastructures unfolding in time and territory (Easterling 2021). Thus, interwoven with this narrative production, curatorial knowledges, mediation and the practices of making public are reposed into the configuration of repetition creates both the conditions of complexity for, and the emergent systemic meaning, manifestations and effects of, non-scalable infrastructural promise.

Where non-scalable and scalable assemblages are more and less complex, the transformative promise of an infrastructural narrative is tied to the relational complexity and transformability of the world that narrative proposes to achieve it. Thus, the staging of different materialisation of meaning is registered in the systemic effects on repetition and how mediation of that meaning connects the configuration of an assemblage (Chapter three) to the pattern and activation of the social material assemblage that makes it possible and which *bodies* that meaning *forth* (Chapter two). Further, this suggests how infrastructural positioning is transformed, not only through re-imagining and re-composing form, but re-staging and re-mediating the repetition that makes a formal, political address infrastructural: dependable, anticipatory and recursive (Chapter one). By extending these systemic effects of complexity and the potential for halting aspects of its repetition into the cognitive assemblages staged around the convergence of infrastructural meaning, materialisation, mediation and practice, the curatorial can express critical and transformative artefacts across the meso-scalar imaginaries and instituted forms, through the generation of change in that expansion. This is how the curatorial can be reposed towards a shift in the narratives that sustain planetary dimensions, infrastructures, imaginaries.

As such, through this framing, previous chapters can also be read as articulations of infrastructural narrative, with each outlining the traces of how this narration is instituted, and with specific qualities. That is as constructions that make realities meaningful in their repetition over time, experience or practice. In what has been tested here as a mode of curatorial writing, these propositions can also be read as prototype accounts of this narration and as attempts to stage such infrastructural reality constructions in text. By coordinating or cementing the form,

practice, activation and configuration together through systemic narratives of break and bridging across infrastructural thresholds new possibilities for and through the curatorial are opened up.

# **Conclusion**

## 0. Cura-Infrastructural Artefacts


in a series of case studies and cura-infrastructural prototypes modelled in text, this thesis has established and examined a number of conceptual frames and critical-speculative test-cases. By elaborating the expanded curatorial frame set up in the introduction, this has described how infrastructure is made public, and how infrastructure composes that making-public. It has shown that infrastructure can be seen as a site of the creation, institution, activation and transformation of meaning, doing this through particular effects of repetition and difference that can be instituted in the circular and performative imaginary of infrastructure. The layering together of these conceptual and practical thresholds has allowed me to show how infrastructural meaning is far from an instrumentalization of an externally-produced image (Chapter one), nor simply a technical function (Chapter two), nor is it complete (Chapter three). Rather it must be thought of as a dynamically embedded and embodied scene and vehicle for generating and instituting relational, connective and mediative meaning over time through and as time (Chapter four).

Using an interdisciplinary approach to analysing and re-staging existing practices and artefacts in these test cases, the thesis offers a critical and analytical framework to explore this definition of infrastructure as it is realized in the creation of the dynamic artefacts that infrastructure makes public. In this framework, infrastructure can be approached from the curatorial and infrastructural imaginaries to be figured into an expanded curatorial practice and theory. Moreover, by showing how infrastructure can be understood as a changeable vehicle and venue for the creation of embodied and embedded meaning-construction, materialisation and mediation; the particular capacities of the curatorial can be figured in relation to this form to establish a conceptual and procedural framework for a practice of critical self-infrastructuring. This turns on the dynamic, tensional, configurable and recursive qualities of the cura-infrastructural artefacts established in each of the previous cura-infrastructural scene and at each level of complexity each case describes. Read together, whether as sequential threshold concepts or as a circuitous model for transforming the looping of infrastructure, these scenes of analysis and proposal have made possible an account of how the curatorial can be both reposed into infrastructural composition and creation and act as a critical mediator of this composition and creation.

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# 1. Overview

As has been shown, transformation is achieved by the integration of relational and performative difference into the composition and conditions of infrastructural artefacts, where that differences create productive frictions, threshold and bifurcations in the repetition that make an assemblage of parts, actors, knowledges, forms and dispositional potentials infrastructural. This has been shown through layers and scenes of sequential complexity to move in scope from working on the material and mediating conditions and forms of infrastructure, to how infrastructure can be conceptualized as a site of closure and opening, and finally how these scenes of difference can be used to enact the possibility of systemic transformation. To achieve this transformation through the curatorial requires a conceptual and practical toolkit that allows a movement and creation through these scenes. Each chapter and the infrastructural scene it discussed contributed one part of this framework.

Scene 1, model. In **Chapter one**, the work of Assemble in Granby Four Streets offered a case study and test case for the creation of infrastructural images through which form, or what Larkin refers to as infrastructural poiesis and aisthesis, is materialized or aligned in infrastructural modes of making public. Through an analysis of the composition, activation and effects of the different aspects of the images and how they are established in this work, the chapter shows how infrastructure consolidates modes and promises of political address in that form. Focusing this analysis through how art-led regeneration, participation and access are interleaved into other infrastructural forms such as finance, regeneration policy or the field of art, this chapter also shows the differences enacted depending on how structure, practices and promises are aligned, situated and conceptualized in that form. This posits a difference in how an infrastructural form performed based on the apparatus and knowledge pre-enacted by the creation of an imaginary.

The comparative analysis of how the Granby Four Streets project showed how it was positioned as a form of provision by both those invested the project financially and those invested in its status as a model of critical practice, the intention and meaning embodied and embedded in the political aesthetics it stages nonetheless exceeded the art-institutional and discursive accounts by which it was and can be framed. This gap, which holds apart the apparent complicity between art and the instrumentalization and extraction of value from an infrastructural assemblage is, in these discourses, at the core of artistic speculation and critique. In the infrastructural frame established in this chapter, however, this alignment is

precisely what allows certain kinds of performative infrastructural meaning or from to be enacted from structure.

At this level of complexity, the effect of instituting new alignments such as by Assemble, Steinbeck Studios, The Granby Four Streets CLT or indeed the claims made by curators such as Hudson, can be seen to correspond to whether that alignment allowed for the smooth repetition of an existing reality construction, or whether that repetition and reality it performed was transformed. In general, this difference shows the speculative stakes of instituting relational artefacts such as infrastructural positioning. How layers of materialized relationships and alignment can be disrupted, remade and tensioned from within the institutions of art is taken up in Chapter two.

Scene two, intervention. If Chapter one showed how, through form and practices of repetition, infrastructure generates instituting imaginaries or reality constructions that could be changed, **Chapter two** indicated how critical modes of tensioning that worked on the disposition of the repetitions and mediations through which the infrastructural images or imaginaries created through alignments are instituted. At the core of the chapter was an analysis of the different ways that the models of curatorial and juridical intervention used by Forensic Architecture to establish truth claims, the practices of counter forensics and an investigative commons could be understood in a productive and creative relationship to infrastructures of mediation. It argued that such scenes of infrastructural creation and tensioning could be seen to disrupt the construction of realities of visibility, evidentiary regimes and power of authorisations.

This was used as a test case for a layer of complexity in which meaning was both cohered into and from the assembly of composite patterns made across a pre-figurative and often invisible layer of sensing and modelling. By developing and activating forms of counter reality construction, an investigatory commons that could be interleaved into existing infrastructure to put it under tension, change its disposition as Easterling calls it (2016), or what I called a 'bumpy' repetition. In this so-called 'bumpy' repetition, difference enters as informational excess, sensory expansion, doubt or a decompression of historical and cultural assumptions from the split second. This allows the various actors in this convergence to remake how infrastructures of truth such as the authorisation of evidence, or of the 'covering over' (Robinson 2019) effects of language, are used to pattern what counts as truth.

More importantly, it is shown that by moving from alignment to tensioning (as in the move from Chapter one to two), the role of the curatorial can be to not only expand the possibility of an infrastructural artefact, but to stage difference into that alignment (in this case by intersecting

two temporal dimensions into the narratives built around the report and narratives about the police killing of Mark Duggan in 2011). This allows a speculative and discursive shift in the disposition of that alignment, making its distribution of continuity and rupture, of creation and closure of a gap and bridge *bumpy*. This folding back of infrastructure into an event, and in to a public anticipation can be thought of in terms of the investigation, in which FA pre-enact an expanded evidence-registering, investigative infrastructure back into the an infrastructurally-situated version of the scene, to rearticulate the traces of media, environmental effects, architectural interaction, spoken testimony, history and so on that are left by an event, but not accounted for; but it can also be seen to pre-enact this expanded vision and mediation of events, effects and traces and testimony back on the conditions of assumption, normativity and narration through which the official account trumps that of those on the ground, or for whom do not have access to resources. Using Johnson's framing of infrastructure as a social-material assemblage (based on the depth of connections composing such artefacts, and which they enable once staged) (2018) the chapter explores and differentiates a more general model of the effects of the mediating and representational qualities of infrastructure on how the exhibitionary assemblages it composed created, mediated and enacted its claims, and how these were socialised and re-performed or trained.

This exploration grounded a key theoretical claim on how making-public activates the properties of an infrastructural artefact, and how the investigative commons interfaces the curatorial field, its transitory and convocational publicing as well as capacity for experimental aesthetics and sensory attunement. That is, by testing the staging of Forensic Architecture's work as part of a dynamic cura-infrastructural artefact, I showed how the convergences of meaning, materialisation and mediation are not only technical, but points at which multi-dimensional, meso-scalar and multi-actor imaginaries are constructed and manifest. However, a bumpy repetition is still a repetition in that model of the world — including the ways that it abstracted the complexity it addressed. How to stage an openness into the form and repetition, mediation and effect in the social-material assemblage described in these first two chapters is taken up in the Chapter three.

Scene 3, systemic proposition. **Chapter three** showed how infrastructural alignments, in Castaneda's terms, *bodied forth* (2002) different forms of critical infrastructural promise and proposition made by FRAUD and Diakron in the figures of extraction and impact. It compared these forms of imagining and instituting formal, figurative or modal difference into the construction of infrastructural mediation and composition, and how this exploits the tensions between continuity and rupture established in the previous two chapters. How these promises are conceptualised and materialised (as both conceptual and mediating infrastructures, as

reality constructions) is explored as a particular kind of image through Suchman's description of con-figuration or making parts work together (2012). This allows a comparison of the potential of such proposals through how the images and their instituted, mediating forms, might be seen as partial or complete configurations. It explored how the possibility of creation and alteration of instituted imaginaries prompted by Castoriadis could be figured into the question of the configuration of infrastructural images and form to show whether these proposals could construct reality constructions that are open or closed to breaking and remaking the meaning of existing reality constructions that they are configured towards or into.

This model breaks with an infrastructural analytic of success or failure, to show how creation is in fact entangled in the complexity and uncertainty of infrastructural precarity and performativity, of the balance between continuity and rupture. Where Primer leaves open the question of specifically way or how such difference is and can be motivated within the private or non-critical infrastructure (such as Aquaporin), the chapter also indicates the ongoingness of the question of the effect differences is in infrastructure. It shows the necessity of ongoing conditions of transformation in repetition, for the ongoing effect of non-completion beyond the point of initial interface and possibility (of interfacing the curatorial with open innovation); to move beyond the pragmatics of configuration to the modality of configuration.

By expanding the field and dimensions of the possible difference and change through instituting imaginaries, the chapter also argues for how forms and the capacity for self-creation of the conditions for images of mediation and systemic configuration can also be understood as opening and closing the possibility of making meaning public: here turning on the completion or partiality of configuration as a dynamic artefact and imaginary. The resulting concept of a **more-than social-historical** transformation is central to the critical proposition and methodology established by this thesis: This corresponds to the more than individual actors and institutions that locate, create and image change; and to the more than historical, linear dimensions in which that change is created. By offering an interface and threshold by which the curatorial constellation (von Bismark 2012), instability of staging knowledge (Rogoff and Martinon 2013) and performative re-making of objects (O'Neill 2019) are reposed at the core of the making and mediation of infrastructural images and forms, what O'Neill would call an escape can be shifted from simply rejecting the infrastructural constraints of a particular setting or assemblage. Rather, the escape can be thought of productively through alternative infrastructures, by escaping *into* the system. That is, as a disruption of it. Accordingly, this chapter allowed a refiguring of the effects of chapters one and two into the active propositions of infrastructural instituting imaginaries. However, the question remained as to how such re-configuration could move beyond this proposition, to enact and institute the possibility of that

threshold into and to transform an infrastructural assemblage. This was taken up in Chapter four.

Scene 4, promise. **Chapter four** used *Feral Atlas* and *Protocols for Phase Transition* as models of making public in infrastructural futurity to show differences in making public via speculative cura-infrastructural artefacts can establish productive tensions and transformations through the capacity for uncertainty to effect that transformation. Whereas Reed argues, frictions (or we can say partiality) will always enter into the completeness of a world (2021), this chapter explored how to mobilise this uncertainty as a source of rupture or creation, and how to create the conditions for it to affect and sustain the transformation of the conditions that makes this creation possible, *and* self-defining. The chapter remodels infrastructural futurity around the capacity to register and respond to the systemic effects of an infrastructural promise within a model which also acts on the transformability of itself, such as in *Feral Atlas*. This relationship between promise and effect is shown to be key to sustainability of any possibility of conditions of openness or difference (such as those posed by A.S.T.'s protocols) possible and achievable.

Here, narrative was shown to articulate a dynamic infrastructural artefact which is instituted into the combination of given forms, experience and fictive possibility, and was used to test the effects of images produced by and as modes of achieving the cementing force. It is also used as motor for enacting speculative conceptual differences into form. The exploration of differences in narrative form in *Feral Atlas* and *Protocols for Phase Transition* make it possible to argue how images and modes of staging can, as described in Chapter three, move across levels of cognitive process and mediation, to realise those specific effects into the recursive, but generative futurity balanced in the dynamic artefacts of infrastructural form between continuity and rupture.

Ultimately, Chapter four showed how to establish thresholds for accretive shifts in the reality constructions by which infrastructure makes the future from within the present and *vice versa*; this shows that difference can enter, but the key stake of the durability of a transformation turns on how difference and uncertainty can act as effects on the vehicle for the initiation of that infrastructural transformation can be sustained. To achieve this two-fold transformation and difference through curatorial modes and approaches means to rebuild the curatorial and what it can stage through its constellatory and mediative performativity as a mode of making public figured into assemblage. This means, as in the example of *Feral Atlas* being both repetitive and continuous; the site of simulation and bifurcation; *and* for responding to the uncertainty this will encounter as an ongoing critique of repetition and completion.

Through an analysis of the *Feral Atlas* platform as a cognitive assemblage that can joint feral scenes, with the research framing itself and users of the platform, the chapter finally argued for how the model of infrastructural transformation through friction generating speculative cura-infrastructural artefacts can be used to repose the terms of the curatorial discourse and practice. That is as a combination of the questions posed around the necessary infrastructural conditions that would make it possible for a re-imagining and instituting of infrastructural differences; and to articulate through this the meso-scalar, planetary, recursive imaginaries made possible by this, not only recuperate and reformulate the institution or exhibitionary complex built around it.

Though this two-fold approach, the chapter produced frictions and effects in the intersection of forms of infrastructural composition, and of making public. By reaggregating the models of transformation and difference articulated in previous chapters, Chapter four offers a model that allows motivated, but non-closed transformation for infrastructural reality construction by reverse engineering the specific possibilities of performative uncertainty into the circular causality that is generated by infrastructural form. It suggests that this achieved through the emergent complexity of a scene, and by emphasising on the halting and bridging of infrastructural narratives; something which is ultimately only ever metastable; a provisional unity. Moreover, by centring the problem of how such forms and differences are made public, not just determining them, this chapter shows how in reposing the curatorial at the convergences of infrastructural materialisation, mediation and practice a different figure and form and relationship between them is established: self and object are not distinguished, but distributed, entangled; authorship and interpretation is also distributed as form / figurations of and in mediation and negotiation.

As such, and in contrast to critical approaches which see infrastructure as a determining rather than constitutive relation, the focus here has been on infrastructure as a mediating object and venue itself. This reconfigures Castoriadis' concept of the instituting imaginary in light of advances made by critical race and literary theory and feminist posthuman approaches to the multiple and distributed more-than-human dimensions of human-technical-environmental and ecological meaningful interactions that support and are made possible by infrastructure. This situates difference and invention in the repetitions and continuity provided by infrastructure.

Accordingly, this critical methodological framing provides a provocation to both the possibility of changeable infrastructural form, seeing these dynamic artefacts as more than social historical (changeable, but where ruptures or transformation occur within and beyond its repetition as ground); and provides a provocation through which to remake and repose the curatorial as a

site for the generation of infrastructural form as a break in instated meaning, transformation or establishment of difference of the closure of meaning infrastructure also enables.

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## 2. Contribution

### Cura-infrastructural artefacts

By showing how infrastructural transformation can be / is achieved through the tension between and within modes of making public, especially those which are mediated though the curatorial by instituting what I have called cura-infrastructural artefacts the first major contribution of this thesis is to curatorial practice and theory. Through the preceding analyses and test cases I have introduced how these cura-infrastructural artefacts (position, pattern, configuration and narrative) articulate and mediate the dynamic relationship between an infrastructural imaginary (provision, coherence, configuration and futurity or promise) and its instituted form and activation through practices that embody and perform that relationship.

Through the internal composition of these cura-infrastructural artefacts, different form, figures and practices are interfaced by these dynamically activated, meaningful and changing cura-infrastructural artefacts to produce internal and contextual tensions. These tensions might be in alignments between different actors, intentions and values (Chapter one); in the active and mediating coherence and effect of patterns of infrastructural traces, processes and histories (Chapter two); in the closure and completion (or partiality) of the configuration of parts or participants in the achievement, creation, repetition and re-imagining of infrastructural imaginaries (Chapter three); or they can be seen in how the futurity of infrastructural transformation and the effect of that transformation unfolds in a relationship between promise and structure, system and the narration / cementing force through which it is achieved and possible, to create thresholds in the closure and creation of infrastructural worlds (Chapter four).

Not all infrastructural imaginaries, institutions and practices are the same. This additive, layered approach has also shown and been used to articulate how different scales and depths of complexity in the relationships, connections and mediators that make up and align infrastructural artefacts, create and institute different effects and degrees of transformability in

each aspect of infrastructural reality construction. I.e., in materialization, mediation, meaning-making and public making practice. Where infrastructure is a circular and performative form, this proposed curatorial theory and practice has shown that to make change sustainable it is necessary to move through this increasing complexity and thresholds to achieve a difference in infrastructural worlds that it is necessary to move through this complexity and into repetition.

### Infrastructural practices

A second major contribution is to expanding how critical and practices approach infrastructure through the curatorial. This move comprises the following. The first is a definition of infrastructure that can be figured through curatorial practice. This centres on infrastructure as a scene of materialisation, mediation and practicing of meaning. This definition grounds a series of specific critical and speculative vocabularies and methodological procedures that subsequently allow for curatorial approaches to infrastructure — each staged in and through the preceding chapters. Through these conceptualising and enactive processes, the test cases in each chapter, a methodological framework is also established for how infrastructure can be figured into and interfaced with curatorial practices and discourses of making public. This achieved in part by re-conceptualising infrastructure as the result of the creation of instituting imaginaries, in part by analytically reposing the curatorial artefacts articulated and explored here at such convergences of meaning materialisation, mediation and practice of infrastructure, and in part by probing the possibilities in and conditions for self-creation and self-composition in them.

In this framework, critical forms of difference enter into the composition of relational imaginaries of provision, coherence, configuration and futurity *and* in how these images repeat and unfold as position, pattern, configuring and narration. The transformative aspect of this difference is negotiated in how both an imaginary and instituted forms of infrastructure are held in tension by the cura-infrastructural practices discussed here. Expanding these conceptual and methodological approaches, the cura-infrastructural test cases in each of the preceding chapters have also, therefore, prefiguratively staged a speculative form of curatorial infrastructuring. Positing this proposition and the thesis itself a form of "inventive (Lury and Wakeford 2012) curatorial writing, this thesis also proposes a form of cura-infrastructural narrative writing that is not limited "to ascertaining what is going on now…, but may rather be a matter of configuring what comes next" (Lury and Wakeford 2012, 7). This is used to spool-up simulate and activate the capacities of cura-infrastructural practices. The dynamic artefacts infrastructural-curatorial interfaces this thesis produced and the effects of these intersections

are used to propose and sustain difference and transformation for discourses of the curatorial and for practice.

To do this, the thesis has introduced the instituting of infrastructural meaning as problem that exceeds the institutional framing of curatorial and artistic meaning, knowledge or artefacts in it. The curatorial can, in this way, be re-posed at this composite practice of meaning making, generate a similar convergence of layers of material infrastructures and infrastructural images across these multiple layers. In this task, the thesis adapts curatorial and infrastructural theory so that contingent and relational creation of infrastructural meaning is shown to be registerable, possible, generative and potentially critical in the cross over of disciplines. This intervention happens, like infrastructural work, by intervening on existing reality constructions, rather than claiming to institute an infrastructure from scratch highlights how to institute infrastructure is to put difference into the accretive nature and circular causality of the infrastructural or infrastructure-like relations through which distributed parts and relationship are able to mediate and transform states and experience through the repetition of particular procedural and operational practices and protocols. The definition of infrastructural meaning put forwards can, in this sense, be articulated as: the performed flow of localised and cohered relations that operate both as content, and as a mediation of how those relations are to be interpreted, the venue in which they make 'sense', have coherent effect and meet what is expected of them. The thesis offers a stabilisation of the construction of an operational, semantically specific and relationally valued reality in infrastructure defined in this way. It creates a literal and conceptual gap and bridge.

The thesis finally, therefore, offers a particular definition of infrastructure itself, re-configuring it as a practicing and convergence of meaning and material conditions; seeing these as a circular configuration, generating worlds in which the generation, repetition and movement of meaning is mediated by the material layers that meaning also holds together.

### A critical methodology

Through the preceding chapters, infrastructural forms are disaggregated along with the scenes which they had held together. Each layer or scene is differentiated first by the structural, systemic and conceptual balance of ruptures and continuity in the infrastructural forms and figures bodied forth; and secondly the effect of their difference on the assemblages gathered around those interventions. How this is registered can be articulated through how those proposals moved back into the world or reality constructed by that assemblage are and folded

back into the dynamic artefacts that combine infrastructural repetition and knowledge. As this thesis has shown, how these layers become coherent in the curatorial, but also where the continuity they provide is ruptured in different ways through speculative artefacts that align the assemblage of gap and bridge, continuity and rupture (by relations and expectations (Chapter two), what and how mediate / in relation to what other mediators (Chapter two ); how conceive configurations formation, duration, effect and terms (Chapter three) and how creates, accounts for, and can incorporate uncertainty, change and transformation into the systemic form and agency it creates (Chapter four).

Through this lens of curatorial making public, it is both shown that infrastructure is not only technical, but multi-dimensional, meso-scalar and multi-actor imaginaries constructed and manifest through pre-conditions, but also that the structural circularity of meaning and interpretation on which an infrastructural present is set and the future built is on can be, and is, worked on by the fields of practice interleaved into that convergence. This offers a frame for differentiating cura-infrastructural artefacts. Like infrastructural form, meaning is contextual, an artefact of being mediated by convergence which are relational and connective in structure; systemic in distribution and scale; repetition in activation; form is the dynamic of these assemblages. Imaginary or promise is this coming together. But these are only *meta-stable*. Hence for an infrastructure to be reworked from within the realm of meaning making, means to pull focus to see different entry points of what comes together and can scale up become unstable. How the scene in which this happens changes the kinds of difference that can enter and the effects of uncertainty and scale on these artefacts.

### A new kind of field: reposing the curatorial

Alongside a definition and critical method for infrastructure rooted in the making and making public of meaning and active imaginaries, a core contribution is to make it possible to repose the curatorial as a cura-infrastructural artefact. This is achieved by developing a definition of infrastructure rooted in the making and making public of meaning and active imaginaries as part of a curatorial constellation. As such, reposing the curatorial in this way establishes the terms, procedures and scenes in which it is possible for the curatorial to navigate and negotiate as well as shape and generate that meaning and mediation. This ongoing negotiation allows the curatorial to re-balance, tension, tune and transform the specific closures, recursion and instrumentality of infrastructural form.

Alongside a shift in scope and methodology, this thesis also proposes a change to the object of curatorial practice. Though the exhibition has provided a useful point of problematisation or potential for glitches in the infrastructural conditions of art — i.e., where the performative speculation in its propositions are achieved through the circular causality of its infrastructural habits and modes of display which can nonetheless be modified, stretched, questioned — the thesis has argued for the *cura-infrastructural artefact* as key to both navigating and configuring infrastructural imaginaries. Where infrastructural meaning and the form that materialises or activates it can be understood in the alignments, tensions and configurations infrastructures mediate, this intersection between infrastructure and curatorial practice is used to work on the dynamic infrastructural images or artefacts that emerge to stabilise those relationships (specifically here, positioning, patterning, configuration and narrative). As was shown in Chapter two this meaning is both only performative and metastable, reposing the generation and repetition of these artefacts through the constellatory approaches of the curatorial (as constellatory, compositional assemblages and scenes of public making) allows production of difference into those infrastructural alignments. Each chapter tests a different approach and form of this difference.

The dynamic infra-curatorial artefacts established at these layers each allow for a scale of alignments and balances in the scope of continuity and rupture. This shows the changing effects of forms of difference through bumpy, frictional and uncertain repetition made possible through the scenes of complexity established by infrastructural instituting and imagining. This means that to enact changes such as those in chapters one and two, it is also necessary to pre-enact a conceptual and practical bifurcation of the practices, knowledges and imaginaries repeated to hold a reality construction together. In Chapter three, to pre-enact infrastructural creation was to make it possible to simulate alternative relationships and arrangements and images into existing mediating infrastructures.

In so doing I have shown that figuring and approaching infrastructure into and through the curatorial expands the scope and extent of curatorial practice. The proposed cura-infrastructural practice enacts dynamic, systemic and shared artefacts, whose task is to both produce the conditions for change and the enact or compose simulations and propositions. These create, thresholds, frictions and interventions into existing infrastructural closures and exclusion. Where the convergences of infrastructural meaning operate at different scales, localisations and layers, the curatorial is also rearticulated as a differentiated means of this ongoing practice of negotiation of scales, resolution and repetition.

**An approach to imagining infrastructural difference**

One of the key conclusions of the thesis, in response to the question of how to intervene in the looping and systemic forms of infrastructure, is that to repose the curatorial as an infrastructural actor is a both practical and speculative gesture. It sites the curatorial into and across the expanded temporal scenes in which infrastructure is anticipated, performed and recursively shapes actions, and in which that anticipation and procedure can be changed through pre-enaction of speculative forms (chapters one and two); in the action and negotiation of repetition and activation (chapters two, three, four); and as a means of modelling, composing and forming a promise or proposition about what uncertainty and dynamics are at stake and how transformation can be achieved (chapters three and four). Achieving this through dynamic and mediating cura-infrastructural artefacts centres relationality as the source of critical difference in place of the radicalisation of the individual and its scalar variant the collective or institution (as in Castoriadis, and in many ways institutional and infrastructural critique).

While this might imply a conceptual approach which operates primarily, in the vein of Karan Barad, as the localisation of the agential relations through which things emerge (2003), the argument made by this thesis does not make infrastructure addressable in the curatorial at the expense of any other imaginary. The discrete and representationally abstract nature of images provides a core critical intervention. Where images can also, performatively at least be closed discrete, differential, allowing for a picture to crystallise or form in advance of actual experience, this relational incompleteness, this bumpiness in what can be seen as the seamless repetition of infrastructure, is also used to create speculative ruptures in these scenes. As such, ongoingness refers to the status of the cura-infrastructural artefact as a mediator through which difference in form and mode can enter. That is, rather than as only a generator of open-endedness of knowledge or action. Using the dynamic and mediative nature of the cura-infrastructural artefact as an analytic and speculative device allows for an approach that inhabits and intervenes in the constellation of multiple moving parts. Where the activation of repetition is a key dynamic in the closure as well as creation of infrastructural meaning, the ongoing negotiation of cura-infrastructural artefacts must unfold without settling definitively into repetition and closure. The thesis therefore reposes curatorial work as an ongoing mediator in the emergence of conditions for and images of infrastructural difference.

**Critical difference in infrastructure**

On the one hand, by using reality constructions as a frame through which to explore the convergence of infrastructural meaning and materialisation, the differences established by these dynamic artefacts in context was concerned with the composition of the conditions in which a composite and dynamic infrastructural artefacts can emerge. The terms of that difference were relational and recursive: such as between non-scalability and scalability, or between smooth or frictional interoperation (what Doctorow calls adversarial interoperability (2019)). This also offers a critical and practical interface with the wider context of infrastructural practices of making public as both a dominant or hegemonic site of worlding. On the other hand, this difference concerned the creation of images in these conditions which could activate a different kind of repetition and recursion by how that image interpreted its mediation. This is only possible to articulate as a mode of transformative and responsive modes of public, however, with previous frames through which the alignment, tensioning and configuration of artefacts and context could be each used to establish the possibility of self-composition of conditions and self-creation of imaginaries and form of instituting. Together, this opens up possibility for both infrastructural and curatorial inventions.

By exploring infrastructural meaning through this methodological approach of both the creation and alteration of meaning, the thesis extends current approaches to infrastructural form and meaning making practices from one of recovery, of contestation in broken infrastructure or of an epistemology pathologization (Guthman in Gan 2019) and reparation (Halberstam 2018; Berlant 2016), to ask how instead, an infrastructural creation might make a new, desired for or sustainable worlding.

Developing the concept of a more than social-historical transformation (Chapter three) the thesis establishes the critical possibilities and parameters of this speculative approach to infrastructure and the curatorial. These include differentiating and intersecting the effects and scope of transformation depending on the scale of the configuration at stake. This included model layer, intervention and mediation layer, systemic proposition layer and the layer of promise. The tensions in the configurations each also offer a means of establishing productive, generative, critical and potentially transformative tensions in the layers that make up reality constructions. However as discussed in Chapter four, the abstraction of these promises and how this relates to shaping the context and mediation possible within that assemblage also determines the transformability and the potential ongoing transformability of a proposal. For instance, allowing for scalable changes leaves for less uncertainty in terms of the outcome of an infrastructure, but potentially more uncertainty in how it operates on and in context, along with greater inability to recover those changes. By generating less scalable conditions, more

complexity is possible, but perhaps more certainty about the changeable nature of that transformation.

The field of curating is not incidental to this thesis, and in particular it allows aesthetic and material experimentation and sedimentation that by re-mediating that infrastructural patterning can, in the words of Haraway, redistribute narratives (Haraway 1986, 85) of infrastructural promise. Reposed through a discursive and practical rearticulation of the convergence, the curatorial can enact generative and critical cura-infrastructural artefacts, which establish infrastructural creation as site in which alternative scales, scopes and imaginaries of infrastructural worlding or reality construction is possible. By sequentially rearticulating the curatorial as a descriptive, analytical, critical and speculative (and hence layered) practice and site for critical (self-) infrastructuring; into which the object constructed by the curatorial (including art, the exhibition and platform of display) as model of functional rather than representational difference, the thesis also develops a methodological approach to curating developed through a more-than-social- historical agency and difference as the basis of its infrastructural intervention, rather than just the content of its outcomes.

### Where this leads to

The thesis opened with the question of how to understand the structural limits of the curatorial with respect to infrastructure and how the infrastructural might be addressed by and figured into curatorial discourse and practice. By expanding a concept of infrastructural meaning and imaginary through the iterations of each chapter to address these questions, this thesis arrived at a series of specific curatorial-infrastructural intersections which require both a conceptual and procedural interface and analysis in multiple registers. There is no one way that the infrastructural and curatorial are to be intersected in this account. As such, while the thesis begins with a particular question, it ends with the generative problem of the curatorial being reposed as a practice of the ongoing negotiation necessary to engaging with infrastructure. Rather than an answer, what is arrived at is an approach and conceptual framework through which the performative and circular relations that compose, activate and enact infrastructural form and repetition can be recovered, analysed, tuned or transformed through the production of critical and speculative cura-infrastructural artefacts. These can, as has been done in this thesis, be speculatively staged as a conceptual or simulated infrastructural artefacts, or which can be extended as a series of questions for practice. These represent the foundations of a cura-infrastructural practice that can move forwards from this thesis, its ultimate purpose in the first place. In each case the capacity to speculatively and analytically re-deploy these questions

and artefacts in scenes of curatorial and infrastructural meaning and public making is what is made possible by this contribution.

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