ERIC SNODGRASS EXECUTIONS

Power and Expression in Networked and Computational Media

MALMÖ UNIVERSITY

EXECUTIONS

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1 INTRODUCTION

This research is an attempt to work through questions of power and expression as they are composed in various ways within networked and computationally-informed situations of the present. In doing so, it puts forth a notion of execution as a central conceptual framework through which to think through the various examples considered. The term execution is invoked here specifically because of its direct connection to practices within computing. As with a program in software, a practice becomes executable when it is able to execute a set of procedures within a particularly designated set of relations and affordances. In a similar fashion, the concept of execution developed here is intended to stand for what this research sees as a central topic for consideration: the ongoing negotiation of affordances of different kinds (technical, cultural, material, political) that can be seen to play out in the execution of a particular computationally-informed practice in the world. To speak of execution as is done here then is to speak of issues of computing and its active participation within a range of practices in the world.

As has become evidentially clear over the last few decades, practices of computation continue to participate within a great many domains of living, showing a notable propensity for furthering the range of executable tasks towards which it can be applied. This research—like many others in fields such as media and communications studies, software studies, science and technology studies—is an attempt to think through some of the implications of this spread of networks, computation and further practices of execution in the world. Everyone, in one way or another, has a story they could tell regarding this ongoing phenomenon of the present, with accompanying questions they would ask regarding the nature of such executions. For myself, one such instance of this manner in which the spread of networks and computation participate actively in the structuring of forms of power and expression occurred around a decade ago, from 2005-2009, when I was working at the Commission for Social Care Inspection (CSCI) in the United Kingdom. During this time, the inspectorate went through a massive restructuring of its inspection practices, rolling out a range of new data collection, inputting and processing methods that worked themselves across the organisation as a whole and further on into the lives of those who receive care. These new methods were aimed and sold as efficiency measures

that would reduce operational costs by making it possible for inspectors to file inspection reports remotely using internet connections and a range of database and other software services aimed at facilitating this change. This led to many of the local offices being closed down, inspectors being supported with the often difficult transition to working from home offices and an ongoing disciplining of all of the many different staff involved towards working “properly” with these new computationally-afforded methods. It also remade the relationship of inspectors with those whom they inspected, with these changes inevitably filtering through and, in various ways, reconstituting certain aspects of the lives of those receiving care. I highlight this here as a simple personal example of what is meant in this research when it speaks of the importance of thinking through the effects of execution in the world. Depending on one’s perspective and position within such networks of relations—as in the case of the inspectors and the inspected—these effects of execution will be experienced differently and with different material effects. It is this participation of the executing practices of networked and computationally-afforded practices within aspects of living and their differentially materialised and experienced effects that this research aims to specifically to look at.

As witnessed in such examples, a key driver in the ongoing development of networked and computationally-informed practices is the question of what and how something can be made effectively executable within the terms and conditions of computationally-informed logics and affordances as they are understood in any particular context. These understandings, logics and affordances of the executable have direct effects in the world. As they take hold, they manifest productive forms of differentiation that participate in the creation of certain realities and understandings of what is executable, and in doing so, potentially closing down or denying other realities and possibilities. This points to what will be the politically-orientated nature of this research. Namely, its attempt to get at questions of power and expression, such as those of for whom does such an executable practice work, and which bodies, relations and forms of expression are included and excluded in such practices?

This is not to suggest a gloomy reading of media and technology as some kind of largely oppressive force, but rather to highlight how each new technology always brings with it certain claims on the possible, just as it is also an emergent enactment and articulation of existing relations and affordances. While executing practices can be highly generative, abstractions, reductions, and exclusions are necessary to the act of making something executable, with execution being the very decision to do “this” as opposed to “that,” “that,” or “that.” Every connection is simultaneously a disconnection, and the focus given to questions of power

in this work is specifically engaged with this problematic of the inclusions and exclusions that making things executable inevitably involves. Part of the stakes involved in considering a concept of execution as it is developed here becomes that of interrogating the particular affordances involved in such understandings of the executable and how they participate in the composition and production of certain forms of execution over others.

An emphasis on execution is also intended to place a focus on this activation of the perceived possibilities of the executable as they can be seen to be concretised and realised in particular executing practices, tracing their situated and formative qualities of affording certain manifestations of power and forms of expression rather than others. Execution in this sense is also invoked for its helpful indication towards issues of actualisation, enactment and the ongoing power of the decision that lies at the heart of things like the algorithmic process. At the same time, in adopting an overarching rubric of executability rather than one of computability, the point here is also to consider the way in which a question of computability necessarily involves considering what happens in the bringing of any computational process and its forms of operation into executable exchange with a range of other important informing factors, such as those of matter, culture, political will, and so on. Crucially then, execution here is not merely the question of the computability of a particular procedure, but the actual practice and execution of this computability in the world and over time.

In order to speak more specifically about this ongoing act of negotiation between perspectives, materials and discourses of different kinds, this work places particular attention on what are described as the “material discursive” factors that inform the act of making things executable. Adopted from Karen Barad’s formulation of the concept, but also working to develop it further in ways specific to the aims and cases in this research, the material discursive approach is one that dedicates particular attention to the mutually constituted and generative forces of “matter and meaning” (Barad 2007, 3). Key for Barad and for the notion of execution explored here is how the establishing of certain relations over others is one that involves the working through of the various possibilities of matter and meaning as they are brought to the fore in any particular and performative event of “mattering” (141). What this research describes as the compositional affordances that directly inform the process and practice of making something executable. These affordances can include those of skin, silicon, the electromagnetic spectrum, and further on into issues such as discursive norms within areas such as computer science, economics and politics, all of which can potentially participate in informing, to various degrees, the question of what is executable in any particular instance and how an executable pro-

cess might specifically be composed. An execution is in this sense an actualisation and putting into practice of a particular material discursive configuration of such perceived affordances, the processual resolutions and ongoing expressions of which can be studied in the situated, executing practices of any given moment. In other words, particular affordances and their actualisations lead to particular forms of expression and relations of power. The Like button as a highly productive site of execution doesn't simply fall out of the sky, but is rather engineered in relation to various perceived computational, cultural, economic and other capacities and relations that its engineers deem as relevant. To speak of expression in relation to execution and executability is therefore to look into how we end up with this particular interface and unit of expression, rather than others, and how such a form of expression, when activated, generates its own further forms of relations and effects in the world.

This focus on the compositional affordances involved in making things executable points towards what might be described as a certain relational imperative that execution points to: namely, that all entities are relational from the perspective that they exist and must, in one form or another, stand in relation with the material discursive processes and habitats in which they are able to exist. Even the strongest of discursively established forces, try as it might, cannot be bracketed out or removed from its co-constitutive relationships with other materialities, processes and practices. Something like culture and its many material and symbolic supports and practices, being as it still is a dominant focus of media studies today, is itself simply one network of established entities and relations embedded and entangled within many others. Similarly, media and technology practices—like any other practice—enter into, in one way or another, co-constitutive relationships with various other overlapping and intersecting practices and forces within which they both emerge and inevitably become engaged with to one degree or another. To think of execution in a material discursive fashion is partly to think things in relation, regardless of whether one is considering a mobile phone, Bitcoin, overhead projectors, passports, sewing circles, Olof Palme, cows, energy supplies or the Mediterranean Sea. This relationality also points in turn to issues of mediation, the question of how things like computers actively participate in the constitution and execution of certain forms of relations over others. In the present cultural moment, this has become particularly evidenced by the overt influx of things such as human-machine curations of relations, where the relations in question might be a social network feed, a product recommendation, a location-based dating service or an anomaly detection algorithm used for predictive policing.

In speaking of such compositional affordances and relations,

there is a further key element of the degree to which certain historically oriented trajectories can be seen as presenting certain connections and activations as more available and likely than others. Habits and material discursive orientations form and are concretised over time, taking hold within existent dynamics, norms and infrastructures of power. The processes and practices of making things executable have long and telling histories that can help to inform the particular contours and specificities of their present applications and practices. To this end, the chapters in this research further apply what is described as a media genealogical approach. This approach aims to track certain recurring qualities of computationally-informed techniques and practices, working to pay particular descriptive attention to how any particular executing practice comes into being in already active sets of compositional affordances and relations. In this way, every chapter here, in addition to looking into the perceived compositional affordances detectable in the executing practice in question, also attempts to position such perceived affordances within the greater and intersecting trajectories and orientations that they can be seen to emerge within.

By tracing certain recurring and recognisable modes of practice and the particular techniques involved in the act of making things executable, it becomes possible to further situate acts of execution. Given the rapid development of practices of computation in the present, such a media genealogical mapping of computationally-informed techniques can be of particular use in thinking through both what is actually new in “new media,” while also showing, in an often strategic and politically-orientated fashion, how these ongoing developments can also be seen to highlight rather longer and more sustained trajectories of practice. In this sense, the media genealogical treatment of execution enacted here is one that aims to consider how specifically a certain executing practice has come to be, with the specific strategic and political intention of considering how such an executing practice might thus be otherwise. The question of execution as it currently happens to be is thus always connected back to a general question of the executable *as it might be*.

To summarise, the concept of execution as it is developed here addresses the following main concerns:

- The question of the *compositional affordances* involved in the coming into being and making executable of *computationally-informed practices* in the world.
- Describing certain key *intersecting, material discursive relations* and *media genealogical trajectories* that participate in the actualisation of certain practices of execution over others.
- The participation of such computationally-informed practices in particular issues of *power* and *expression*, with a focus

on the politically-orientated questions that arise and the further *modes of potential engagement* and intervention that they point towards.

With this in mind, the research question that mobilises the writing in this work becomes as follows: *In what ways can a notion of execution be developed so as to act as a relevant and politically-oriented concept for describing and engaging with important features of contemporary networked and computationally-informed situations?*

Content of the dissertation

This developing of a concept of execution as a helpful method for inquiring into and engaging with contemporary networked and computationally-informed situations is continually iterated upon and further developed through each of the examples considered in the writing. The chapters work to gradually introduce aspects of each of the key concepts and approaches highlighted in the opening Approaches section, at the same time that they use each of their situated examples as a way of further questioning and testing the theories and this catchall concept of execution. Despite this iterative quality of the development of the concepts across each of the chapters, many of the chapters can also be seen to be relatively self-contained in relation to the particular examples they consider, and the reader is welcome to jump to those chapters which sound of most direct interest and then work through the rest of the text in order to see some of the more overarching correlations, connections and comparisons that are made across the research as a whole.

The opening chapter on “Approaches” gives an explanation of the key theoretical and methodological points of departure that inform the general approach in this research. This includes a longer explanation of the material discursive and media genealogical approaches discussed in this preface. Furthermore, it introduces what is described as a multi-sited method of intentionally moving from the study of one practice and site of execution to another. The chapter also introduces the particular take on power in this research, highlighting what it sees as an important quality of power and the way in which every executing practice involves the often uneven actualisation and affording of particular forms of relations over others, with the distribution and effects of these affordances and relations highlighting intersecting and often competing claims on power, expression and forms of agency within the world. Finally, the chapter finishes with an explanation of the dissertation’s choices regarding the various examples selected.

The next three chapters make up what is the first section of the book, titled “Compositional questions of execution.” The section

as a whole focuses on key aspects of computation, with particular attention given to the process of making things executable and some of the particular techniques and tensions involved therein. Each of these three chapters feature a series of historical and contemporary vignettes on execution, such as the historical examples of Charles Babbage and Alan Turing, as well as more recent examples within artistic practice. The deliberate intention of this moving from one such example to another is to work through the aspects of computation under discussion while also building up a feeling for certain qualities of the computational as it takes executable hold in a variety of present and historical settings.

The first chapter in this section, “Sites of execution,” sets out to introduce the concept of execution, highlighting how a material discursive approach can be of help towards developing an understanding of execution. In shifting purposefully from one site of execution to another, the chapter attempts to track a few key qualities of execution as they relate to practices of computing, looking at several artistic works that can be seen to highlight certain formative compositional questions of execution.

The next chapter, “Processing power,” is a genealogical look back into some of the early history of computing and the specific example of Charles Babbage’s studies of nineteenth century practices in manufacturing. In doing so, the chapter highlights how practices of execution come into being in already active sets of relations, emerging from and plugging into many existing and potential valences (material, technical, economic, etc.), while also further exerting their particular capacities as entities and systems capable of both reproducing and further spreading their particular practices in the world. As the chapter highlights, a key requirement in programming an executable process is the act of coercing existing practices and material discursive entities into its particular requirements for execution, with a focus here on particular techniques involving the division of tasks and labour and also various emerging notions around efficiency in the emerging economic traditions of the time.

The third chapter, “What is executing here?” looks at the question of interpretation in computing, highlighting the way in which compositional questions of execution can be seen to propose themselves again and anew in regards to an executing practice and its situated relations to other practices. In doing so, the chapter highlights the way in which executing practices readily spread and spill into other domains of practice, and in doing so, open onto further generative questions of interpretation. Where the first chapter in this section looks at issues of enclosure, this chapter finishes with a discussion of openness in relation to issues of computation and interpretation.

After this section and its continual shifting from one site of execution to another, the second section of the book, “Platform and

projection,” attempts to provide a more sustained investigation into the coming into being of a particular dominant technological platform of networked connectivity in the form of the social network platform Facebook. While continuing to look at questions of computation, this section focuses particularly on how such questions relate to the capturing, sharing and exchange of information within networked forms of computation. In doing so, the questions of the ongoing negotiations of various compositional affordances involved in execution that were raised in the first section are in this section further framed within a context of how these questions play out in social forums for networked interaction, with a particular focus on the power relations involved in such forms of networked and computationally-mediated forms of exchange.

The opening chapter in the section, “One/easy/click: Facebook’s Like button,” uses the implementation of the Like button as a central and highly effective site of execution around which to then trace out some of the overall workings and productive features of Facebook’s platform. It focuses on questions of interface and the creation of certain units of expression within networked and computational environments, with further attention given to issues of contemporary forms of political economy that Facebook’s particular implementation of the Like button points towards.

The chapter following this, “Engineering relations: APIs and the structuring of networked flows and connection,” moves to looking into some of the techniques that Facebook has employed to successfully project its particular technical model for collective interaction out into a range of different forms of networked environments. In particular, it looks at the workings of APIs (Application Programming Interfaces), with a focus on the example of Facebook’s Social Plugin APIs (of which the Like button is one example) and their role in structuring and projecting certain forms of executable exchange between Facebook and those parties that would connect and interact with its services. The chapter also highlights how these abstractions for executable exchange can themselves be manipulated to create further forms of relations, with a brief look into the issues of “fake news” and voter microtargeting. These forms of what are described as “leaky abstractions” help to further highlight some of the key, interwoven ideological and technical aspects at play in Facebook’s platform model.

The concluding chapter of this section, “Diamond Reynolds was live,” continues this theme of taking up the political questions that Facebook’s various structures for interaction and exchange point towards, looking in this instance at a case in which Diamond Reynolds, a user of Facebook, employed its newly launched video livestreaming service to create a live, recorded broadcast

of the immediate aftermath of the police shooting of her partner, Philando Castile, taking place in the US state of Minnesota. Drawing on theories from intersectionality studies, the chapter brings to the fore a notion of movements in and across different affordances and relations of power, discussing how such intersecting relations of power are crucially informed and further inflected with intersectional, political, material discursive and other forms of determination and agency. The chapter also speaks of how in this example of the livestream and others like it, one sees modes of what is described here as oppositional coding, approaches that point towards the potential formation of other platforms and executable infrastructures for politically-orientated forms of resistance and change.

The final section, “Ecologies of the executable,” continues this work on highlighting how a notion of execution can be developed so as to act as a politically-orientated concept for both description and engagement with contested issues of power in contemporary political practices. The section as a whole looks at the situation of migration as it specifically occurs in the space of the Mediterranean Sea, working to describe the “orientations” (Ahmed 2006) that have been put into place on the part of Europe so as to make this space a particularly deadly one for those particular bodies and boats that would move through it. The section places a strong focus on particular material discursive affordances as they are activated and relate to the particular implementations of technology involved in various forms of enforcement, but also resistance, within this space. In doing so, it highlights three key compositional affordances involved: those of the electromagnetic spectrum, the material artefact of the boat, and its operating environment of water and the sea. In doing so, it describes how these particular affordances as well as others (particularly those of the law and risk analysis) play a role in composing and orientating the politics enacted in this space in specific ways, manifesting certain executable vectors of violence, control and resistance.

The section features two chapters, the first of which is titled “European orientations and infrastructures of violence at sea.” The chapter is a detailed study of how technologies have been enrolled in helping to orientate the Mediterranean Sea into a highly-codified space, one in which an “electromagnetic frontier” of surveillance and control has been implemented in an ongoing attempt to thwart the movements of certain people that would seek entry to Europe. Building on key works of historical and current research relating to this issue, it looks at how a collection of entities and actors are orientated and further orientate themselves within this highly-politicised body of water. It also involves some discussion of the visual politics of representation of the situation in mainstream media outlets, working to rethink their qualities through a material discursive lens. Furthermore,

the chapter looks into some of the specifics of European policing of migration at sea and how this involves the mobilising of a range of compositional affordances and political trajectories that result in the violent and deadly practices that one witnesses in the situation as it is today.

The final chapter, “Watching the Med: active infrastructures for intervention and resistance at sea,” looks at several counteracting methods employed within this environment by the activist network WatchTheMed Alarm Phone. The chapter highlights their putting into place of an ensemble of various technologies and practices that, along with other methods, point towards productive and tactical approaches for intervening into as well counteracting the forms of oppression discussed in the previous chapter.

All of these chapters, despite their relatively broad range of examples, revolve around the task of finding effective approaches for describing contemporary networked and computationally-informed practices. In this way, much of the work here is aimed towards developing particular ways of describing how executing practices of the present come into being and potentially take hold in the world. Attempting to capture not only some of the specifics of such operations, but also a feeling for their liveliness – the predictable and also unpredictable forces that emerge in the introducing of various forms of computation into a world of other executing practices. The examples used here were thus partly chosen because of what were deemed to be their capacity to highlight certain key and fundamental qualities of contemporary technology, but also because of their further ready ability to highlight what Wendy Hui Kyong Chun has aptly described as “the vicissitudes of execution” (Chun 2011a, 53), the continually generative and shifting nature of computation and its execution in the world.

In doing so, the chapters regularly highlight what are described as ongoing questions of execution. Such as those of how do we end up with *this* particular unit of expression (e.g. the Like button), *this* particular form of mediated connectivity (e.g. the platform model of social networking) or *these* particular sets of power relations and their corresponding techniques of manifestation and enforcement (e.g. the EU’s practices of enforcement in the Mediterranean Sea). These questions can be seen to be reiterated in the computational practices themselves. A technological platform asks what we would use it for—*What’s on your mind? What’s happening? What do you see?*—at the same time that it frames and provides particular possibilities and proposals to the answering of such questions. In the example of the Like button, the computational query of “What is executing here?” is made more readily processable via its transformation into a more sharply delimited question of “Do you like what is executing here?” A question that the particular networked economy of a platform like Facebook

and its particular proposition of the Like button infuses with both social and technically orientated forms of compositional inputs and outputs.

Carrying out this research has involved addressing a range of issues relating to the discipline of media and communication studies within which this dissertation is situated. In regularly speaking of media *and* technology, this research highlights some of the emerging tensions that can be seen in media and communication studies as a discipline at present, particularly the question of how one is to address the ongoing situation whereby so many forms of media and media practice are increasingly underpinned by and infused with the powerful techniques and possibilities that the technologies of networks and computation allow for. The tensions that this question of media versus technology raises is evidenced in things like Facebook CEO Mark Zuckerberg's longstanding discursive and ideological attempts to position Facebook as a technology platform and specifically *not* a media company (discussed in further detail in the middle section on Facebook). Rather than taking an either/or approach to such disciplinary questions, this research adopts more of a both/and approach, placing its focus not in bracketing out the one from the other but rather working to show how both can be seen to work in productive relation to one another. A focus on mediation points to how technologies always act partly as filtering devices that afford certain possibilities while discouraging others, just as a focus on some of the specific workings of technology can help to pinpoint how and why it is that technologies for mediation are constructed with their particular provisions of expression rather than others. To this end, the research continually invokes the term co-constituted as a way of speaking of this mutually informing quality of affordances and relation-making, and it would point to media and technology as another example of the co-constituted and dynamic processual ways in which concepts and practices are formed and take shape.

Given the particular focus on issues of media, technology, computation, materiality, power and politics that this research involves, it inevitably moves across writings from different disciplines on these topics in order to try and further develop what it proposes as useful methods for understanding the cases and questions under consideration here. Computation continues to spread itself into a number of domains of practice and living, and as such it can be seen to partly chip away at notions of disciplinary stability, or rather to potentially reconstitute them. The situations discussed here are often dispersed and complex, and not readily addressed by one particular disciplinary perspective, and it is for this reason that this research continually aims to speak of the way in which technologically-informed practices are themselves wrapped up in a range of intersecting relations. Within media studies, similar recent approaches in the field include the

writings of Wendy Chun, Matthew Fuller, Tiziana Terranova, Jennifer Gabrys and Jonathan Sterne, as well as classic examples such as those of Walter Benjamin and Lewis Mumford. In addition to writings from various branches of media studies, this research also draws heavily from the now established writings of science and technologies studies and also that of the more recent tradition of software studies, while also looking further afield when the example in question calls for it. In addition to perhaps being of relevance to those interested in any particular topic highlighted in the chapter overviews, it is also hoped that this research provides some further suggestions for how one might integrate particular concepts from these various fields into ways that can meaningfully address networked and computationally-informed issues of the present. The work in developing the relatively generally applicable set of theoretical tools presented in the Approaches section can be seen as the most concrete attempt to do so. And the chapters themselves continue the overall aim of demonstrating how a concept of execution can act as a potentially useful mode for both description and engagement with contemporary networked and computationally-informed situations, bringing to the fore some of the most dominant but also emergent contours of the executable as they can be seen within a range of practices of the present.

2 APPROACHES

The research here sets out to address the following question: *In what ways can a notion of execution be developed so as to act as a relevant and politically-orientated concept for describing and engaging with important features of contemporary networked and computational situations?*

This chapter works to describe the overarching aims and approaches that have been used to work through this research question. It proceeds in four parts. The first, “Compositional affordances,” outlines what can be described as the research’s most central focus, what it describes as the questions of execution and the ongoing negotiation of various forms of *compositional affordances* that can be seen to play out in any executing practice. Of particular importance to the notion of compositional affordances provided here is Karen Barad’s concept of the material discursive, and thus some explanation is given of Barad’s approach. This is followed by a section on “Genealogies of media and technology,” which gives specific details of how a further genealogical focus has been carried out in this research, with some description on how such a tactically orientated approach can be carried out in relation to studies of technologically-informed studies of media. The next section, “Multi-sited, intersecting relations of power,” explains how each of the cases looked at in the coming chapters involves a continued and strategic approach of moving across one site of study to another, while also considering the intersecting relations and registers of power that become manifest in such moves. The final section, “Choice of cases,” will describe how and why the cases discussed in the research were chosen, and what it is that ties such seemingly disparate examples together.

COMPOSITIONAL AFFORDANCES

The focal point in this research is the study of computational and networked media and their relation to issues of expressions of power. In working specifically with a concept of execution, this focus will continually revolve around the study of the particular kinds of affordances that can be seen to inform and compose the situations under consideration, what it describes as a continued negotiation and process of making things executable. In the various practices looked at, what emerges over and again is the way in which affordances (e.g. of skin, silicon, the electromagnetic spectrum) form and are informed by the inclusions and exclusions of further intersecting discourses (of politics, computer science, economics), the expressions and processual actualisation of which can be seen in the situated, executing practices of any given moment. These affordances are described as being

compositional in nature, in that they continually inform and participate in the practice of what is considered to be executable in any particular situated acts of execution.

There are many ways into speaking of affordances. The term itself was most notably developed by ecological psychologist James J. Gibson in his research on the particular actions and possibilities that the physical environment can be seen to afford for an animal. As he writes, “the *affordances* of the environment are what it *offers* the animal, what it *provides* or *furnishes*, either for good or will” (Gibson [1979] 2015, 119). Gibson emphasises specifically the relational quality of affordances and how these affordances are both physical properties of the environment at the same time that they are relative to the specific organism in question. An affordance in this relational sense “points both ways, to the environment and to the observer” (121). Gibson’s reading is helpful for highlighting this relationality and its particular environmental properties. Besides Gibson, other common starting points for discussions of affordances in relation to technology include those of Gaver (1991), Pickering (1995) and Hutchby (2001). But, while building upon a range of theories and perspectives to develop a notion of affordances in relation to a concept of execution, the reading of affordances provided here aligns most directly with Karen Barad’s (2007) formulation of what she describes as a “material-discursive” approach.

Before detailing Barad’s approach, it should be pointed out that Barad is still perhaps not commonly associated with a notion of affordances. Indeed, Barad rarely uses the term affordances, focusing instead on a language of agency. Nevertheless, her work is currently being taken up by researchers in a range of different fields, often specifically for its ability to highlight questions of affordances and agency, and also because of its strong ethical focus, an interest that this research also shares. In addition to Barad, the notion of compositional affordances developed here is also directly inspired by Matthew Fuller’s writing on what he describes as the “compositional drives” of media and technology (Fuller 2005, 102), and Fuller’s understanding of affordances will also be discussed further in the coming pages.

Material discursivity

Following in a rich tradition of science and technology studies, and particularly in the vein of what is commonly referred to as feminist technoscience, Barad provides one of the most thorough recent expositions of the mutually informing entanglements of “matter and meaning” (Barad 2007, 3). As the term indicates, a material discursive approach is focused on the formative and mutually constituting ways in which matter and meaning interact in an ongoing and compositional fashion. Drawing on both a long feminist tradition of considering seriously the constructed

and performative qualities of materially-informed relations, and also an extended reading of the uncertainty principle in quantum physics and the key role of the mediating apparatus,¹ Barad treats matter as a processual and iterative agent involved in the production of differences and relations. She describes this material discursive perspective as being that of a “relational ontology,” one that privileges the primacy of relations and “does not take the boundaries of any of the objects or subjects of these studies for granted but rather investigates the material-discursive boundary-making practices that produce ‘objects’ and ‘subjects’ and other differences out of, and in terms of, a changing relationality” (Barad 2007, 93). As such, the inclusions and exclusions enacted in any material discursive perspectives and activations of certain relations over others becomes a crucial and further constitutive element to consider in any acts of “mattering” (141). The ongoing and co-constituted nature of materialities and discourses is, in Barad’s words, one of mutual entailment and articulation: “Neither discursive practices nor material phenomena are ontologically or epistemologically prior. Neither can be explained in terms of the other. Neither is reducible to the other. Neither has privileged status in determining the other. Neither is articulated or articulable in the absence of the other; matter and meaning are mutually articulated” (152).

The act of a particular material discursive articulation amidst other possible articulations is what Barad describes as an “agential cut” – the making separate and productive certain relations over others in the name of a certain perceived material discursive availability and agency for the performing agent in question. Barad gives several instructive examples of the productive way in which such agential cuts involve the bringing together of particular performative resolutions of matter and meaning amongst many other such potential resolutions. Most prominent of these is her reading of Niels Bohr’s wave-particle experiments, but other examples include her discussion of Bohr’s example of the varying subject-object relations a person can establish with a stick in their use of it to navigate in the dark (154-5), and also her discussion of the piezoelectric crystal and how it can act, alternatively, as both a transmitter and receiver. In these examples, we see the further importance of the apparatus, and its own quality as both an agent in the production of material discursive practices and also another example of a material discursive entity that itself achieves iterative and relational shape in an ongoing field of relations and practices. As many examples of the agential cut and discussions of particular apparatuses of technology will be considered in the chapters to come, it is enough here to point out that all of these examples are used to serve as pointed reminders of how materials and discourse mutually constitute one another, with each agential activation of their situated and informative

1 As famously highlighted by Niels Bohr in a set of path-breaking experiments on the wave-particle duality paradox, the uncertainty principle highlights the way in which certain phenomena can be, depending on the perspective being applied, alternately understood as particles (materially particulate entities occupying a specific point in space at a given moment of time) or as waves, which are here to be understood “not as things per se,” but rather as oscillating fields or disturbances, which, unlike a particle, cannot be localised to a point (Barad 2007, 77).

qualities producing certain executing practices and understandings of the executable rather than others.

As can be witnessed in Barad's formulations, a material discursive approach implies a multiplicity of possible materialisms and materialities, a situation which, as Jussi Parikka points out, presents a methodological task of grounding such an open-endedness with analytical attention to the specificity of their actual practices and actualisations (Parikka 2012, 99). These multiple materialities might include those of a "base" materialism, a practical materialism, a social materialism, a sensuous materialism, and so. Along the way, particular materials are granted agential status and named as differences that make a difference, be they the skins of organic bodies or the physical implementations of logic gates in computing.

This recognition of openness and multiplicity does of course involve its own exclusions and reductions. For instance, it potentially imposes a certain indifferentiation at what might be understood as a "macro" level of interpretation (Frow, in Bennet and Joyce 2010, 35), as well as infinite differentiations at the "micro" level that, amongst other things, might inhibit the possibility of large scale, collectively organised political action. This risk of differentiation and indifferentiation is in fact a tension that is returned to on several occasions in the research. In general, the continued attempt at highlighting and parcelling out very particular "sites" of execution can be seen as a concerted attempt to test the particular degrees to which agential differentiations can be understood as more or less flexible, more or less able to take hold and travel across other differentiations, materials, bodies, situations and so on. In fact, the material discursive approach here might be understood in many instances as being at least somewhat less openly flexible than Barad's. The examples chosen are generally focused more on the constraining and disciplining coercions of executable relations. This is partly because of the explicitly politically-orientated project of the research: to describe processes of coercion and the instigating of particular power relations over others that technologies and media can be seen to participate in. This is not to suggest any rejection of the open-ended leanings and powers of the material discursive approach, nor to suggest any gloomy reading of media and technology as some kind of essentially negative force, but rather simply to say that in this particular case, the focus will often, though not always, be more on the coercive rather than expansive potentials in the material discursive spectrum.

In contrast to classical understandings of matter that focus on notions of a purely substantive quality of material "things," Barad insists on a need to bring to the fore the relational and performative positionings and forces involved in claiming any materially inscribed entity as discernible as a thing. In situating such

a relationality and performativity of matter and meaning as the immanent centre of her approach, Barad points out that hers is an “agential realism” that “allows matter its due as an active participant in the world’s becoming” (136). In this way, matter and meaning, in their situated but always open-ended relationality, have an agentially “real” quality as “constraining but not determining” (177). The potential tension regarding the “realism” of such a take on materiality is important to keep to the fore. While building off of her pioneering work, Barad nevertheless takes writers like Judith Butler to task for the way in which Butler’s materialism, while trying to attend to difference, nevertheless often ends up defaulting back to a kind of “factual” form of materialism in which the specificity of materials in the object of analysis are lost sight of and end up being treated as a kind of given. The risk in such a treatment of materiality is that it ends up glossing over or forgetting the active and constituting qualities at play in any particular materialisation under consideration. In addition to Barad’s critique of Butler, this research would also ask that one considers certain dangers in the other end of the materialist philosophical spectrum, such as the highly malleable materialism of writers like Deleuze and Guattari (1987), in which the sense of a continual open-ended possibility of materials is occasionally itself at risk of losing attention to the specific materialities and conditions under consideration. This research actively strives to keep a certain tension in play regarding the material discursive perspectives on execution that it actualises, acknowledging the open-ended nature of the material discursive understanding of matter as always mattering, while also trying to pay heed to specific affordances, esclusions and constraining qualities that the practices of execution looked at here often tend to highlight.

While essentially agreeing with Barad’s ontological premise, the approach here might better be described as a more tactical material discursive take that will at times strategically allow for the parcelling out of more singular or static notions of materiality and discourse when such a take serves the case in question. For instance, this might be because the executing agents in the practice in question can be seen to be treating materiality or discourse in just such static ways. Or it might be because the privileging of a certain discourse that perhaps loses sight of issues of mattering is nevertheless seen as tactically and politically more useful for developing the particular case under consideration. In the end, this research directs its attention to the specifics of certain kinds of active operational cuts, limits and exclusions, while also acknowledging an underlying relationality at play, with the understanding that it can be tactically useful and important to work through the operational divisions of an executing practice as they are construed by the actors involved. In order to further signal both this debt and occasional divergence from Barad’s

approach, I have intentionally removed Barad's hyphenation of the concept as "material-discursive" when using the concept here.

So, the material discursive mobilised in this research is one of considering how the making executable of certain potential affordances, relations and practices over others can be seen to take shape within an ongoing network of executing practices and their co-constituted relations, with particular attention given to materialities of different kinds and their important and often overlooked quality as participant elements within such relational acts of mattering.

Ecologies of the executable and their compositional orientations

A material discursive approach to execution looking at issues of power aims to consider modes of agency and the conditions of what appears as possible and executable according to a variety of constitutive forces. The focus on relations, iteration and performativity that a material discursive approach involves points to an ongoing processual view in which the descent, emergence and possible dominance of a particular executable set of relations is the achieving of certain forms of consistency between the many different elements involved. In thinking through these active and relational qualities of the material discursive, it is also helpful to work to capture a sense of the way in which distinguishable material discursive elements and their executable processes come to take shape and consistency in a manner that also aims to keep a sense of the historical power dynamics and genealogies that inform such conceptions of the executable. Sara Ahmed, in her writings on how "orientations matter," speaks of how "[w]hat passes through history is not only the work done by generations but the 'sedimentation' of that work as the condition of arrival for future generations. Objects take the shape of this history" (Ahmed 2006, 41). The terms orientations and sedimentation in Ahmed's reading are meant to point beyond an object's surface effects and any kind of ideal sense of givenness attributed to an object, and indicate instead towards a historical and materialist sensitivity that traces the condition of such "arrivals" of "what appears" in the object or process in question. Making reference to Marx and Engel's critique of commodity fetishism and their example of the table, Ahmed highlights how it is not enough to treat "making form" as the transformation of nature (i.e. wood) into use-value, as this has the effect of positing nature as "simply 'there' waiting to be formed or to take form" (42). Rather, "a more dynamic view of the 'facts of the matter'" is required in which such arrivals are understood as "'brought forth' as effects of generational action" (42). In each of the points along the way to the stabilised object of a table, one can discover different points in which matter takes processual form within intersecting orientations of execution and the executable. In a material discursive mode of thinking

through issues of executability, variously enacted practices have an ongoing history of highlighting some entities and relations more than others, of orientating and being orientated with a propensity towards certain practices and executions over others.

This research's focus on a genealogical approach, discussed more in the next few pages, places much importance in this interwoven historicity of the executable and the way in which executions of one kind or another are not simply given nor entirely contingent, but rather appear in certain ways and amidst certain formative timelines and their particular aggregations of executable orientations and practices. One question that arises as a result of the taking on-board of many contrasting forms of material agencies is that of how a material discursive approach aims to work with the interrelated issues of the historical development and contingencies of these related but also multiple agents. For Foucault, error, "faulty calculation" and the many vicissitudes of the unplanned for and accidental lie at the core of historical development and the genealogical project (Foucault 1984, 77, 81). While acknowledging this view, the perspective taken in this research is that there remain certain more prevalent and dominant material discursive dispositions and tendencies within ongoing drives towards agential self-organisation and execution. As such, chance happenings though they might be, these tendencies do allow for ways of tracing certain recurring or identifiable trajectories of the executable. It's a delicate balance, this acknowledgement of history as a fragmented, heterogeneous collection of encounters emerging from unpredictable accidents and ruptures that nonetheless can be seen to stand out precisely as contingent as a result of certain iterative material discursive processes from which they stand in relation to. It is the challenge of approaches such as genealogy and a material discursive take on execution to attend to such sedimented orientations, interferences and the material discursive patterns of diffraction and stubborn gaps that inevitably stream out from any set of executing practices.

In his writing on articulation, Stuart Hall (1980) speaks of certain "tendential combinations" that can be seen to occur across a variety of examples of historical articulations (particularly in relation to structures of oppression), and how such historical tendencies are constitutive forces in executable pursuits. Such a notion of compositional tendencies can also be further developed in relation to similar formulations from studies of technology. Thomas Hughes, in his book *Networks of Power* (1983), provides a historical reading of the different material "momentums" that the spread of electricity networks took in Berlin, Chicago and London, highlighting the varied historical trajectories that each situated case points towards. Hughes: "technological systems, even after prolonged growth, do not become autonomous; they acquire momentum. They have a mass of technical and organi-

zational components; they possess direction, or goals; and they display a rate of growth suggesting velocity” (Hughes 1987, 76).

The particular focus on compositional affordances worked out in this research explicitly aims to track such tendencies and momentums and the technologically-informed practices that assemble within their relational energies. It works to take into account the processes, frictions and asymmetries of material discursive exchange and the particular ways in which these may be seen to inform, to a greater or lesser degree, the arrival of the kinds of “matters of fact” that Ahmed speaks of. One only needs to think of the great geopolitical struggle that takes place as a result of the compositional material discursive properties, quantities and locations of oil, not to mention the many ongoing effects of its intensive extraction and subsequent emission back into the atmosphere. Working with the material discursive tendencies and sedimented orientations of various ecologies of executable processes is both a demanding but potentially rewarding task, and studies like Ahmed’s (2006) carefully crafted exposition of tables or Reviel Netz’s (2004) history of barbed wire are just a few examples of thinking through this particular and important aspect of the executable and its particular material discursive contours and executions.

In thinking through such a sense of propensities in relation to media and technology in particular, it is also worth taking note of Matthew Fuller’s descriptions of what he describes as media’s “compositional drives” (Fuller 2005, 102). As developed most specifically in a chapter titled “The Camera That Ate Itself,” but also throughout his book *Media Ecologies* (2005), an approach such as Fuller’s seeks out the generative compositional vectors of potential that media both plug into and activate in turn. To study media in an ecological mode is to study what Fuller describes as “materialist energies” that inform the conditions and coming into existence of any set of ascribed entities and relations in a particular context. Materialist energies, whatever they might be, feed into and thus continually act as compositional forces for executable processes of all kinds. And a medial will to power such as Fuller speaks of becomes rather like the metabolism that is constantly at work, always harvesting energy towards one form of production or another. As Fuller’s reading of the camera shows, what is normally called a camera is a device composed of many technological parts, which are themselves constantly changing over time. Regardless of what these parts might be at any one point in time, the device itself is predicated on a disposition to take and produce photos, a certain will to metabolise and process light and its reflections into these compositions that are called photographs. Such a metabolic processing power is able to take hold in existent and emergent dispositions and comes into further contact with an ecology of overlapping and interacting material discursive

affordances, dispositions and processes. In doing so it might in turn gain a certain sustainable traction such that “the parts can no longer be disassembled,” producing what Fuller describes as “[n]ot a whole, but a live torrent in time of variegated and combinatorial energy and matter” (Fuller 2005, 137). The resultant photos produced by cameras mobilise image-sharing ecologies around themselves, which activate yet further processes, dispositions and relations (e.g. identity formation, political awareness, body anxieties, representational modes of understanding, etc.). The metabolising drive cascading its effects across a variety of related and relevant ecologies.

Part of the overall position of this research’s understanding of media and technology, and much of what can be described as its ecological understanding of relationality, is to see contemporary technologies as active and activating components in an ongoing and relational interplay of the always active and generative powers of energy transfer. Thus, a recurring question here is that of how a technologically-informed proposition can be made to cross a certain threshold of executability, with this research being an attempt to bring this compositional drive of mediated processes to the fore in a mode of questioning that focuses on the material discursive components and power relations of such compositional drives. Executability is partly this becoming active of such emergent elements, their taking on of consistent, identifiable and executable qualities for material discursive systems and their executing agents in question. This is one important aspect of the way in which the particular material discursive approach employed here is orientated and applied, working to follow such sedimentations, orientations and the various forces, propensities and momentums involved in processes of the concretisation of certain forms of executions and executability over others.

To summarise then, an overarching attempt is made in this research to describe and situate processes and practices of execution in relation to an understanding of the compositional affordances that can be seen to find expression and actualisation in the executing practice in question. As highlighted, in speaking of such compositional affordances, much of the attention will be on situating the particular intersections and executions of various aspects of matter and meaning within certain historical traditions and trajectories of the executable. To this end, this research’s take on compositional affordances is also specifically genealogical in nature, and the next section will address in some more detail this genealogical approach.

GENEALOGIES OF MEDIA AND TECHNOLOGY

This research employs genealogy as an explicit tactic for tracing the role of various forms of practices, techniques and power relations in producing situated modes of execution in the world,

focusing here on media and technology's long standing and co-constitutive role in the production and dissemination of power via material discursive techniques and practices. Genealogy is viewed as particularly helpful in this work's focus on contemporary technologically-informed practices because it helps to put into some perspective what are currently dynamic and rapidly developing computational and networked practices. In the work that it does to draw out some of the more sustained and recurrent practices and trajectories that can be witnessed in technological development, a media genealogical method provides what might be seen as a tactical way in which to highlight various patterns within such trajectories, while also being conscious of just how unpredictable and often highly contingent they can be. As witnessed in the example of the chapter on the policing of the ongoing migration situation in the Mediterranean Sea, the relations of power expressed in such an example are continuously changing, with one seemingly stabilised technological and legal implementation suddenly replaced or mutating into another, and each so-called solution to the situation raising a whole new set of problems and corresponding practices and modes of engagement.

While working through questions of historical tendencies, genealogy resolutely rejects notions of origins and linear, teleological forms of historical exegesis. Instead, it operates via what are often referred to as transversal excavations aimed at elaborating on the situated configurations of variant pasts, their disparate and intersecting temporal pulses, and tracking their varying durational registers and effects as they are layered into and across configurations of the past and into the present. At the same time, genealogy also specifically seeks out, so as to challenge, traceable orientations and trajectories of power in order to show how a particular instance of a given understanding of an issue or practice has taken hold and been made to be given as such. The method of genealogy applied here can in this sense be understood as a two-pronged mobilisation of historical inquiry: one that aims to carefully track the sequential orientations at play but also at the same time to highlight and break up the formative orientations and practices of the present so that they might be both further interrogated and potentially rethought, intervened upon and constituted anew.

Foucault describes how genealogy "must record the singularity of events outside of any monotonous finality; it must seek them in the most unpromising places ... it must be sensitive to their recurrence, not in order to trace the gradual curve of their evolution, but to isolate the different scenes where they engaged in different roles" (Foucault [1971] 1977, 139-140). By paying heed to the assembled situated particularities and also divergent contingencies of events it becomes possible to develop an understanding of power and knowledge as processual, emer-

gent and plural (hence the continuous use of the plural form in this dissertation when referring to things like materialities, ecologies and so on). The hope is that by doing so one might better allow for divergent histories and perspectives that can be of further aid in the studying of taken for granted supports, orientations and relations at play in any given situation. And in doing so, better open onto the general genealogical aim of disrupting stable readings of knowledge and power, creating in the process potentials to challenge dominant orientations, manifestations and practices of power.

As with Foucault, media historian Friedrich Kittler is also interested in pursuing a more genealogical understanding of discourse, with a specific focus in his case on technology's role in such instances. If Foucault's approach often centres around a somewhat linguistically-orientated notion of discourse as consisting of statements and the designation of the sayable and the unsayable, Kittler's approach focuses on discursive technological networks and the mediating channels upon which things such as writing and expression transpire. Writing is just one of a number of what Kittler calls systems for writing down (*Aufschreibesysteme*, a neologism invented by the early modern figure of judge Daniel Paul Schreiber), or as it has more regularly been translated: discourse networks. The term is intended to "designate the network of technologies and institutions that allow a given culture to select, store, and process relevant data" (Kittler 1990, 369). As with Foucault, there is a strong focus on the archival and executable nature of particular cross-sections of cultural practice, with the focus in Kittler being more squarely on the technical specifications of how certain forms of data — and not others—are made selectable, storable, transferable and calculable by the technologies of the time. The medium as message and generative driver of history. A condition that demands the studying of the circuitry of such inscription mechanisms so that one can better acquaint oneself with "the very schematism of perceptibility" (Kittler 1999, xl-xli) and the potential discourses on the executable which such discourse machines and networks afford, delimit and inscribe. Technologies materialise and put into play particular mediated practices, each "with their efficiencies, abstractions, reductivism, blockages, abundance and erratic plenitude" (Fuller 2011). To exist in co-constituted relation with the networked and computational technologies of the present is to engage with and be situated within a series of sociotechnical provisions, each with their own compositional affordances, propensities and established and emergent understandings of the executable. In any mobilisation of a new material discursive network of technologically-afforded situations, both intended and accidental effects emerge, mobilising yet further energies and responses in relation to such systems.

“To have a feel for such monomanias is to have a sense for media” (Fuller 2011).

As with Marshall McLuhan’s work, the question posed by Kittler’s approach shifts from a focus on content to that of the particular affordances and constraints of media arrangements that help to produce any particular content and the inflected power relations that they help to determine – not to mention the key question of who programs and controls these media and their determinant power relations. Where Kittler’s reading involves a so-called hard determinism, the approach adapted in this dissertation can, in general, be understood as a more open-ended and flexible reading of such media determinacy, with the focus on genealogy and a notion of execution and executability working specifically to highlight points of intervention, thus pointing to how a particular technologically-afforded practice is always open to further configuration and other expressions of the executable. Still, as Fuller (2013) points out in a talk on Kittler and media standards entitled “The Forbidden Pleasures of Media Determinism,” Kittler’s provocatively determinist orientation of media theory, whatever one thinks of it, has proved a useful, pointy-shaped tool for prodding the field into more sophisticated considerations of those technical elements involved in media and communications that can be seen to have a much greater agential role in practices of media than was typically previously granted or understood. Indeed, in an age of smartphones, Google, Facebook, Tinder, Big Data, neural networks and the like, this once controversial perspective of Kittler’s can be seen to have become something of an obvious, even normative point in media studies now.²

Given such a situation, this research is an attempt to outline, in a media genealogical fashion, some of the generative qualities and tinkerable circuitry of these media. The first section of this research considers various early models of computation as they were informed by emerging forms of capitalist manufacturing and its technique of the division of labour and economies of scale, shifting back and forth from past to present to consider how such techniques and their material discursive energies and orientations can be seen to be at play in some of the dominant computational practices of the present. The chapter on the Facebook Like button similarly looks at the emergence of this now pervasive networked and computational site of execution and the ways in which its power as an interpretive device within the greater and currently dominant computational platform of Facebook is nevertheless a very particular kind of dominance, one that establishes certain norms that are themselves potentially challenged by other forces in the network and society in general. Finally, the section on the Mediterranean Sea, is perhaps the most comprehensive look at this way in which competing questions and forces of descent, emergence and domination are continu-

² It is also worth counterbalancing this sense of a prescience to Kittler’s approach by noting that he was notably largely incapable and unwilling to account for the powerful emerging networked forms of sociality as they began to take shape in the final decades of his career.

ously in flux and in contestation with one another.

Problematizations and their questioning technologies

Foucault described his approach as that of a concern with “the genealogy of problems” (Foucault 1997a, 256) and there is a similar sense in which one of the overall aims of this research is to address what might be described as a genealogy of the problems, or problematics, of execution. The central quality of the Foucauldian problematic is the way in which it, in one way or another, involves a destabilising and making uncertain and unfamiliar—and thus in need of addressing—particular domains of action and understanding, demanding in the process a response on the part of those who feel this urgency and challenge of the problematic in question. The example of the “Earthrise” and “Blue Marble” images of the Earth that materialised at the end of the 1960s and early 1970s provide one such example of a technologically-informed problematic. These were sociotechnically produced images that mobilised a range of questions in need of answering – e.g. what are “we” to do with this visual crystallisation of the relational fact that we all live on the same planet? A problematic is thus a forceful prompt that can be seen to emerge and take hold because of some particular ways that its problematising qualities have the effect of putting into motion certain questioning energies in the particular historical and material discursive context in which it gathers force. As Foucault summarises it at the end of an answer to a question of Paul Rabinow’s, “This development of a given into a question, this transformation of a group of obstacles and difficulties into problems to which the diverse solutions will attempt to produce a response, this is what constitutes the point of problematization and the specific work of thought” (Foucault [1984] 1997b, 118).

This working through of problematisations can be understood as an experimental and creative project that is at the same time a carefully situated and concrete one. The experimental quality here is the way in which Foucault’s ultimate aim in this approach of his is to highlight the ways in which, having problematised the issue in question, one creates a potential space of relational freedom in which it is possible to intervene or experiment with alternative articulations of situated being and action. Such a notion of opening up possibilities is not to be read as a glib, utopian-style statement, but rather to be taken in the context of Foucault’s emphasis on the constant and always ongoing care required in addressing and speaking of the inevitably highly sensitive qualities that a problematic often brings painfully to the fore. One can think here of Agamben’s discussion on Anna Akhmatova and the far from straightforward potential of daring to address and give expression to the problems of one’s time (Agamben 1999, 177-8), or of Sara Ahmed’s recent writing on “willfulness” and

the challenges of speaking against the general terms of a given will and discourse (Ahmed 2014). This continuously questioning nature of problematisation points to a processuality at the core of its approach, as well as a way in which problems and the critical responses that develop in relation to them can be seen to be instances of an issue gaining a certain critical mass in which it has become able to be seen in its particular time as a problem to be addressed. In a similar mode to Foucault, but with an additional material discursive focus and register, this research is similarly interested in a notion of problematics and the act of questioning, such as the recurring question of “what is executing here?” that the next section takes up.

As a method of problematisation indicates, the relation between a concept and what this research characterises as the questioning dimension of media practices can be thought of as an immanently co-constituted and multi-directional one, in which the users of technologically-informed practices are participating in both forming and being formed by the sociotechnical affordances of their media practices. In addition to Foucault’s situated and recursive approach of problematisation—what Ann Stoler describes as his “recursive style” (Stoler 1995, xi)—one can also speak of other related approaches in this regard. Christopher Kelty (2008) speaks of a recursive relation between media technologies and their practitioners, by which the technical actualisation of certain media-informed concepts will set off new inscription technologies that reshape and tease out further manifestations of what can be seen as an ongoing, symbiotic relationship of complex ensembles of human and nonhuman dispositions. In other words, any executable and executing form of technological practice, in attempting to address a perceived need or problem, always in turn poses its own problematics. Thus, this research questions technological forms at the same time that the technologies and a large array of other forces act as questioning entities with their own issues to be addressed. As Kittler ([1985] 1990) makes evidentially clear throughout his writings on technology, the “discourse network,” with each technological advancement, continues to present an ongoing and fundamental question of technology, challenging notions of human-centred agency and problematising the very notion of human-centred interpretation itself. Olga Goriunova describes this infusing of wills, ideas and concepts at the level of computation, protocols and the engineering of materials as pointing towards a way in which both ideas and the technologies that inform them can be thought of as “infrastructures,” and that in this sense “infrastructures are also a part of the imaginary themselves” (Goriunova 2012, 92). The relation here then, whether between concept and question or public and communicative infrastructure, is not reversible, so much as spiralling, producing a generative recur-

sivity whose intersecting and productive questions and processes of world-forming this research explicitly aims to track.

A problem finds its resonance in the historical juncture and practices in which it is situated and from which its potential becomings—as events, practices, concepts, etc.—take shape. Similarly, in its often most productive form, a genealogical and problematising approach can work to give a particular kind of diligent and careful political accounting of history, especially via its seeking out of oppositional or displaced experiences and forms of subjectivity. In doing so, it can attempt to make possible a process of acknowledging other voices, practices and realms of the possible, adopting a technique of what bell hooks describes as “history as counter-memory, using it as a way to know the present and invent the future” (hooks 1992, 131). As will be made clear further on in this chapter in the highlighting of the methods of intersectionality studies, it not only a focus on historical trajectories that is of interest to the method here, but rather of going a step further than Foucault normally took in his writing³ and tracking actual ways in which informed knowledge of a problematic can be specifically put into practice in simultaneously strategic, creative, intensifying and activist modes of intervention. Hence the discussions of specific artistic practices at various points, as well as the descriptions of certain forms of interventions, as witnessed in the discussion of Diamond Reynolds’ oppositional tactics of mediated gazing or in the final case study on activist interventions into the present migration situation. While continuously dedicating writing space and giving emphasis to the benefits to be derived in the difficult act of describing the complexities and uneven application of relations of power as they find expression in the cases studied, this work, though largely focused on what might be described as the more restrictive or dominating relations of power observable in contemporary technologically-informed situations, nevertheless continues to highlight that power is not given but in processual and situated relation and thus always open to direct and multiple forms of intervention.

To summarise then, the employment of a genealogical and material discursive approach is for what this research views as their productive problematising modes of enquiry and engagement, capable as they can be for tracing specific histories and their continued interplay of processes of descent, emergence and domination, as they alight from one act of interpretation and technological expression to another, via certain bodies to others and across a range of intersecting, sedimenting and contested networks of power. As this chapter on theoretical points of departure already indicates, this has meant drawing on approaches of media and technology studies but also searching further afield for productive modes of interrogation that also serve this primary and politically-orientated aim of questioning and intensifying an

3 As Edward Said’s helpful critique puts it, Foucault’s imagination of power is “largely with rather than against it,” and is thus “not finally as contestatory, or as oppositional as on the surface it seems to be” (Said 1986, 151-2).

understanding of particular executing techniques and practices of the present moment.

MULTI-SITED, INTERSECTING RELATIONS OF POWER

Imagine an internet system, linking up computer users. Or a rush of immigrants across national borders. Or capital investments shuttled to varied offshore locations. These world-making “flows,” too, are not just interconnections but also the recurving of channels and the remapping of the possibilities of geography. ... Imagine ethnic groups, corporations, refugees, nongovernmental organizations (NGOs), nation-states, consumers, social movements, media moguls, trade organizations, social scientists, international lawyers, and bankers, all swarming alongside creeks and earthworms to compose the landscape, to define its elements, carve its channels of flow, and establish its units of historical agency. —Anna Tsing (2000, 327)

In working with and through concepts and strategies with approaches such as material discursivity and genealogy, it began to become clear in this research that there was a certain productive power to a methodological technique of exploring the way in which material discursive actualisations of techniques and technologies work their expressive power across multiple sites and scales of operation. Fuller's (2005, 13-54) chapter on UK pirate radio was particularly inspiring early on for its ability to follow its dynamic subject across the many intersecting and contested assemblages of record players, transmitters, microphones, dub-plates, drugs, legal rulings, bodies, and so on, while always retaining a general sense of the vibrant energy and sense of liveness that was the UK pirate radio scene in the 1990s and early 2000s. A range of similar readings from other fields (particular those of science and technology studies and media history) provided further examples of the relevance of a multi-sited approach that looks at the intersections and situated executions of many different forces and material discursive relations of power and expression.

Clearly, with the spread of computation into so many distributed and diverse aspects of everyday experience, arguing for a multi-sited approach in this research seems almost a given that requires little methodological arguing for. The example of Facebook is a platform whose effects can be traced across many different sites and scales of operation. The ongoing policing and also activist networks' efforts at working with the situation of migration in the Mediterranean Sea is unarguably multi-sited, with a whole host of actors, technologies and materialities at play. Nevertheless, in working with these cases I began to become somewhat dissatisfied with the lack of a more concrete sense in which to think through how exactly something like a site or a scale is

to be thought through and understood. The next chapter's consideration of the computational artworks of Martin Howse put forward the notion of a "site of execution" (Howse 2013a). This notion of a site of execution began to become intriguing when trying to read it through a material discursive approach, suggesting several questions regarding the approach used in this research. If interpretation is the privileging of particular sites over others, how was I to motivate choices in this regard? Given the material discursive standpoint that objects are relational, processual and performatively established events, how could I bring this relationality to the fore without falling into a kind of seamless and easy to manufacture notion of sites and relations as processual "entanglements" involving this or that "assemblage" of actors and networks? In the end, what I found of particular value in a notion of site, as with that of execution, was that it acts as an ongoing provocation and prompt to reconsider the choices made in regard to the inclusions and exclusions involved in highlighting any particular set of relations as a site of interest. While the question of how to think of a site will come up regularly in several of the chapters to come, this discussion of multi-sitedness is an attempt at giving some concrete motivation regarding what might be described as the *aggressively* multi-sited nature of the approach taken in this research.

As many writers looking at a notion of multi-sitedness are quick to point out, that multi-sitedness has become a problematic for academic discussion in recent times is not particularly surprising. While the many different flavours of globalisation and capitalism have been working their way across subjects, cultures and environments for many hundreds of years, there is perhaps a more overt way in which such practices have announced their multi-sited intentions in recent decades. Similarly, with the increasing spread of networked communications technologies into the daily lives of so many individuals, this multi-sitedness becomes still harder to ignore, buzzing as it often is in the pockets, screens and everyday engagements of the present day. In this context, a central aim of this research is specifically to capture something of the mutative and mobile ways in which networked computation and its various forms of practice can be seen to be working themselves into and across a variety of other existing compositional relations of power and expression, helping in the process to create certain notable sites and practices of execution in the world. In doing so, however, it is a recurring theme in this research that one should continue to pay close attention to the certain questions and tensions questions that a multi-sited approach raises. For instance, the act of "siting" itself raises particular questions for a material discursive approach. Every shift from one site to another, and the inevitable process of making abstractions in order to speak of certain correlations and general techniques that can work

across such sites, involves a certain care and consideration to the possible exclusions enacted in such acts, demanding some motivation and discussion of these acts of separation and comparison.

In order to highlight some of these challenges that a multi-sited approach can touch on, it can be helpful to delve into discussions on what is being described in the field of anthropology and ethnography as “multi-sited research,” while bringing into consideration other approaches (particularly those of intersectionality studies) in order to motivate and describe this research’s own strategic development of a multi-sited approach that looks to describe and pinpoint some of the intersecting material discursive relations of power and expression at play in the examples under consideration here.

Multi-sitedness as an explicit methodological question arose perhaps most notably in discussions relating to ethnographic methods, particularly as these were being rethought in mid-90s and turn of the century discussions within anthropology (and as already mentioned, these discussions can in turn be seen to have been influenced by earlier approaches in STS and cultural studies). The article that is typically cited as foundational is George E Marcus’s piece, “Ethnography in/of the World System: The Emergence of Multi-Sited Ethnography” (Marcus 1995). In this article, Marcus describes what he sees as an emerging multi-sited method that responds to the “more complex objects of study” emerging in ethnographic studies of “the circulation of cultural meanings, objects, and identities in diffuse time-space,” objects of study that seemingly “cannot be accounted for ethnographically by remaining focused on a single site of intensive investigation” (Marcus 1995, 95-6). Typical examples of these new objects of studies would be the transnational movement of people, ideas, practices and the relations that develop across multiple scales and sites of activity, with emerging technologies of electronic communication and specifically the World Wide Web and later mobile smart phones being key drivers in this respect (providing yet another example of the co-constituted nature of research methods and practices and their often direct relation to the inscription technologies of their time).

Marcus proceeds to outline several ways in which one might construct and carry out multi-sited research. This includes strategies of “following connections, associations, and putative relationships” (97) as they gradually posit themselves in the following of such relations from one site to another. Marcus is particularly perceptive in describing the methodological challenges and necessarily uncertain and unstable way in which such a method of probing comparison proceeds:

in multi-sited ethnography, comparison emerges from putting questions to an emergent object of study whose contours,

sites, and relationships are not known beforehand, but are themselves a contribution of making an account that has different, complexly connected real-world sites of investigation. The object of study is ultimately mobile and multiply situated, so any ethnography of such an object will have a comparative dimension that is integral to it, in the form of juxtapositions of phenomena that conventionally have appeared to be (or conceptually have been kept) “worlds apart.” (Marcus 1995, 102)

Later in the article, Marcus also highlights the potentially experimental contours of such an approach. Pointing towards the pioneering documentary film practices of Dziga Vertov, he commends the constructivist position of viewing “the artist as an engineer whose task was to construct useful objects, much like a factory worker, while actively participating in the building of a new society” (106).⁴ At times in the writing up and presentation of the research carried out in this research, an at least somewhat experimental approach of juxtaposition is also ventured. This is perhaps most apparent in the next chapter’s often highly abrupt shifting of attention from one site of execution to another. This has not been done with the intention of providing flashy flourishes of comparison (a common and perhaps well-deserved criticism of multi-sited approaches), but rather represents an attempt to occasionally explore what happens in pushing such an aggressive form of multi-sitedness to the fore, and also to see if new objects for consideration present themselves in such a butting together of different sites and processes of execution. In this way, the multi-sited approach, as described by Marcus shares similar traits to that of the genealogical one, in that in bringing more concerted to the fore the constructed nature of a research endeavour it points towards an inherent tactical quality at play in any research practice and its delimiting and connecting of various sites or objects of study in the name of a particular aim.

4 The final section in this research on the Mediterranean makes reference to a powerful example of multi-sited filmic exposition, that of Allan Sekula and Noël Burch’s film essay *The Forgotten Space* (Sekula and Burch 2010).

Sites of execution

As Marcus and others point out, the multi-sited approach immediately raises the question of how one is to understand the “unit of study” in question. In typical ethnographic studies a unit of study might be a particular “society” or “culture.” As highlighted by James Ferguson, the contemporary situation is one characterised by a tendency for more and more aspects of things like culture and society to be globally connected, thus positing potentially massive and unwieldy units of study (Ferguson, in Coleman and von Hellermann 2011, 197). In addition to the theoretical frameworks for this that Ferguson highlights, such as that of Ong and Collier’s (2005) description of “global assemblages,” one might also add more recent framings such as that of Timothy Morton’s (2013) “hyperobjects,” a term which is intended to point to

vast temporal and spatially distributed entities (such as global warming) and which Morton posits as specifically destabilising traditional conceptions of what constitutes an object or thing in the first place. A material discursive framework as outlined here specifically grants a certain primacy to relations, and thus in speaking of an object or site of study one needs to be careful when granting any sense of given concreteness to the designated object of study. An object or site is in this sense always defined within the various intersecting sets of perspectives, materialities and other relationally informed practices by which it comes to be actualised as a matter of concern. A multi-sited approach, by its very comparative nature, only serves to further add to this notion of connections and relations as contextualising, dynamic and key factors for consideration.

At the same time, as discussed earlier, it remains important to consider the situated and material discursive way in which such relations come into being, take hold and spread as executable practices within and across sites of different kinds. To this end, this research further posits a notion of “sites of execution,” a term taken from research early on in this project on artist Martin Howse’s (2013a) own use of this phrase, as a useful conception that pushes for a closer consideration of particular actualisations within ongoing and multiple horizons of the executable. As discussed earlier, it is the stance of this research that there is at least somewhat of a risk to the material discursive approach’s emphasis on the relational and how it potentially allows one to too easily slide into talk of all as assemblage, entanglement, and so on. The very act of “siting” and also an emphasis on execution can be seen as perhaps helpfully pushing back against any potentially overly seamless readings of relationality. To this end, this research will at many points posit certain key sites for consideration, be they the busy instruction pointer of a computer in a mode of execution, the organic body as a sensitive material discursive conductor and constructor of lifeworlds, the Facebook Like button as a powerfully projective mode of processing, or the boat as a mobile site for movement whose materially informed specificities directly inform the many relations that develop in tandem with it. While always being processual and mattering entities open to ongoing configuration, the point of treating such entities as sites is to highlight the way in which they can be seen to be particularly decisive or productive forces and concretising transducers of the executing relations and practices under consideration. As invoked in this research, a site is not simply that of a location (though it can be). Rather it is to be understood as a noteworthy phenomenon that, in one way or another, can be situated and described, and is often particularly noticeable for the sense of traction and “frictions” (Tsing 2005) it takes on within the material discursive relations and registers in which it is actualised and

achieves its durational and noticeable sense as a site of execution.

This opening up of an understanding of site can be seen to have the effect of continuously challenging oneself as a researcher in regard to one's construction of those objects of concerns that one designates as sites. As highlighted by Adrian Mackenzie, the study and treating of something like an algorithm as a "global phenomena" shows such an objects' "distinctive capacity for decontextualisation and recontextualization, abstractability and movement" (Mackenzie 2005). This continuous sense of decontextualisation and recontextualisation, as it is further studied from one site to another, has a very real effect of continuously problematising one's decisions as a researcher, a generally exciting and positive thing, but one that demands a significant amount of care as to each agential cut enacted in the designation of a particular site and the sets of relations one ascribes to it.

Intersecting relations of power

In studying issues of power and expression in contemporary networked and computational media, the theme continually arises of the multiple and varying compositional ways in which such technologies participate within actualisations of power and their diverse and varying effects on those effected by such actualisations. In working to speak of the establishing of power relations, this research works to adapt a particular understanding of power both by studying the situated actualisations of power relations as they occur in particular executing practices and by using a particular set of understandings on power to do so.

The focus on compositional affordances employed here sets out to pay attention to the specific roles that the actualisation and making executable of various relations have in the constituting of certain relations and alignments over others. The ongoing execution of certain relations and forms of exchange over others has the effect of establishing of certain orientations, relations, flows and potential asymmetries in the process of interaction and exchange. In studying such relations, one can begin to speak of certain forces having more power and others less in any particular system of relations. Furthermore, these relations of power can disperse into and take further hold in the executable infrastructures that arise in order to support any particular set of relations, thus potentially taking further hold and establishing certain orientations and trajectories of the executable. Power is never given in such an understanding, but rather requires a study of the particular arrangements and expressions that it is able to activate within a certain material discursive set of executing practices. Gregory Bateson, in outlining the epistemology of cybernetics, defines an "idea" or "unit" of information as "a difference which makes a difference" (Bateson 2000, 315-318). This research partly attempts to discover such differences and relations of power by

seeking out those techniques that are particularly noteworthy for their generative ability to become dominant regimes of practice, most notably in their ability to enact, as Barad describes it, “marks on bodies, that is, the differences materialized” (Barad 2007, 89). As many of the examples looked at here attest to, relations of power take hold in a complex multiplicity of executing practices, and power relations in this sense can be seen to work themselves within and across differentially established bodies, sites and situations.

In the further adoption here of a genealogical approach, the research treats formations of power as being exercised within what Foucault describes as a “network of relations” that are in constant tension and activity, with the strategic application or taking hold of a particular form of power being partly that of its quality as being composed within the “dispositions, manoeuvres, tactics, techniques, functionings” and other propensities that exist within such a network of relations (Foucault [1975] 1991, 26). This is the sense of what this research refers to as executability, the force of particular relations that present themselves as more available and actionable than others in a particular network of relations. However, this research is not only interested in questions of executability but also in the actual executions themselves and how executing practices further concretise particular set of power relations (Foucault 1982, 788).

Over the process of working through the particular sites and examples looked at here, one of the key returning figurations has been that of a sense in which the various intended and unintended subjects of media and technology can be seen to continually be moving in and out of overlapping, contested and intersecting relations and determinations of power. A final important perspective that helps to further develop this approach of describing the multiform role of technology as it executes and is executed within a range of intersecting compositional affordances and relations of power has been the work of intersectionality studies. Intersectional writings such as that of the foundational Combahee River Collective ([1977] 1995) statement provide a very direct way of speaking of the complexity of power relations. In working as this particular statement does to outline “the multilayered texture of black women’s lives,” it and other writings like it are able to speak powerfully on the “interlocking,” “manifold and simultaneous oppressions” that enact multiple forms of discriminations upon groups of different kinds (Combahee River Collective 1995, 235). Few other writings on power are as focused on grappling with the pressing issue of treating seriously the intersecting complexities and situated differences of power and its applications. And one of intersectionality’s strengths is the way it is able to avoid the “monofocal” nature of certain critical approaches (Crenshaw 1991, 1266) and instead highlight the “*interactive effects of dis-*

crimination” and the “compound” ways in which forms of oppression and the relations they instantiate are activated in both structural and dynamic ways (Crenshaw 2003, 46). As Patricia Hill Collins describes it, this involves an important change in emphasis, replacing “additive models of oppression” with a method that fosters an approach of “thinking inclusively about other oppressions” (Hill Collins 1990, 225).

In speaking of such instances of intersecting power relations, it is a commonplace for geometrical style figurations to be invoked. For instance, Chela Sandoval describes the penchant within late-twentieth-century critical and cultural theory for conceiving of power as a gridlike and horizontal force, as opposed to earlier notions of power as vertical and hierarchised. In such models, power “is figured as a globalized, flattened but mobile, gridlike terrain” (Sandoval 2000, 73). Doreen Massey similarly speaks of “power-geometries,” the multiple and continuously shifting time-space compressions and flows of mobility, connectivity and place, and how they are experienced differently for different social groups and individuals (Massey 1994, p.149). Foucault also speaks of power as establishing a particular “grid of intelligibility” made up of a “multiplicity of force relations” that “can be coded” and further enacted according to this intelligible grid of relations (Foucault [1976] 1990, 93). And in Barad one finds an invocation of “topologies of power” (Barad 2007, 234, drawing heavily on Leela Fernandes’s *Producing Workers* study). In much the same manner, power in this research is this ongoing actualisation and production of certain executable formations (of identities, norms, laws, material relations, etc.) over others, each iteration helping to actualise and make more readily available certain orientations rather than others.

Patricia Hill Collins’s concept of a “matrix of domination” is one of the most forceful and helpful conceptualisations of this intersecting quality of power relations. In her conception of it, Collins calls for an “inclusive model” that “provides the conceptual space needed for each individual to see that she or he is both a member of multiple dominant groups and a member of multiple subordinate groups,” and that “the matrix of domination is structured along certain axes” (e.g. race, gender, and class), with each axis included in the particular model in question revealing different systems of oppression (Collins 1990, 288). Without reference to Collins, but in a move that can be seen to helpfully tie together themes from both intersectional and material discursive approaches, Joseph Pugliese posits the need to consider “multi-dimensional matrices of suffering” and the way in which the suffering experienced in occupied zones is both relational and distributed, binding together a network of intersecting and interactive relations of humans, animals, buildings, land, animate and non-animate objects and entities (Pugliese 2015, 1-2).

In these various figurations, the experience of expressions, oppressions and situated relations of power are at one and the same time individual, communal, relational and differential; intersecting at various sites and scales and according to the situated particularities of the practices and entities given consideration to. The ethico-political and also tactical value in such an approach is manifold. It serves to overtly recognise and work through the complexities and particulars that a sensitivity to imbalances in power relations always demands. As also pointed out by Collins, at the heart of an intersectional approach, like that of the material discursive, is an acknowledgement of any particular standpoint as representing a partial perspective: “The overarching matrix of domination houses multiple groups, each with varying experiences with penalty and privilege that produce corresponding partial perspectives, situated knowledges, and, for clearly identifiable subordinate groups, subjugated knowledges” (Collins 1990, 234-5). From a research perspective, this partiality and forceful acknowledgement of the inevitable incompleteness in knowledge that an intersectional but also material discursive and multi-sited approach highlights, demands an ethical and political care and sensitivity regarding what delimitations, sites and objects of study one chooses, as each always involves exclusions and also potential occupations of one form or another.

Much of the work of this dissertation is given to the task of describing and addressing what are treated as compound and compositional sets of affordances, to work through their intersecting points of actualisation and interpretation. In its political drive, such an exploration and description of intersecting relations of power is carried out with the ultimate intention of highlighting various potential sites of intervention. As highlighted by Kim Fortun, a thorough practitioner of multi-sited approaches, “Working across scale in multi-sited ethnography can produce understanding of the multiple pressure points where systems are subject to change, even if slowly or in ways hard to track. Points of entry light up, so to speak, through multi-sited, open-systems analysis” (Fortun, in Falzon 2009, 83). This approach to studying the intersecting sociotechnical affordances and relations of power is very much of a tactical nature and shares this aim to seek pressure points in the practices it studies. Furthermore, in its working to attend to the specificities of the cases as they present themselves, it has also ended up becoming a fairly concerted attempt to bring together fields of study that, in some cases, have not seen much interplay with one another. Certainly it has been the experience in this research that the intersecting approaches they provide for both the description and call for intervention into issues have been powerfully informative for the approaches developed in this research.

CHOICE OF CASES

Before very briefly summing up this chapter, some short motivation regarding the reasons for the choice of examples can be given. While ostensibly quite varying in nature, all of the examples looked at here are examined via the approaches discussed in this chapter. Each example always involves attempts at descriptions that work to particularly address the multi-sited and intersecting qualities of power relations that can be seen to inform and further emerge from the executing practices in question.

The Like button as a way into a discussion of Facebook as a platform presented itself after the lengthy expositions on execution in the chapter preceding it. It was not the intention to go into the massive construct that is Facebook at all, however in the midst of looking at a series of what might be thought of as somewhat more obscure sites of execution that the first section of this research explores, the Like button gradually presented itself as an intriguing mainstream example of a prominent site of execution. Given Facebook's hegemonic status as a dominant actor in computational and networked media, it also immediately felt useful to take on this example within the context of the research. In terms of the use of Diamond Reynolds' livestream of a police shooting, as further described in the chapter, I had been following the issue of the police shootings and their discussion in various corners of the media quite closely. Having been in the middle of writing considerably on Facebook and also issues regarding the visual politics of certain representations of the situation in the Mediterranean Sea, when encountering this livestream for the first time it felt relatively unique in the context of the other police shooting videos and also something that might be of help in further developing and also linking issues from the section on Facebook to that of the Mediterranean Sea. The issue of the policing of migration in the Mediterranean Sea become a dominant political problematic of the years in which this research was carried out. Not only did it push its way into this research, but it had an important effect on reshaping much of an overall shift that happened around the halfway stage in this research in turning the overall focus to issues of politics and power.

In both the next section on the question of execution and the section following it on Facebook as a platform, several examples from the field of so-called media art (art practices that have an overtly media or technologically-orientated bent to them) are turned to as useful exemplars for considering the issues under discussion. These practices and works tend to be invoked for the ways in which they are able to both concretise and also further intensify the problematics under consideration, often intentionally undercutting the sometimes dense theoretical considerations with what might be seen as their shared quality of being relatively simple in design and execution. While not discussed in this

research, this research was also informed by occasional artistic forays on my own part. These included the writing and coding of a recombinant, radio-play style script for live performance (with Talan Memmott and Sonny Rae Tempest), a “dictionary of un-” generated via data mining (with Mahmoud Keshavarz), a knife-mounted instruction pointer on wheels featuring “real” and “protected modes” of operation (with Tony Olsson), a performative meal addressing themes of computation and the sea (with Fran Gallardo, Helen Pritchard and Magda Tyżlik-Carver), pedagogical forays with colleagues at UnderAcademy College, and other similar small-scale experiments that often, in one way or another, acted as further entry ways into engaging with many of the practices being considered here.

This chapter on theoretical points of departures and approaches developed within this research has attempted to frame and summarise what lies ahead. The emphasis will be on the material discursive, intersecting and compositional nature of multi-sited forms of computationally-afforded situations and the particular ways in which certain relations of power and expression can be seen to take hold and achieve dominance within particular executing practices. In its media genealogical mode of problematising the often dominant and stabilised objects of its interest, it hopes to engage with and potentially rethink or further develop an understanding of what exactly goes into a particular executing practice, bringing the sometimes readily glossed over elements and relations in these practices into view. Simply changing one small design element, such as the ticker that counts the number of Likes in Facebook (Benjamin Grosser 2012, *Facebook Demetricator* – discussed in the section on Facebook), can radically change the interactions with and relations formed within a media experience. Studying what goes into something like the attempt to produce a surveilling technological picture of the Mediterranean Sea can be a route into many other related areas of study, such as the politics and infrastructures of production, globalisation, economics, etc. It can be of help for marking out certain situated sites and techniques within these relational flows and processes, pointing out tangible routes towards intervention, change and renewal, as well as alternative potentials for individual or collectively mediated expressivity.

Execution breeds execution. It shifts across sites and scales, injecting its material discursive actualisations and energies into existing and emergent forms of relations. The work here is an attempt to capture these exchanges of lived and enacted execution in the world, whether one is speaking of their discernible and predictable orientations or the ongoing and fugitive forms of resistance and uncertainty that push them in different directions. The Like button is a compressed unit of computational expression engineered and projected across a network of executable

relations. Its projection is charged by certain wills on the part of its makers, but it too is subject to other compositional energies of power and relationality. A technologically orientated practice of policing the sea can work to both contain and bend materials and bodies to its will via its particular coercive infrastructures, just as these bodies can in turn work against, around or even willfully through such practices, and in doing so orientate anew the relations at play. All executable processes carry in their material discursive actualisations the marks and scars of histories of interaction as well as the volatile and situated uncertainties present in any executing practice. Always, even in the most oppressive or hegemonic network of relations, a continual testing and working out of further energies, agencies, relations and their emergent modes of the executable.

COMPOSITIONAL QUESTIONS OF EXECUTION

3 SITES OF EXECUTION

In this opening section, the concept and practice of execution is considered from a series of perspectives and examples. Execution will be developed here as a concept intended to stand for the actualisation of a particular set of affordances and relations, what this work describes as the compositional affordances that present themselves during an ongoing process of making things executable. The chapters will look at the ongoing encounters and negotiations that can be seen to arise in this process of making things executable, highlighting certain key techniques and practices of execution, such as the foundational “cut” of making things discrete, as well as the coercive tasks of enclosing, refashioning and moulding over the various entities and procedures an executing practices works to include in its executable domains. A further recurring point that arises in the chapters is the way in which executable practices of one kind or another can be seen to be executing within a network or ecology of other executing practices and relations, with one domain and regime of execution often overlapping, spilling over and cutting into others.

In order to capture this lively nature of execution, the opening chapter intentionally adapts a mode of shifting its focus from one site of execution to another. As described in the previous chapter on approaches, this can partly be understood as a “multi-sited” approach, one that reflects what it sees as the multi-sited nature of its object of study. The reader should be warned that, especially early on, these shifts from one site and concept to another are at times quite abrupt, but that over time it is hoped that a certain continuity starts to carry over from one shift to another, as recurring variations on a theme gradually start to become evident. The intention over the course of the chapter is to build up a sense of execution in the world, and in doing so, to consider how it helps one to further consider this research’s main focus on compositional affordances, particular as it relates to intersecting issues of technology and power.

Despite the regular shifts from one site of study to another, there will be some recurring figures that will be returned to. These include the concepts of Karen Barad, as well as Alan Turing’s foundational works on computation and contemporary artist Martin Howse’s work on execution and executability. It is from Howse that the notion of “shifting the site of execution” is directly adapted from.

Much of the thinking for this chapter has been and continues to be greatly informed by involvement with the “Critical Software Thing” research group of friends and colleagues (<http://softwar->

estudies.projects.cavi.au.dk/index.php/CriticalSoftwareThing), with whom I have been involved in arranging a series of symposia, workshops and exhibitions in which we engaged directly with a theme of execution from a variety of perspectives, particularly those of artistic research. This resulted in the book *Executing Practices* (Pritchard, Snodgrass and Tyžlik-Carver 2017), in which the interested reader can find many more reflections as well as artistic practices working with the theme of execution.

Initial work from this chapter on the practices of Martin Howse was also presented in 2014 at the FIELDS Exhibition and Art+Communication Festival (theme: “Renewable Futures”) held in Riga and Liepaja.

INSTRUCTION POINTER

Execution. The act of carrying out a set of instructions.

Execution. The act of carrying out a set of instructions in a step by step fashion.

Execution. The automated act of cycling through a set of machine-readable instructions in a step by step fashion.

Execution. The automated act of cycling through a set of machine-readable instructions (logically encoded character-chains fetched from stored-program memory) in a step by step fashion (making calls upon the memory for relevant operators and storing any resultant operands back in memory).

Execution. The automated act of cycling sequentially (in a time co-ordinated process) through a set of machine-readable instructions (logically encoded character-chains fetched from stored-program memory) in a step by step fashion (making calls upon the memory for relevant operators and storing any resultant operands back in memory), whereby any actions are made effectively decidable (capable of being interpreted by a logical decoder) according to the parameters of the active instruction set.

Execution. The automated act of cycling sequentially (in a time co-ordinated process determined via a pulse whose period is established by a phase distributor) through a set of machine-readable instructions (logically encoded character-chains fetched from stored-program memory and placed in the executing command circuits) in a step by step fashion (making calls upon the memory for relevant operators and storing any resultant operands back in memory), whereby any actions are made effectively decidable (capable of being interpreted by a logical decoder whose signals address the instruction pointer to the component

on which the instruction operates) according to the parameters of the active instruction set and repeating such cycles for as long as they continue to remain effectively decidable or until there are no more instructions to execute (the instruction pointer points to the end of the instruction sequence).

PROTECTION AND PROVOCATION

Writing on the introduction in the early 1980s (and then regular inclusion) of what was termed as a “protected mode” feature within what is the still common x86 family of instruction set architectures,⁵ media theorist Friedrich Kittler ([1991] 2006) indicates towards ways in which logics of enclosure can take hold in computational systems. In the example that Kittler is looking at, the enclosing logic in question is the implementation of a built-in restriction that further removes users from the “real mode”⁶ of ostensibly full access to a computer’s Von Neumann architecture.⁷ Protected mode style features, typically referred to as executable space protection, can be implemented in a variety of ways. In the example that Kittler is referring to, it is a technique applied within the central processing units (CPUs) of computers to segregate areas of memory by marking them as non-executable, such that an attempt to execute machine code in these regions will cause an exception. The NX bit (“No-eXecute”) is one example of this. In contrast to such a segregated system of restricted access, in real mode a user should ostensibly be able to access and address all areas of memory without any protection mechanism being employed.

In an ongoing series of experimental works, artist Martin Howse interrogates the nature of computational enclosures, with their “separation of users and of their desires and affects,” and how “The possibility of transferring execution outside these sets of containers or black boxes into the world is resolutely denied” (2013a). Many of Howse’s works can be seen to highlight a key question to be addressed in regards to the nature of computation in the world. As Howse characterises it in an interview discussion:

One question I’m very interested in which you could say fuels my research is to ask where exactly software executes. Where exactly do these seemingly abstract coded processes which seriously effects our lives, where do these take place? At first it seems simple, somewhere inside this machine or black box, a laptop, a smartphone, but looking at it closer there’s no easy answer. And I feel that this answer has to do with our skin and the Earth. (Howse, in Sayej 2013)

For Howse (with a direct nod in his notes to JG Ballard’s *Crash*), one method or exploit for triggering a reacquaintance of the immanent fault lines of such a question is the act of shifting the

5 A still regularly used family of backward compatible instruction set architectures introduced in 1978 by Intel with the release of their 8086 central processing unit.

6 Like the tightly wound psychoanalytical schematics of Jacques Lacan, protected mode can be seen to act here “as both the enemy and co-existent partner of a Real Mode” (Kittler 2006, 359-60).

7 A stored-program computer for the processing, transmission and recording of inputs and outputs in which numerically encoded program instructions and data are stored in the same read-write, random-access memory and accessible via a common bus. Protected mode style features indicate towards a general trend of modifications to the Von Neumann architecture, with one common modification being that of the Modified Harvard Architecture, which involves the implementation of a memory hierarchy via a CPU hardware cache that allows for certain separations of instructions and data (typically for speed or security reasons) while still retaining the flexibility of a unified address space that an underlying Von Neumann architecture gives.

site of an executable process from its typical or stabilised domain to a less typical, less stable one. To this end, Howse carries out a range of experiments that, in one way or another, work to shift computational sites of execution into “new material (data), outside the particular confines of a trusted and identifiable process or skin” (Howse 2013a). Beyond simply shifting the site of execution, Howse can also be seen in these works to be continually foraging for and repurposing such shifted arrangements towards alternative conceptions and sites of the executable. Looking at almost any of Howse’s projects, a lingering question can be seen to take root: *What is executing here?*

Figure 3.1. Martin Howse’s *pain registers* (2011). Images courtesy of the artist 2016.

⁸ Accompanying statement to a short video by Howse (<https://vimeo.com/86690846>) on the `ptrace()` call: “Date of origin: 1979. Author/inventor/context: Seventh Edition Unix, Bell Laboratories. An operating system call, first implemented in Version 7 of AT&T UNIX in 1979, which allows one piece of software (the parent) to observe, control, examine and alter any aspect of another process running on the same operating system. The `ptrace` call is commonly used to debug running code and can be considered as an active language, infiltrating and interrogating, snooping on and injecting code into living, running processes; an active language projecting a potential process promiscuity within the machine. `Ptrace` shifts the site of execution and is nowadays commonly viewed as an unnecessary security risk.”

The above images are from documentations of Howse demonstrating the workings of his piece *pain registers* (2011), which uses the `ptrace()`⁸ system call to make readings of the opcodes (operational codes). Opcodes are the portions of machine language instructions in an instruction set architecture that specify the operation to be executed by a processor (e.g. an operation might be “read,” “write,” “add,” “jump,” etc.). In Howse’s characterisation of them, opcodes are the “bare logical bones of computation” located on the “questionable surface which divides software and hardware” (Howse 2013a). The `ptrace` system call ostensibly

allows one piece of software (the parent) to observe, control, examine and alter certain aspects of another process running on the same operating system. In *pain registers*, the readings of the opcodes running on a computer CPU are promiscuously transposed, with Howse shifting the site of execution of code from the instruction pointer over to a machine-operated needle that carefully executes an up and down rhythmic pricking upon the skin of its user, writing patterned, piercing inscriptions on the skin's surface according to the currently executing processes running on the user's computer (such as the booting up or closing down of a Firefox web browser). The contraption concretising and making operable its pointed materialist problematic.

This is in part a kind of reanimation of the semi-mythical "killer poke" from the earlier days of a less materially protected form of computing, in which "The computer crash originally referred to the disastrous impact of the hard disk's read/write head on the shiny, information-rich surface of the hard drive platter ... eliciting violent hardware destruction" (Howse 2013a). With echoes of Kittler, Howse contrasts such a materially present crash with the more enclosed nature of the crash as it came to be presented at the level of software in the standard operating systems of the day (such as the "Blue Screen of Death" of Windows operating systems):

The promises of the word made flesh are denied in a necessary crash; the crash of the operating system is some kind of fraudulent non-accident, designed to avoid the Ballardian collision and miming the same faked revelation or exposure of the pornographic, designed and enacted to draw to a halt any potential perversion of the instruction pointer, before it gets out of hand. Crash appears as original and volcanic revelation, yet uncovers only another unpierced skin layer; in both cases, only more protocols. (Howse 2013a)

As hinted at in *pain registers*, for those users spared/denied of the pains and vicissitudes of computing, whether due to choice of software and hardware and/or because of a certain privilege that keeps them at the higher end of the speed and computational efficiency spectrum (and far away from both the manufacturing sites and waste dumps of computation's political economies), the shifting of sites of execution can bring about potentially painful and intimately charged events. The simple conceit in the work being to highlight execution's always tentative stability and make it vibrate in a potentially more tangible and evocative fashion.

In a general sense, execution in computing can be understood as involving some kind of privileging of a discrete and symbolically enumerated logic of enclosure in the name of executability, defining the rules and limits of its procedures, and in doing so, creating various kinds of executable entities and processes.

In this understanding, execution is a programmatic imposition of which it is to be the embodiment of, the execution in question aiming to make operative the inclusions and exclusions of its particular executable makeup. Further more, and crucially, execution is not merely the computability of something but the actual practice and execution of this computability in the world and over time; each instance of execution bringing the wound-up velocities of its established logical abstractions into contact with the frictional and situated materials of its executing encounters. An ongoing interplay of affordances and potentials whose various ensembles of entities involved in its operations act as further situated and compositional bearers of a certain propensity and potential for execution.

At the same time, as shall be further explored throughout this section as a whole, an understanding of execution is subject to interpretive viewpoints. Push an electrical engineer on what execution is and you will most likely receive a different answer than that of Java programmer or a researcher in software studies. Similarly, the explanations of “the executor” of a particular process would likely differ from those of “the executed” of said process. As such, discussions of execution throughout this research continually turn to considerations of perspective, power relations, situated specificities and the generative ways in which all of these dynamics continually form and inform a notion and practice of execution in the world.

Questions and problematics of interpretation are inevitably a central point of discussion for most discursive and disciplinary endeavours. In the early twentieth century however, as witnessed in much of the emerging work at the time in fields such as linguistics, mathematics, physics and the arts, the question of meaning-making and interpretation can be seen to have become a particularly pressing and formative one. In his paper “On Computable Numbers, with an Application to the *Entscheidungsproblem*” (1937), Alan Turing was able to formulate his breakthrough description of computation and a sketch of its practical application in the form of a “universal machine.” As with Howse’s contraption, there is a pincer-like quality to Turing’s formulation. Georges Ifrah, a historian of computing, captures it as follows: “The real genius of Turing’s invention is the fact that he invented both the abstract form of a revolutionary device and the mathematical concept which allowed the device to be analysed: the theory and its application were unified from the outset. It’s as if Archimedes had invented the principle of the lever and the lever itself at the same moment” (Ifrah 2001, 278-9).

Such theories of Turing’s,⁹ as well as those of the likes of Kurt Gödel and Niels Bohr before him, bring to life powerful models of interpretation and execution. Furthermore, the crucial questions of constraining perspectival limits that each highlight can

⁹ Turing’s name and work is often invoked in this writing as a stand-in for what can easily become an ever-expanding list of a range of actors involved in various key achievements regarding both the theoretical horizons and practical materialisations of computation.

be understood as being generative in nature, as provocations and incitements towards further queries and inventive responses to the dynamic encounters of execution as it presents itself at any particular instance. As Elizabeth Grosz describes it in her reading of Jakob von Uexküll's biosemiotic theories, an organism's milieu "is an ongoing provocation," with an organism's own existence to be understood partly as a "provisional response to that provocation" (Grosz 2008, 44). Or as French philosopher and physician Georges Canguilhem was exploring in his 1952 text *The Knowledge of Life*, the way in which organisms are formed and informed by the problems posed by their milieu is constitutive of their being in the world.¹⁰ The same compositional problems and provocations can be understood to further apply in a similar fashion to executing agents of various kinds, be they organic, computational and the many ensembles of relations that emerge and cut across such categories of determination.

10 In Foucault's formulation of a genealogical method of problematisation we detect here Canguilhem's profound and lasting influence on Foucault. See also Gabrys's (2016) chapter on "Animals as Sensors" for a particularly helpful reading of Canguilhem's thinking on this issue of organism and milieu as it relates to questions of technology.

Figure 3.2. Screenshot stills from "A robot amongst the herd" video by the Australian Centre for Field Robotics (2013), portraying a pilot investigation regarding the behavioural responses of dairy cows to a robot

At the same time, theories such as those of Turing, Gödel and Bohr involve what might be seen as a rather leaky form of stabilisation in the name of practical execution. Namely, that for any formalist discursive endeavour there will inevitably exist truths that are not accessible by the same system that implies them. Just as the machine cannot read and write code at the same instant, formalisation can be seen here to come up against a kind of tantalising gap between its expression and execution, just as its discrete makeup is itself contingent upon a continuous flux and iterability of things (Mackenzie 2006, 36-7). In the very undecidability of their nature, such theories and their actualisations point to a generative power of execution as it continually churns across a spectrum of interactions. An ongoing moulding, feeding off of and puncturing of executing lifeworlds that indicates towards discourse as materially orientated and materiality as subject to its own ability to be discursively marked and formed. An interfacing and marking of bodies upon one another. The forcing or mere leaking of energies of interaction across entities, systems, flows and experience. And in the process, the potential coalescing of newly fused ensembles and ecologies of the executable that

emerge from such interactions.

(...SKINS, BODIES, TAPES, HANDS...)

Howse is continually after ways of bringing the materialities of executable practices to the fore. Thus skin, as a notably sensitive and markable surface, is a site of interest for Howse because of its quality as a thing “to be pricked, pointed to, mined, excavated and extruded, in order to test, engineer, show and expose precisely something” (Howse 2013a). In *pain registers*, this pricking involves not only the code calling the `ptrace` function but also the creation of the modified hardware setup that acts as “an appendage or code prosthetic” for translating the opcode values into “needled plunges.” In order for skin to take on its quality as skin, various organs, appendages and other extensions and externalisations must form so as to be able to touch upon (in one way or another) and thus partly point towards its quality as skin, as the epidermal border around which markable bodies have for so long been demarcated.

Building further on Howse’s notion of it, an executable enclosure can be thought of as the establishing of a discretely defined site, but also in turn as a kind of skin, a surface, a grid, a volume, an object, a body, etc. A similar quality of bordering can be seen to work itself into Turing’s machine model, which requires its site of discretely arranged tape, with which an instruction pointer can read and write its instructions for operation. In this way, a key function of the tape is twofold, providing (1) a layer of discretely contained and enclosed areas that (2) have the ability to be marked. The instruction pointer points to one set of computable instructions after another in a mode of execution, with the instruction sets having necessarily bounded parameters of one kind or. In doing so, it mobilises various pacts of structural impositions, both intensive and extensive, while also having the potential effect of making amenable and consolidating certain entities and sites into its operating regime. Where it is effective, a practice of execution has the effect of incorporating such sites into its material discursive registers, making them amenable to its operating regime. Where execution meets resistance, it is often a question of recomposing either the program and/or the executable bodies in question (with the application or threat of pain as a knowingly effective measure in the case of many organic bodies). Bodies then, as demarcated entities within a particular system, are notable sites and material discursive loci that can act as productive points of entry for studying the heterogeneous workings and executing processes involved in a certain situation.

In the case of *pain registers*, the human body and its sensitive encasements of skin and nerves act as a particularly suggestive site for engaging with Howse’s ongoing interest in interrogating a notion of execution in computing, the needle becoming here a

rather tangible instruction pointer for better impressing its mode of execution onto the user (not unlike the harrow of the execution apparatus in Kafka's *Penal Colony*, to which Howse also makes reference in his writing). Indeed, Howse sees *pain registers* as pointing towards an even older computational reference, with its punctuating of executing processes upon the skin of its user enacting a "knowing reversal of the operation afforded by the punchcard, that other surface lying historically at a beginning for user software with Jacquard's loom" (Howse 2013a; Jacquard and punched cards will be discussed further in the chapter following this).

In speaking of bodies and skin here, the point is to intentionally interrogate and infuse traditional notions around bodies and skins with aspects of the computational, while also retaining the quality of each as notably sensitive and markable sites of execution within an executable operation. Gayatri Chakravorty Spivak (in conversation with Ellen Rooney) highlights both the seeming impossibility yet strategic task of tracing a notion of the body within what she describes as an ecological perspective:

The body, like all other things, cannot be thought, as such. I take the extreme ecological view that the body as such has no possible outline. As body it is a repetition of nature. It is in the rupture with Nature when it is a signifier of immediacy for the staging of the self. As a text, the inside of the body (imbricated with the outside) is mysterious and unreadable except by way of thinking of the systematicity of the body, value coding of the body. It is through the significance of my body and others' bodies that cultures become gendered, economicopolitic, selved, substantive. (Spivak 2009, 22)

In other words, a body always exists in iterative relation as opposed to singular isolation. As Foucault describes it, "The body is the inscribed surface of events ... the locus of a dissociated self (adopting the illusion of a substantial unity), and a volume in perpetual disintegration" (Foucault 1984, 83). It is a site consolidated in relation to ongoing and intersecting material discursive forces. In studying how a set of relations and processes might be described as taking on a *significant* body of one form or another, it can become possible to explore these very relational and perspectival qualities of the executable via the potential entry points of such significant bodies. As indicated by the Spivak passage, working under the sign of body is also potentially useful because of its readily political ability to bring into play issues of power relations and the way in which bodies are inscribed upon and made subject to such relations in very material and substantive fashion.

Adrian Mackenzie, in his book *Transductions – Bodies and Machines at Speed* (2002), provides several helpful ways for think-

ing through a notion of bodies in relation to and in tandem with notions of technicity. Building on concepts from Gilbert Simondon and Judith Butler, Mackenzie highlights the processual nature and relationality of objects as they are actualised within an ensemble of many other active, relational parts. Given that, as Donna Haraway highlights, “the body is simultaneously a historical, natural, technical, discursive and material entity” (Haraway 1997, 59), bodies are then bound to figure as “sites of complication” (Mackenzie 2002, 7) in which the intersections and knotted contestations of various intersecting and mutually constitutive forces (discursive, material, technical, political) can be seen to be continually at play. In order to work with these complications, Mackenzie points to Gilbert Simondon’s explicit focus on ontogenesis (how something comes to be) over that of ontology (what something is). In such a mode of thinking, the focus is placed on a unity of becoming rather than a unity of substance – the temporarily attained metastability, rather than any permanent stability, of the object of study. Building on Butler’s notion of performativity, Mackenzie highlights how such a processual metastability is achieved via repetition and iteration. A body takes shape via the comparatively sustained and stabilised executions of a particular discursive take that materialises and supports its capacity as a recognisable body within the executable sets of relation in question. Such “corporeal repetition and citations” help to stabilise and establish what counts as a body that matters and what does not, thus simultaneously filtering out and refusing other potential bodies in the very processes of repetition and iteration (39).

Mackenzie’s aim in working with these concepts is to develop a notion of transduction and how technicity works its way through and across what become the individuated, metastable border spaces and sites of intersecting forces within such networks and ecologies of executable relations. Bodies act simultaneously as agents involved in the demarcations of such individuated borders and also as key sites upon which the interpretive work of transduction occurs (as in the case of a “user interface”). They are both compositional and composed; sedimented sites and notably sensible and generative interfaces in which the relational and the processual can be traced over time. They might in certain material discursive networks take on the relatively hardened skins of a Boolean system of true and false (e.g. true=inside said defined body, false=outside said defined body), or they might be more dispersed, continuous and/or fuzzy. Networked and computational media, despite their now even more seemingly malleable ability to configure and reconfigure nevertheless still form in relation to certain resistive sets of rules, protocols and perspectival logics that play out across an array of resistive discourses, materials, competing processes and bodies which they come into contact with. In such processual negotiations, one sees the ongoing com-

positional interplay of affordances and their potentials, whether of the human body or at other scales, such as the expressive capacities and limits of the media inscription networks of the time, or the environment and its ostensibly indifferent yet nonetheless virulent, formative processes of entropy and exchange.

In this respect, a site of execution is any material discursive locus that has taken on a form of substantial unity within those executing ecologies from and within which it is formed and gives further shape to. This perceived unity is achieved via a taking on of finite qualities out of the multiple possibilities that any particular instance and range of material discursive forces affords. A site is also a site in the sense that it has a particular kind of executable addressability within these systems. Finally, as a material discursive point of execution, a site is notable for the manner in which it both marks and is marked. This perceived unity of a site is however always in motion. Sites are conjoined and held together by the intersecting processes which they are a part of. They are shaped and reshaped over time; open to both assembling forms of material discursive sedimentation and projective enclosure, as well as comparatively disassembling forces of contingency, entropy and emergence.

In transductions such as Howse's, a particular shifting of the computational occurs via the demarcating of a site in which a readily visible contraption forcefully compresses aspects of computation onto what Donna Haraway has described as "the data structures that are our bodies" (Haraway 1997, 62), making sensible certain contours of execution and its power to change things through this very act of shifting the computational. In the example of *pain registers*, such a shifting of the site of execution is actualised with an explicit goal of registering certain "pains" and the formative, if often invisible, expressions of discourse and power that these computing processes manifest in their every execution. Given the way in which a large majority of computing today transpires for the everyday user at a level in which many such interactions occur in relatively restricted and virtualised interfaces, whereby the so-called back-end runnings and workings of computational processes occur at often relatively inaccessible or remote removes and speeds, it is not surprising to see Howse and others working to explore a sense of shifting and making tangible certain sites of execution. As Mark B.N. Hansen (2004) has argued, at a time when media convergence, under the leveling sign of software and digitality, seemingly loses much of its material specificity, it is perhaps not surprising to see the body posited as one still relatively distinguishable framer and processor of information. In this regard, *pain register's* shifting of the site of execution from the CPU's instruction pointer to the skin can be read as enacting a performative method of materialising the cybernetic epistemology of a "unit" of information as "a dif-

ference which makes a difference” (Bateson 2000, 315-318) via the self-same cybernetic apparatus and onto the user’s hand, so as to account for a sense of difference as “marks on bodies, that is, the differences materialized” (Barad 2007, 89). A method of execution that brings computability and the materials for its executing practice into direct and active exchange, creating in the process what Howse identifies as “sites of execution” via the kinds of agential cuts that Barad elucidates (discussed in further detail in the next few pages). In the case of execution, the enacted cuts involved will include, amongst others, the particular contours of logic and computability as they have been prepared and arranged into the executing machine code and its integrated moving physical parts. With sites of execution as the materialised points of contact (or even piercing collisions) of these cuts as they inscribe and articulate their executable qualities amidst other active ecologies of execution.

Bodies, sites and systems take shape in relation. In tandem with the spatial notion of marks discussed here, one can also consider the temporal dimensions of relationality. For instance, in *pain registers*, Howse specifically slows down the micro-temporal processes of execution occurring in his transduction of them from the machine over into the needle plunger and onto the skin, partly for the practical and performative purposes of his barebones physical arrangement, but also so as to set a suitable rhythm of intensity that captures the overall intention of the piece.¹¹ This perspective of varying speeds and intensities again highlights bodies as relational entities with varying capacities to take form in a diffractive network of other relational entities and speeds.

By treating as bodies and sites a range of what are in many instances very different forms of entities—ranging across now well-demarcated categories of the human to the non-human, the organic and the non-organic, and so on—the intention is not to suggest some kind of non-situated, flat ontology of comparable relations nor to enact an erasure of the specific make ups and workings of particular entities via too easy comparisons. As Donna Haraway, Karen Barad and a range of others working in traditions such as science and technology studies and elsewhere have long made clear, “Devices and apparatuses ... always come to us as already sedimented layers of intra-actions, which means that they are already marked with an intended purpose, a set of meanings, and an already specified relationship to the material world” (Anne Balsamo 2011, 35). These sedimented layers, relationships and the various forms of agencies which they envisage always involve asymmetries (Lucy Suchman 1998) of one sort or another; both at the level of the bodies in question, the already active and orientated ecologies in which they are situated and the relationships and agencies that they take on and develop within these intersecting layers of affordances. They highlight how the

¹¹ Artistic pieces working with themes of speed and computation are numerous, but Ryoji Ikeda’s large scale installation work *The Transfinite* provides one of the more memorable examples of a piece exploring what might be thought of as the transcendental qualities of numbers and computation as they present themselves to the comparatively more finite and slow bodies of their human subjects.

establishing of material discursive boundaries and identifiable bodies in the name of executable actions is never innocent, objective or independent from the world of relations in which an executable process and its sites of execution both emerge from and participate within.

Executing forces and agents of any particular time and location solidify by incorporating and making substantial their various bodies, sites, architectures and apparatuses of power. In this sense, Barad's emphasis on "marks on bodies" is constructive for the way in which it keeps to the fore a sense of the materialised effects and the genealogies of scars and lineages that coarse through and spill over from one generation of marked entities to another. It calls for a sense of responsibility geared towards interrogating the ongoing potential violence of enacting material discursive marks on bodies, considering in the process the existent and potential asymmetries involved in any operable cut enacted and how the difference that *matters* is often located in material differential logics as they take hold of and inscribe themselves upon a range of bodies and practices. Part of the reflection to be done in this respect (whether from the perspective of a researcher studying such material or that of programmers, designers or politicians thinking through the implications of an executable system) becomes that of keeping to the fore the potential of such regimes to become a "system of marks" (Colette Guillaumin 1995) – an engine for the production of material discursive power relations and their systems of distinction and differentiation.

As is often highlighted, many of the most formative technologies developed to date have emerged from the scarred laboratories of the battlefield. And as discussed in the final chapter in this section, Turing, situated and immersed as he was in the liberating playgrounds of theoretical and applied mathematics, was of course a particular body at a particular time. So too the "universal" machine, as it gradually materialised to various degrees in its history and across various sites and points in time. Indeed, the central notion of changing states in a computing machine is often strongly felt by those entities brought into contact with such executing logics. Turing himself was made acutely aware of such an executive power of codes: whether programmable, political or cultural. Definable as a war hero according to one set of patriotic configurations, he soon found himself rapidly switched from national saviour back to that of sexual deviant and criminal body to be chemically castrated by the state. Computable according to some logics and configurations, incomputable and thus in need of reconfiguration according to others. Such is the potential power and violence of any cut and its executability, for which an attentiveness to marks on bodies and a study of these marks and their sites of execution is meant to attend to.

THE RELATIONAL AND ACTUALISING CUT OF EXECUTION

As has been highlighted, execution is both a cutting out in order to make executable and actualisation and following through with this executable cut. The enactment of what is here described as the relational cut of execution is in service of making both processes and their intended materials executable according to the particular perceived operations and logics of the executing task in question. This potential for tension and resolution between executing entities points to a perspectival aspect of execution and also its quality as making necessary distinctions and marks upon bodies.

Consider the originary interstitial gap that Turing's (1937) computing model opens up, with its mandate of discrete elements capable of being enumerated and made into effectively calculable algorithms for execution upon and by computing machines. As a machine that cuts so as to count, the task that digital computing sets engineers is originally that of rendering various forms of analogue hardware (vacuum tubes, transistors, etc.) signals into discretely readable units whose determinations can be accurately analysed and reliably carried out from one step to another. In this materialisation of Turing's thesis into actual computing machines, the act of making things discrete, so as to be computable, becomes one of establishing machine-readable cuts: the switchable on and off state elements, or "flip-flops" executed via logic gates used to store and control data flow. Such switchable and readable states constitute a practical material basis that allows for the writing and running of executable binary instructions of machine code upon a computing machine. This first cut of the discrete model of a universal computing machine is one of its key structural conditions, in an operational and material discursive sense, and finds a productive breakthrough and seismic materialisation in computational form via its giving birth to what Kittler describes as this "manic cutter known as the computer" (Kittler 2010, 228).

Executability in this standard model of computing requires that the range of material discursive entities that it might engage with can be made amenable to its requirement of making things, in one way or another, discretely definable within its system of interpretation and operation. As Alexander Galloway has put it,

[The digital] is the basic distinction that allows us to make any distinction at all. The digital is the capacity to divide things and make distinctions between them. ... The making discrete can come via separation, individuation, exteriorisation, extension, or alienation. Any process that produces or maintains differences between two or more elements can be labeled digital. (Galloway 2012)

Technically though, as Turing and John von Neumann were both well aware of, when comparing what Turing describes as

the “idealised machines” of his formal descriptions of “discrete state machines” to their instantiation into “actual machines,” the very materiality of these machines means they are of course not actually discrete. “Strictly speaking there are no such machines. Everything really moves continuously. But there are many kinds of machine which can profitably *thought of* as being discrete state machines” (Turing 1950, 439-440). Actualising discrete models of computation in the world thus always involves a negotiation of the various continuous properties of materialities of various kinds, with all such distinctions being made in the name of a deemed profitability on the part of the executing agents in question. As will be discussed in the next chapter’s focus on coercion, such a material discursive productivity on the part of computers working to create reliably readable discrete states is typically only achieved via a constant disciplining of the many unpredictable elements at play in any executing endeavours.

Philosopher and theorist of science and technology Karen Barad gives the name of “agential cut” to any acts of separation and distinction in the name of executability. By naming it so, Barad aims to highlight the ultimate impossibility of a clean cut and separation between an independent subject and independent object, and instead situates the ultimately relational nature of phenomena as the ontological ground from which “intra-actions” might then be discerned via any particular agential cut. The term intra-actions is purposely employed by Barad so as to distinguish it from a notion of interaction, “which presumes the prior existence of independent entities/relata” (Barad 2007, 139). As Barad elucidates, this understanding of cuts as agential and entities as intra-active is particularly notable for highlighting the way in which, “Matter and meaning are not separate elements. They are inextricably fused together” (3). In other words, interpretations and their executing practices are dependent on the compositional affordances of materials and devices whose operations are themselves dependent on the actualised affordances of the components that make them up, all of which are in turn moulded and informed by further technical, social and material discursive forces and relations of any particular moment.

The relational cut of execution always enacts productive and generative marks of one form or another. In attempting to temporarily isolate sites of execution as well as a general explanation of sorts for execution, one aim here is to interrogate a notion of execution and executability by tracing its material discursive power across so-called levels of abstraction and into their situated executing forms and enactments. The example of Howse’s *pain registers* is highlighted because of the way in which it helps to foreground particular sites of execution, with the focus in this example given to a sense of marks on bodies – the fairly precisely defined points and piercing sites of execution in relation to a

body. In speaking of marks on bodies, the focus is not simply that of marks on human bodies, but rather any potential body constituted within a particular executable process. It is in such a fashion that one can speak of a planet as a body or of a body of sea, in that each is deemed as having its own productive relational qualities and relatively distinguishable metabolisms that can be assigned within a certain demarcatable container. Technologies also acquire bodies via which they execute their particular functions. As with any such materialised entity, a technology comes with its own genealogy, and in its taking on of material form, a technology, like other bodies, is itself marked. As a body in this sense, a technology is never simply a passive product of the discursive practices in which it is put to use, but rather takes on the active qualities of the matter and relational ecologies in which it comes to being within and is a part of – understanding ecologies here in the overall sense of this research as the material discursive relations, exchanges and affordances of a particular set of intersecting energies and forces. In the case of a technology, these factors will include the materials with which it is composed but also sociotechnical factors such as the prevailing technological standards, protocols and other interfacial bodies and systems (technical or otherwise) it is intended to come into contact and interoperate with. As a perhaps highly open-ended and often massively distributed body, the technology in question is nevertheless formed and marked in relation to these and other forces, just as it in turn marks and forms those bodies and relations in which it plays a part.

As Eva Hayward describes in her multispecies anthropological fieldwork on working with cup corals (*Balanophyllia elegans*), such a reciprocal material discursive marking of bodies of many different kinds can be understood as the making and imparting of impressions:

The ways species and their constituting senses are impressed should not be understood simply as offering a cozy closeness; impressions are also traces of indigestible beings that feed on signifying practices, populating meaning with multiple kinds of matter. If species are impressions, they are also mediations. Impression registers the reciprocal nature of being touched in the act of touching, as well as the double meaning—as in “having an impression of” or “making an impression on me”—of knowing and being. (Hayward 2010, 581)

A body is processually reiterated and partly “enfleshed” through its transductions of received impressions and its executing of impressions and gestures of its own “corporeal enunciation” (Hayward 2010, 592) in regard to such material discursive inputs and outputs of relations. As Hayward also points out, Marshall McLuhan’s well-known dictum that “the medium is the

message” can be understood as a material discursive declaration, especially if one understands materiality itself as a “transmedium mediation” (585). Indeed, passing through the “prepositional orientations” of activated materials always “creates remainders of filterings that result in texture” and its “unmetabolizable more of animate forces moving across bodies and objects” (585). Marking a body is not a straightforward process, just as enfleshing a signal of communication inevitably involves working through the perceived orientations of matter in relation to the particular assemblages for sending and receiving, as they are currently conceived and as they might be further made to be.

Even a reductionist approach that would posit the collapse of all forms of media specificity into what Kittler (2010, 227), with reference to Vilém Flusser, highlights as the “zero-dimensional” levelling plane of numbers and bits would still have to reckon with the various specificities of different forms of enumeration. As highlighted by Adrian Mackenzie in an article on the applications of differing styles of mathematical functions in computational modellings of the unfolding of flu epidemics, “numbers multiply in multiple ways” (Mackenzie 2014, 189).¹² Or, as Nobert Wiener ([1948] 1965) reminds one, if the minimum condition for communication is contact, then even in what might (comparatively) seem like a zero-dimension of numbers and bits, the very act of establishing an agential and relational point of contact will see the establishing of certain forms of specificity in the name of this contact.¹³ Executability and its actualisation of certain points of contact and execution over others is this constant generation of sites of encounter, each with their particular compositional affordances and agential separations and connections that work through and with these filtering affordances, just as they are themselves worked over by them.

If von Uexküll’s ([1934] 2010) work in the laboratory set off a series of 20th century philosophical trajectories in relation to his famous example of the tick and its perceptive search for mammalian skin to pierce (e.g. Heidegger, Merleau-Ponty, Deleuze, Agamben), one finds in the likes of Howse, Kittler and Barad a diverse but nevertheless at times overlapping range of genealogical enquiries that constitutively bind technology and the mediating qualities of the embodied apparatus to a certain physical struggle that grounds the emergence of any formation of being in its various material supports (body, metal, silicon, earth, etc.). Indeed, much of the richest emerging literature in the field of media and technology studies is able to highlight this sense of bodies—human and nonhuman—as marked and impressed upon. Walter Benjamin’s ([1935] 2008) canonical “The Work of Art in the Age of Its Technological Reproducibility” essay almost single-handedly carves out many of what were to become media studies’ key themes, and the essay is notable for its ballistic sense of

12 Specifically, Mackenzie looks at how the equations of non-linear dynamic system models involve different specificities to those found in statistical models, with the convolutions of each of these modes of mathematics highlighting a general entanglement in which “the flow of numbers through events have definite shapes, textures, and patterns of composition that are endemic to these events” (Mackenzie 2014, 191).

13 See Tiziana Terranova (2004) for a helpful discussion on Wiener and the central propositions of information theory and their relation to issues of culture and politics.

14 One of Kittler's most poignant texts in this respect is his essay "Flechsig, Schreber, Freud: An Information Network at the Turn of the Century," dramatising as it does the intense struggles of German Judge Daniel Paul Schreber (and at a further remove, the eminent Sigmund Freud), caught as Schreber (and Freud) is in the powerful new medical inscription mechanisms and proto-psychiatric techniques enacted across the levels of body and psyche by Schreber's designated neurophysiologist Paul Flechsig.

bodies (human, technological, etc.) impacting other bodies, of each entity attempting to take in and counteract the effects of the other in a landscape of brooding techno-ecologies and their visceral, penetrative architectures of human and more than human energies. Kittler, for all of his at times sneering views towards the user of technology, was nevertheless a disciple of both Nietzsche and Foucault (as well as a child born in Germany during the darkest days of the Second World War), and his writings capture much of the volatile and decisive ways in which technologies mark both their users and also other technologies.¹⁴ In addition to Barad and the example of Reviel Netz's writing on barbed wire, recent noteworthy examples of this marking of technologies and bodies include the various ongoing projects and writings of the Forensic Architecture group that highlight the way in which materiality—the consistent fact that bodies are marked—can be made to act as a witness to historical and present acts of violence.

Geoff Cox, in his critique of software violence, points to the inherent imposition of potential violence in the making executable of systems of communication, in particular for its act of forcing "the thing into a field of meaning that is outside of itself" (Cox, in Pritchard, Snodgrass and Tyžlik-Carver 2017, 51). Part of the use of a method of shifting the site of execution from one stable domain in which it is situated to a less typical or stabilised one is to bring to the fore this sense of difference and the material discursive points of forceful intersection and exchange between executing logics and materials as they coalesce into actively operable practices of one form or another. In shifting the site of execution from the instruction pointer back onto the surface of the skin, Howse provides one such basic but potentially productive encounter in which one might consider again both the material qualities of such computational black boxings and abstractions and also their operative nature, how they indeed work themselves on the bodies of users. By registering a certain sense of pain, in reintroducing a sense of friction and contact in the exchange, the manufactured invisibilities, enclosures and exclusions of the executing practice are brought back to the fore as potential sites for consideration and contestation.

This chapter has introduced a series of figurations for speaking of execution that will be returned to and further iterated upon over the remainder of the text. This includes an understanding of acts of execution as emerging and taking hold within a range of other executing processes and practices. This in turn points to issues of perspectivalism and how any act of execution is an agential cutting out of certain material discursive perspectives and possibilities, with the act of making things discrete and countable being one of the key operative cuts enacted within practices of computation. Part of the intention in this chapter of shifting at times abruptly from one example to another is to highlight the

way in which one executing and material discursive practice can both enclose and fashion entities according its particular workings, but also pierce and be pierced by others. As a way of bringing to the fore the issues that such understandings of execution involve, it might be helpful to finish with one more shift towards an artistic example that can be seen to further work through many of the issues introduced so far.

CUT PIECE

To any list of the world's shortest yet most productive pieces of code, one might want to add Yoko Ono's *Cut Piece*. This canonical work of performance art is set into motion with a seemingly simple line of instruction that serves to initiate an encounter between the designated performer's seated, near motionless and silent self, and the members of the audience in question, who are presented with a pair of outsized scissors with which they are seemingly given free rein to execute the instruction as they see fit. The single-worded program: "Cut."

Original performances of *Cut Piece* took place first in 1964 at venues in Kyoto and Tokyo. The piece was performed again a year later at New York City's Carnegie Recital Hall. In the archival video footage of the Carnegie performance, there is a stand-out moment in which one male audience volunteer purposefully cuts into Ono's dress and even bra with the scissors. Ono appears visibly affected by the man's efforts and it is a particularly tense moment, each cut sparking off scissions of reactive flux, destabilizing the space(s) between performer, audience, female, male, victim, assailant, sadist, masochist, scissor, cloth, art, artlessness, and so on. Each such potential interpretation indicating towards a question of perspective and context, inclusion and exclusion. A seemingly simple but open-ended and fluctuating question: *What makes the cut?*

In the case of this work of Ono's, there are a myriad of compositional affordances one might highlight in order to situate the event of the cut as it occurs in performances of *Cut Piece*. To begin with, the work has been performed on multiple occasions, and while the basic instruction to "Cut" remains the same, Ono provides some noticeable contextual tweaks in her various scorings of the piece. After its initial debut in 1964, a 1966 script presented for the "Strip Tease Show" designates two possible versions for a performance of the piece:

CUT PIECE (1964)

First Version for single performer: average time: 30'

Performer sits on stage with pair of scissors placed in front of him.

It is announced that members of the audience may come on stage

– one at a time – to cut a small piece of the performer's clothing to take with them.

Performer remains motionless throughout the piece.

Piece ends at the performers option.

Second version for audience:

It is announced that members of the audience may cut each other's clothing.

The audience may cut as long as they want. (Ono, in Hendricks 1990, 66)

A few years later, in the 1971 paperback edition of Ono's *Grapefruit* collection, the basic instruction now carries with it a short addendum of archival details and an additional clause on the gender of the performer:

CUT PIECE

Cut.

This piece was performed in Kyoto, Tokyo, New York and London. It is usually performed by Yoko Ono coming on the stage and in a sitting position, placing a pair of scissors in front of her and asking the audience to come up on the stage, one by one, and cut a portion of her clothing (anywhere they like) and take it. The performer, however, does not have to be a woman. (Ono 1971)

These slight but noticeable changes in the contextual framing of the instructions for Cut Piece (comparable perhaps to commenting functions within computer code) would seem to reflect Ono's experience of performing the piece within a variety of contexts and sites (Kyoto 1964, Tokyo 1964, New York 1965, London 1966, and on several further occasions over the coming decades). As Ono makes clear in interview discussions of *Cut Piece*, a cut in the Sōgetsu Kaikan Hall in Tokyo was not the same as one in the Carnegie Hall of New York City:

When I went to London—swinging London, at the time—the minute I put the scissors in front of me, 20 people came up on the stage and made me totally naked. Oops! It depends on the audience really; it's a dialogue between me and the audience.

... It always draws something out of people. At Carnegie Hall, it

seemed to draw violence out of the audience, like a poison. It is a frightening piece to perform.

... the funny thing was, most people thought of the other side, which is the body being violated. But when this piece was performed by Charlotte Moorman in a nunnery, the nuns said, "Well, this is what we're doing." They bypassed the sexual connotation totally and just understood the philosophical connotation and the positive side, which was to be giving. (Ono, in Pfeiffer and Hollein 2013)

As is perhaps becoming evident, a work like *Cut Piece* can be read very directly in relation to Barad's notion of the agential cut and this chapter's general exposition on execution, with Ono's programmatic call here to cut highlighting how each cut brings into play both existent and new senses of the ongoing and performative quality of intersecting and compositional sets of potential relations. Much of the power of the piece is in its ability to emphasise the performativity and politics of acts of cutting, how each cut potentially materialises certain sets of relations, each with their energetic sense of potential asymmetries that continually converge and charge the seemingly simple event of a scissor scissoring.

Performances of *Cut Piece* intentionally commit its audiences within this program of cutting. Ono's "amplified scissors" (Rowe, cited in Clayson 2004, 8) reveal the potential of any cut to plug into the networked and situated dynamics of those participating in this event in which each cut enacted on the performative layer skin that is Ono's clothing is, potentially, both an unveiling and amplification of the cultural and body politics of those in attendance. It accounts for and generates still further accounts of particular kinds of cuts made by particular kinds of agents on particular kinds of bodies.

Ono has written, on several occasions, of her positioning of herself at the centre of this event of cutting as akin to taking on a Buddhist-inspired role of deferential, ascetic surrender. But of particular note in the initial performances would have been the way in which such an act of potential submission was inserted into highly stratified and notably gendered contexts, such as those of the first performances in Japan but also similarly in her early performance of *Cut Piece* at locations such as Carnegie Hall and also the male-dominated gathering of artists at the Destruction in Art Symposium in London (lead by Gustav Metzger as Honorary Secretary for the event), an exciting but notably masculine take on the "auto destructive" potential of art. Like her contemporary Carolee Schneemann and subsequent generations of performance artists, this work of Ono's is notable for the ready way by which in its different performances it was often able to initiate an event that is able to unsettle and often "unveil" gendered and

other perspectives that inform the seemingly straightforward act of cutting an individual's clothing.

In *Cutting Performances – Collage Events, Feminist Artists, and the American Avante-Garde*, James M. Harding (2010) points out Ono's full awareness of a highly fetishistic and Orientalist vein that the piece would likely tease out with certain Western audiences. Thus, Ono's performed stillness on stage would potentially be further amplified by Western stereotypes of passive Asian subjects and the electrified matrix of a performance art setting in which fetishistic fascination and voyeurism were so readily unleashed, particularly when seemingly licensed under a label of "Art." As Harding points out, this can be read as an intentional and knowing move on Ono's part in relation to those audience members who could be seen to bring such stereotyping baggage to their particular readings and actualisations of the cut. Harding:

Directly following her metaphorical comments on the audiences' dissatisfaction with their encounter with Ono's nonessentialist conception of the self, Ono triumphantly added the postscript: "P.S. If the butterflies in your stomach die, send yellow death announcements to your friends." This playful allusion to the Asian stereotype (butterfly) and its visually severed marker (i.e., yellow skin) not only consumes the narrative of Puccini's opera but specifically positions Ono as an active agent willfully moving beyond the passive suicidal long-suffering that the stereotype would attribute to her. For she does not fade like a butterfly, but rather presides over the death of a stereotype. (Harding 2010, 114)

In this way, Ono can partly be seen to be using "race as technology," as Wendy Chun (2012) has described it. In this case by intentionally playing off of such racial stereotypes in a method that materially performs race and further practices of othering as a particular form of encoding that gives certain agents a method of doing things a certain way. In its ability to highlight not only issues of race but also those of gender, privilege and agency in general, *Cut Piece* can be seen to mobilise an intersectional space that problematises and opens up these issues as questions for the audience to work through, both individually but also collectively.

This issue of race as a form of technology and of execution as pointing towards certain intersectional and interactive arrangements of power will be returned to in later chapters in this research. As Chun discusses elsewhere in a talk entitled "Orienting Orientalism, or How to Map Cyberspace," a certain penchant for "high tech Orientalism" can be witnessed in the writings of influential pieces of early cyberpunk fiction, such as in the works of William Gibson, Neal Stephenson and Bruce Sterling. Such perspectives often project a sense of these spaces as infused with a sense of otherness, with savvy "Asian" and "African" characters

often used to by the authors as cookie-cutter stand-ins for this otherness of future forms of tech.¹⁵ But, as *Cut Piece* successfully enacts, and as Chun also writes, “The move to objectify others does not mean that the viewer can watch from a distance. Rather ... this gaze—this ‘jacking-in’—itself is put on view in a way that calls into question its omnipotence, and further, the structure of high speed telecommunications networks themselves makes impossible a clear distinction between spectator and spectacle” (Chun 2000). *Cut Piece* forcibly presents one with this way in which cuts do not operate in empty vacuums of space. A programmer might occasionally envisage his or herself as almost omnipotent, but to make executable is always partly to cede to existing protocols and compositional affordances and energies as they present themselves at any particular time. Just as to execute something is also to open a process (and even oneself) up to the ability to be cut in turn by the many unknowable contingencies and potentials that execution always opens onto. The cut in *Cut Piece* highlights this sense of potentiality. From the performed but also very real sense of Ono making her body available to certain marks, to the choice given to audience members of where to cut and whether to cut, this potentiality radiates with its possibilities for interpretation and engagement. A cut might be violent but it might also be a caress. Such is the question of execution that Ono’s piece brings to the fore.

Cut Piece originates in material form as a piece of printed instruction included in Ono’s *Grapefruit* collection, first printed by Wunternbaum Press (Tokyo) in 1964, the same year as its premiere performance. In this sense of the piece as printed as an instructional text, there is also an obvious echo to notions of source code in computing. In situating the “source” of the artwork both within an instructional score and its performative realisation, Ono was partly addressing long held practices of privileging the singular originality of the artist and also the object-focused nature of art practice and theory, against which many of Ono’s generation of artists were working in opposition or counter to. Along with the likes of John Cage, La Monte Young, Alison Knowles and her Fluxus colleagues, Ono was a pioneer in this respect, having already produced a series of scores and instructional pieces whose “event bent” (Ono, cited in Harding 2010, 93) could be seen to restructure the fundamental pairing of artist and finished art object with a new, much more processually orientated pairing of instruction and real-time actualisation, in which any actualisation might bring various interweavings of an artist-performer, an audience-performer and other situated factors into play. In writing about Ono’s early Instructions for Paintings series, in which her soon to become characteristic instructional style was first showcased as a simple combination of text inked onto canvas, art historian Reiko Tomii points out how, “Ono revoked the self-sufficient body of the

15 It is perhaps interesting to note that several of the earliest artistic endeavours carried out using computers regularly include nods to Asian traditions of poetry. These include Margaret Masterman and Robin McKinnon Wood’s “Computerized Japanese Haiku” program, written in the TRAC language and featured in the influential Cybernetic Serendipity exhibit at the ICA in 1968. And also Nanni Balestrini’s “Tape Mark I” text generator, performed using an IBM 7070 computer at the Electronic Centre of the Lombard Provinces Savings Bank in Milan in October 1961 (and also later featured at the Cybernetic Serendipity show), which appropriates and recombines text extracts from Michihito Hachiya’s *Hiroshima Diary*, Lao Tzu’s *Tao Te Ching* and Paul Goldwin’s *The Mystery of the Elevator*.

painting: not only was paint replaced by language, the structural syntax of the medium was also laid bare. Moreover, the role of the viewer was reconfigured as an active agent who completed the artwork either physically by her/his making it, or simply as a mental process” (Tomii, in Munroe and Hendricks 2000, 23-4). Ono’s instruction—“Cut”—creates a programmatic space and procedural sequence in time in which audience members can respond to and actualise iterative manifestations of the instruction. *Cut. Cut. Cut.* The instruction both repeats itself in recursive obedience of its instructional command while also continually discovering the contours of its actualisation in the generative and emergent contexts of its performative execution.

As Kristin Stiles (1993) notes in writing on *Cut Piece*, the Latin *decidere*, which means “to cut,” is also the source of the English verb to *decide*, and in this sense *Cut Piece* can partly be understood for Stiles as a “decision piece” in which the audience must continually choose how to cut and for how long. In this sense, *Cut Piece* can also be read as having something of an algorithmic quality, in that the instructions provide a ready rule for carrying out decisions in relation to the data (in this case, the clothed body of the performer). In Ono’s knowing framing of the piece around her particular body as well as greater critiques of certain dominant practices of art at the time, the piece can be seen to readily play into general questions of programming and decision making, such as the always prevalent questions of inclusion and exclusion, command and control, mastery and submission, determination and agency. And in continually calling upon members of the audience to actualise these instructions, *Cut Piece* can be seen, in a procedural way, to highlight the prescriptive and inscribing quality that cuts entail but also a sense of the sensitivity, or indeed insensitivity, that an acknowledgment of these very inscribing qualities that execution and its enactment of cuts involves.

Finally, in the very particular quality of the command to cut being in the instruction itself in this case, *Cut Piece* also highlights the compositional and constitutive quality of codes in general. As Cox (2013, 5) writes in his reading of Althusser and Butler in relation to what he characterises as the interpellative qualities of code, this quality of code and its execution is no straightforward question of determination. Rather, as one also sees in an example like *Cut Piece*, this constituting quality of codes and their executions highlights the compositional affordances and propensities that suggest themselves in any particular execution, and for which one can find both predictable and unpredictable energies within. An executing practice enacts cuts, but these cuts are never fully determined and in their taking hold in the world can take on a life of their own, the code and its executing effects moving both within and beyond the parameters of its original constitution to

discover further generative mutations and states of the kind of “excitability” that Butler (1997) speaks of in relation to the always provisional, fluid and performative qualities of meaning-making. As Cox puts it,

The recognition of the choice of action, already programmed but perhaps not knowingly so, confirms that both subjectivity and code recursively write their own instrumentation. Yet the subject is not simply preprogrammed like a machine but more like code in actively combining internal and external factors, standing between what is possible and what actually exists. (Cox 2013, 109)

Programmers can of course never exercise complete control of a program’s execution and interpretation, just as a program itself exists in contestable and processual relation to the many other programs and relations that it is situated within. It might take hold in predictable ways, just as it might also help to actualise and participate in newly discovered potential enmeshings, compatibilities and structural couplings between executable programs and the extra-linguistic entities and practices they might come into contact with. Such an excitability might arise from a sense of incompleteness, frictional duress or indeed violence in a felt non-compatibility that has the effect of highlighting certain limits, each with their own suggestive frictions and slippages that might tease out other possible contours of the executable. In such a vein, Brian Kim Stefans (2014) speaks of the need for further exploration of the “points of resistance” and “poetic discharge” in the cybernetic exchange between the “free play” of algorithm and the organic body of the author or user. A collection like the recent *Fun with Software* (Goriunova 2014) is full of essays exploring these very questions of the pains, pleasures and paradoxes of computability.

At the same time, one shouldn’t overplay a notion of limits, violence and transgression. Haraway warns one off of such a “Man-making ... prick tale” in which the only tools of note are words and weapons, with their “cutting, sharp, combative tale of action” (Haraway 2016, 39). As Barad’s agential quantum cut aims to highlight, a cut does not produce absolute Cartesian style separations between one thing and another, but is rather always enmeshed in a topological set of ongoing relations in which one is always—like the implicated and involved members of Ono’s piece—“cutting together-apart” (Barad 2014). As we have seen, Turing was fully aware of the performativity involved in the cut of computation, the way in which the mattering elements used to actualise discrete state machines meant these machines were not actually discrete, even if they could be “profitably” thought of as such. This collapse of possibilities in the name of certain agential and executable practices is often perceived as most visible in its

various pricks and marks on bodies, but its emergence and sustained effects arise within ongoing topologies of relations. Every cut in *Cut Piece* has the effect of bringing these formative and compositional relations into view, highlighting the way in which effective delimitings of various kinds of executable practices have the effect of activating relations and thus pointing towards an ongoing question of betweenness and mediation.

Execution is this discovering and rediscovering of potential constellations of the executable. It is the working through the conditions of certain necessarily constricted forms of interaction, while acknowledging that these are never complete or ever fully determinative. Protected mode is never fully protectable, but always vulnerable and open to the promiscuous and political questions of other potential cuts and configurations. In adopting a politically-orientated and material discursive sensitivity to such questions, it is important to acknowledge the potential asymmetries and intensities of what Lauren Berlant and Lee Edelman describe (in conversation) as the “constant pressure to adjust that is at the heart of being nonsovereign” – the particular kind of space of potential but also vulnerability that opens up in an acknowledgement of the impossibility of complete control and how such an opening up partly involves an embrace of multiple potential ignorances and their “awkward relation to each other” (Berlant & Edelman 2014, 5-6). That apt and awkward salute of executability in computation—“Hello, world!”—can be read as indicating to this affirmative but potentially delicate act of putting into practice an inscribed instantiation within a set of existing practices, just as it also, in its very exuberance, indicates an uncertain, excitable sense of openness to engaging with the world.

4 PROCESSING POWER

In tracing out execution as it is actualised and shifted across a range of examples, certain recurring themes appear. As discussed in the previous chapter, execution involves the bringing to bear of compositional affordances and energies into sites and live processes of encounter and negotiation. This chapter aims to further look into such processes of negotiation, highlighting what it portrays as certain formative techniques that can be seen to be regularly employed towards the task of making things executable. In doing so, this chapter will take a few steps backward in time, in order to look at a range of concepts and practices which it argues are relevant to an understanding of crucial compositional affordances and forces involved in computational practices. This will involve looking at well-known writings by Foucault on disciplinary techniques as well as some discussion of Charles Babbage's studies of nineteenth century practices in manufacturing and work relating to early forms of mechanisation and automation. In particular, it highlights certain forms of coercion that are involved in processes aimed at automation, with the technique of the division of labour and tasks in the name of efficiency given particular attention to. As the chapter highlights, a key requirement in programming an executable process is the act of coercing existing practices and material discursive entities into its particular requirements for execution, with the chapter giving the name of processing power to this ability and persistent drive of computationally-informed processes to make things executable according to their necessarily coercive regimes that are carried out in the name of efficiencies of various kinds (computational, economic, etc.). In doing so, the chapter highlights how practices of execution come into being in already active sets of relations, emerging from and plugging into many existing and potential valences (material, technological, economic, etc.), while also further exerting their particular capacities as entities and systems capable of both reproducing and further developing their particular practices.

The intention here is not to suggest that these genealogical expositions on discipline, power and coercion map directly onto contemporary practices of networked computing. Clearly the modes of control in the present are in many cases quite significantly different in their epistemic, situated and practical pursuits (as indeed Foucault's own critical trajectory and ongoing problematisation of an understanding of power aims to show). Nevertheless, it is a point throughout this chapter that contemporary forms of networked computation and their establishing of relations of power depend in their coming to being on what might be thought

of as concerted and formative stages of disciplining and coercion carried out in the name of efficiency. Such stages are particularly focused on making both technologies and also those entities they would interoperate with consistently reliable and processable in terms of the productive, normative and material discursive registers that they aim to instantiate in their practices and processes of execution. Several of the chapters following this one will also give further attention to techniques and infrastructures of coercion and efficiency, and thus many of the points here will be continued and expanded upon in more concrete and extended examples later on.

TECHNIQUES OF COERCION AND EFFICIENCY

Barbed wire fences or computer operating systems, with the many restrictive and generative power relations that they put into place, do not simply come into existence as given executable practices. Their emergence and taking hold within particular contexts typically involve varying degrees of disciplining of the variable components that the practice in question would work to bring into consistently executable being. Foucault is, of course, a classic reference in this regard, with his book *Discipline and Punish: The Birth of the Prison* (1991; originally published 1975) serving as one in a series of influential studies on this subject matter. Of particular interest to the exposition on execution being carried out here is the way in which Foucault in these investigations demonstrates ways in which it is possible to track and trace the emergence of techniques and technologies of power as they take shape within various actualised configurations and alignments. Using Foucault's notion of disciplinary technologies and some of the specific examples he gives, this chapter will then work to highlight certain key developments and formations in the way in which important techniques and technologies of power begin to find material discursive purchase and expression within practices of computation.

Several key aspects of Foucault's thesis in this book are worth highlighting in relation to the prospective aims of this research. First off, from the very start, it serves as a strong reminder of the way in which violence has acted as a fundamentally constitutive element in the creation of the European societies Foucault focuses on. His extended and careful description of the extreme pain and violence enacted in the public torture of convicted regicide Robert-François Damiens at the opening of the book is there specifically so as to remind one of this originary and coercive world-making quality of violence. Invention and the further coercive spread of its findings, whether technological, scientific or political, is both a birthplace and also a graveyard, littered as it so often is with these painful, often deadly histories of experimentation and implementation.

Following this opening scene on earlier sovereign displays of public execution, the book then starts its tracing of how such forms of execution begin to be gradually replaced by other modes of power and control. As Foucault is able to show over the steady course of the exposition of the book, a range of emerging examples can be seen to point to a formative shift in the dynamics of power at the time. Despite their diverse nature, certain recurring features can be traced in the steady materialisation of these new forms of power, the central binding factor of which Foucault characterises using the rubric of disciplinary power. A key and new aspect of disciplinary power when compared to previous forms of power is the way in which it begins to shift its attention from the application of direct violence on the body towards a more meticulous and dispersed “discretion in the art of inflicting pain” (Foucault 1991, 8). In this transition from an earlier and relatively direct “punishment-body relation,” such a highly visible expression of power relations in the form of publically displayed physical punishment is no longer to be so overtly manifested, leading to emergent forms of discipline in which “Physical pain, the pain of the body itself, is no longer the constituent element of the penalty.” And, as “a result of this new restraint, a whole army of technicians took over from the executioner” (11). This for Foucault should partly be understood as an act of abstraction, one in which punishment “leaves the domain of more or less everyday perception and enters that of abstract consciousness” (9). This element of abstraction will be explored in greater and more specific detail in discussions of interface and platforms in the chapters to come, but a notable quality of abstraction here is the way in which the site onto which power aims to operate is no longer the body but the “soul,” specifically as it is prescribed within nineteenth century discourses of rationality and morality. In this shift, the challenge, from a disciplinary perspective, becomes that of how “The apparatus of punitive justice must now bite into this bodiless reality” (17). The problem for power and its mobilisation becoming one of: if no longer the guillotine, then what?

One element of the emerging answers to this problematic of power and its application lies in a newly conceived relation between power and the bodies and subjects upon which it would make its new claims. Whereas the application of violence on the part of power typically made its claims directly upon the body, treating it as an elementary whole, in these new operations of power the body begins to be treated as an entity capable of carrying out a range of discretely defined actions, all of which might then be coercively acted upon by the powers of the time, both individually and collectively as ensembles of actionable disciplinary relations. In this manner, disciplinary techniques can begin to take on increasingly granular forms of expression and control, with the (material) discursive and corrective expression of the

norm in many cases taking a leading role.

As these newly emerging conceptions of the execution of power begin to materialise and find various forms of expression in the emerging institutions and practices of the time, techniques and technologies of discipline are able to transform and diversify their scales and modalities of operation. Foucault describes how the various apparatuses and institutions of the time work to instantiate “a micro-physics of power, whose field of validity is situated in a sense between these great functionings [of disciplinary techniques and technologies] and the bodies themselves with their materiality and their forces” (26). The newly emerging techniques of power of this era can be seen in the specific situated technologies and knowingly crafted exercises of discipline involved, such as those of “time-tables, compulsory movements, regular activities, solitary meditation, work in common, silence, application, respect, good habits” (128). In such coercions of the body into what Foucault famously characterises as a “docile body,” the continually disciplined and corrected body takes on a quality at times as a “mechanical body” (155), made to march according to certain timetables, to adapt certain corrective postures and manners, and generally to acquire a specific form of regularity and thus recognisable normativity in the societies of the time. At one point, using La Matrie’s *L’Homme-machine* as reference, Foucault describes this almost mechanical body as a joining together of two registers: the “analyzable body” and the “manipulable body” (136). Furthermore, the body, whether mechanically docile or resistive, is itself surrounded and enmeshed within a range of disciplinary technologies, techniques and machinations, and thus can be understood to be “constituted as a part of a multi-segmentary machine” (164).

As is perhaps already noticeable, these descriptions of Foucault’s can readily lend themselves to speaking of technology as it is more commonly understood, particularly those technologies of the steadily emerging forms of semi-automated mechanisation and production that were occurring during the very same period. Foucault gives examples such as those of late eighteenth and early nineteenth century factories and their practices of partitioning and distributing bodies in space, with these distributions now beginning to be more directly articulated according to the specific requirements of the production machinery. Foucault speaks here of “serializations” and the formations of “a permanent grid” aimed at bringing together the particular variables and moveable parts of both labourers and machines, with techniques of coercion in such cases now gradually gathering around a notion of imposing specific forms of organisation and order in the name of productivity and efficiency:

Thus a new demand appears to which discipline must respond: to construct a machine whose effect will be maximized by the concentrated articulation of the elementary parts of which it is composed. Discipline is no longer simply an art of distributing bodies, of extracting time from them and accumulating it, but of composing forces in order to obtain an efficient machine.
(164)

With such descriptions at hand, a whole lineage of technologies can be traced in respect to this emergent coercive imposition of various models and practices of disciplinary techniques and technologies in the name of efficiency. It is nothing new to trace the lineage of such practices as they materialise and spread into everyday practices and also as they relate to key elements of computing technologies. In histories of computing, the punched cards and partly automated machines of Joseph Maria Jacquard's looms and Charles Babbage and Ada Lovelace's subsequent implementation of a punched card model of programming for Babbage's Analytical Engine make for popular launching points for discussions on the epistemic and practical breakthroughs that slowly bring about the materialisation of the general-purpose computers of the present. As Lovelace's memorable insight into the open-ended qualities that such a general-purpose computing can be applied towards puts it, the "Analytical Engine weaves *Algebraical patterns*, just as the Jacquard-loom weaves flowers and leaves" (Lovelace, in Morrison & Morrison 1961, 252). The closing decades of this formative nineteenth century sees the introduction of punch clocks, in which the punched card also becomes an overtly disciplinary technology for the tracking of worker activity. In this period the punched card also begins to be employed by Herman Hollerith and the soon to be christened IBM corporation as part of their influential electromechanical punched card tabulators for the semiautomatic data processing of census information, a technology that can be seen as an indication of the transition or expansion of disciplinary methods of power aimed at the coercion of individual bodies towards those of what Foucault describes in later works as a calculative mode of biopolitics and biopower, whose aim is the regulation of populations via various calculations of life (birth rates, mortality rate, longevity), as typically measured in quantitative and statistical terms.

Beyond such individual examples, of particular note in nineteenth century technological development is the overarching way in which "mechanization takes command," as Sigfried Giedion ([1948] 2013) describes it in the title of his wide-ranging history of key technical developments in the emergence of techniques and practices of mechanisation and their gradual spread from the factory floor into everyday life. In sections with titles such "Mechanization Encounters The Organic," "The Mechanization of Death" and "Mechanical Comfort in the Household," Giedion

provides a collection of examples of the gradual development of an “assembly line attitude” (Giedion 2013, 78) based on divisions of labour and the removal of various forms of friction involved (whether that of the unpredictable and inefficient human labourers involved or the notably challenging organic qualities of skin to be removed from animal carcasses in the slaughterhouse). As one example after another shows, mechanisation here becomes a constant interplay of encounters between bodies of various kinds and the making amenable of them to new models and techniques aimed specifically at forms of organisation and efficiency in the name of mass production; the assembly line being perhaps the prime example of, in Giedion’s words, “the putting into practice of the dominant principle of the twentieth century: industrial production based on efficiency” (93).

Such early practices of mechanisation point towards a way in which execution in the form of mechanisation is specifically a processing of materials (e.g. meat processing). Machines act in such instances as combinations of compositional mechanical forces arranged in various ways so as to process the resistant material discursive entities they are compelled to work upon. Like executable code, such machines have the effect of further composing and mobilising both matter and people (Cramer 2005, 52).¹⁶ In this way, to Foucault’s notion of disciplinary power this research would suggest a further concept and consideration of questions of *processing power*, the ability and also drive of computationally-informed processes to make things executable according to their necessarily coercive regimes that, in many if not most instances, are carried out in the name of efficiencies various kinds, in tandem with a general intention to scale up and process greater numbers of materials.

As an aside to this discussion of disciplinary techniques, one might consider how from the time of eighteenth century automata and Mechanical Turks to that of the mid twentieth century, and in what could be seen as an almost two-hundred-year arc onwards from La Mettrie’s *L’homme Machine* (“Man a Machine”), one eventually arrives in 1948 to a situation of Alan Turing, in his essay “Intelligent Machinery,” speculating on the uses of understanding “man as a machine” so as to further consider the inverse of such a statement. In this influential proposal, Turing suggests the implementation of “pleasure-pain systems” (what he alternatively characterises as “reward” and “punishment”) as a way of educating self-organising, intelligent machines. The essay also concludes with what in this context can be understood as a prescient Foucauldian insight into the need for generative and productive forms of *initiative* in addition to those of discipline. Turing:

¹⁶ In a presentation touching on the ideologies and politics of automation given at Malmö University in 2016, Cramer gave the amusing but telling example of “square pigs,” taken from the parodic science fiction film *Space Truckers*. The interested reader is encouraged to seek it out.

If the untrained infant's mind is to become an intelligent one, it must acquire both discipline and initiative. So far we have been considering only discipline. To convert a brain or machine into a universal machine is the extremest form of discipline. Without something of this kind one cannot set up proper communication. But discipline is certainly not enough in itself to produce intelligence. That which is required in addition we call initiative. This statement will have to serve as a definition. Our task is to discover the nature of this residue as it occurs in man, and to try and copy it in machines. (Turing 1948, 21)

AUTOMATION (HABITUATING COERCION)

These many different burgeoning methods of disciplinary division of bodies and tasks in the name of productivity and processing power can be understood as being formative within a diverse range of executing systems, past and present. In relation to execution and its capacities of automation, the potential drive instigated by such techniques is towards coercing and making more things reliably executable according to the practices of the executing process in question. This is a will towards what Foucault gives the name of domination to, the way in which sites of emergence can be understood to have the ability to sediment into dominant forms of understanding and expression. Domination is the consolidating of an emergent will. A species-like hardening of a system of interpretation and its bending or engraving of power and its compositional orientations into the bodies and practices it would make accountable to it. As Foucault shows, such a potentially self-amplifying and organisational will to power often gains further traction by convincing all parties involved of its own normative necessity and inevitability, pushing to the side any notions of the contingent accumulation of its situation and configurability of its aggregate parts. In its peak stage, domination is when the executability of an emergent will—computational, cultural, political, etc.—is able to attain a level of everyday, near automatic execution. Thus, the norm critique of Foucault points towards an understanding of execution and executability as a productive ability by a material discursive pursuit to make dominant and sustainable its particular practices and requirements.

Automated execution in the context of computation is understood as the carrying out of a set of operative instructions by a machine in a mode of execution that, in ideal conditions, is able to run with minimal interventions into the nature of its decidability. Execution in the particular example of automated forms of computation is any ongoing instance of programmed automation, however minute or extensive this period of execution time (“runtime”) might be. It is an ongoing process of executability in which instructions as well as inputs and outputs can be continuously decided and acted upon. In addition to keeping in mind that any

ongoing form of automation, no matter how seamless, necessarily involves mutual agreement over relevant protocols for interoperability as well as maintenance of the infrastructures and materials upon which automation transpires, it is important also to remember that computer code is itself a discursively established and maintained thing. In the words of Adrian Mackenzie and Theo Vurdubakis, “the repetition that allows [code] to become conventional is itself coded. Something has to be ritualized in order for repetition to occur. Code works by being coded, and this code is encoded ... Without the ‘coding of code’, code has no force and it does not ‘execute’” (Mackenzie & Vurdubakis 2011, 14). This points towards automation’s reliance on norms and standards of interoperability. In the case of networked computation, this demand for standardisation is in many respects even more essential, in that from hardware to software and onwards to network protocols, the rules for control and algorithmic decision-making need to be made, in one way or another, mutually executable.

Wendy Chun’s work provides numerous examples of what might be seen as peak stage and dominant processes of computationally-infused practices of the present, such as in her recent characterisations of “habitual new media” and the way in which such media have a notable quality of driving users into a cycle of “updating to remain the same” (Chun 2016b). Chun’s key point in speaking of habit and the habituation of various computationally-informed practices is that, as with ideology, “our media matter most when they seem not to matter at all” (1), with habit, like execution, being a form “ideology as action” (7). As Chun points out, these habits are “not a natural or inevitable outcome,” but rather rely on users subscribing—whether willingly so or in simple grudging or casual acceptance—to their particular terms and potentially becoming over time a habitual mode of engagement (57). In this way, the process of making things more readily executable in the name of various forms of automation can be seen to involve a similar challenge and trajectory such as Foucault describes in relation to discipline. Namely, that of the productive integrating into everyday practice of the particular coercive computational terms and conditions that the executing practice depends upon.

While being a necessary and practical part of any executing practice, this agreeing to terms is always a political question, in that it inevitably involves a delegating of power and decision making in regards to the forms of expression and relations that the practice in question supports. As Chun and others (e.g. Cayley 2013) point out, in everyday examples such as that of agreeing to continuously shifting terms of service during the rollout of automatic updates, using the dominant networked computing platforms of the present would seem to demand a certain readiness to abnegate, or defer and delegate power over one’s own infor-

mation and the many productive processes of decision making that are enacted upon it. Indeed, the computational codes that underwrite more and more of contemporary cultural activities of the moment have a particular way of selling this agreeing to the continually shifting terms of the service in question as the best means with which to guarantee its subjects a sustainable living in the digital era (whether what is being sold is a data mining process for being kept safe from terrorism or a particular social feature to be implemented in the name of a better collective experience). A pincer-like discursive binding can be seen to be in play in these impositions, whereby the tools in question are “increasingly privileged ... because they seem to enforce automatically what they prescribe” (Chun 2011, 91-2). As can be seen to be enacted in many of the ongoing crisis-orientated forms of governance today, in which a state of emergency of one kind or another is implied as the natural state of things, the application of computational modes of execution into such situations can be viewed as almost a perfection of the potential violence of the *polis*, a cutting out of the executive so as to become the executor (101).¹⁷ Or, as Florian Cramer describes it, “Computers therefore exist, as hacker wisdom says, to solve problems which we would not even be aware of having if not for the computers themselves” (Cramer 2005, 125).

These various ways in which practices of automation typically involve an acceptance and thus partly a deferral of a moment of decision, also indicate to how the initialising of an algorithmic process in an executable computer program is both the initiating of a decision making engine of generative possibilities at the same time that it is also a termination of other possibilities, in that the moment an executable process is run, decision making processes at the level of the executing code and the parameters of computable inputs and outputs (however potentially broad or computationally adaptable they may be) are thus temporarily decided and agreed upon – with the provision that this act of automated decision making is always subject to unpredictability, contingency, break down and the ability to be updated yet again.¹⁸ This is not to bemoan such a situation, but rather to consider this potent quality of computation as it is put into sites of encounter with the material discursive entities that are brought within its range. Such programmed forms of habituation have demonstrated a range of both exciting and predictable vectors thus far (with Chun’s research highlighting a wide spectrum of its contours). Unsurprisingly, one such vector is the push on the part of certain dominant manifestations of programmed executability to extend the reach of their particular methods and terms. Furthermore, as with any discursive force, one of automation and programmed execution’s most powerful effects is not only its deferral of responsibility, but the expansion of power that can occur once such a deferral is nor-

17 The conditional, protocological command summed up in a Gilbert & Sullivan lyric: “Defer, Defer, to the Lord High Executioner!”

18 Emerging forms of machine learning and also the ongoing entanglements and spread of codes into further aspects of living of course have the quality of questioning and problematising a notion of decisions and algorithms as pre-given entities.

malised, with sites of contestation, uncertainty and emergence potentially fading or shifted elsewhere in every such deferral to the particular powers in question. Sealed within the black box, gift wrapped in the sales pitch and enclosed in every discovery is the embedded promise of forgetting.

INVISIBLE HANDS (HABITUATING EFFICIENCY)

In order to consider this act of coerced deferral and concealment that execution often involves, this final subsection on processing power invokes the rubric of the invisible hand as an existing and relevant concept from economics, but also as a figuration that can be further mobilised in order to highlight some particular aspects of computation and its execution in the world. In the economic traditions from which it develops (particularly those of so-called ordoliberal and neoliberal forms), the invisible hand will be portrayed in the context here as a kind of black-boxing of economic responsibility and decision making. As it is famously originally evoked in one (and only one) passage of Adam Smith's *An Inquiry into the Nature and Causes of the Wealth of Nations* (1843), the invisible hand is characterised as a kind of natural driving force of economic behaviour, one that directs so-called rational, self-interested economic actors towards optimal market behaviours. An economic actor in this model, whether one is speaking of a producer or consumer, is guided so that "he intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention" (Smith 1843, 184). The power of the invisible hand in such economic traditions is in its ability to cloak and make seemingly natural the executable functions of economics and politics that it puts into play.

This figure of the invisible hand as described by Smith goes on to become an almost irresistible and also rather effective conceptual figuration for invocation by those wishing to promote various forms of unregulated, free-market economics. Foucault, in his later work on analysing the emergence of various forms of liberal economic thought, picks up on its power, pointing towards how a figuration of the invisible hand acts as a convenient discursive concealment and path clearer for the emerging capitalist forces of the time, particularly in its pronouncing of economic causes as both autonomous and unknowable – and thus unregulatable (Foucault 2008, 279-80). In a nineteenth century that would be full of different figurations of "natural," self-evident processes, the self-regulating market is here presented as a natural organism with its own evolutionary style methods of Darwinian style selection ("survival of the fittest") and its production of a specific species of economic actors (what has been called *homo economicus*, or, economic man). In such a manner, the liberal principle of laissez-faire (to let go so as to let do) treats the market as "some-

thing produced spontaneously which the state must respect precisely in as much as it is a natural datum” (120). This is of course not at all the case in practice, and thus much political effort will be directed towards shaping economies in very specific ways so as to bring forth a very specific species of economic actors and subjects, marketplaces and their co-constituted models of governmentality. Philippe Pignarre and Isabelle Stengers have described such moves as a form of “capitalist sorcery,” speaking of the way in which such a conception unleashes “a system of sorcery without sorcerers” (Pignarre and Stengers 2011, 135).

More relevant in connecting this figure of the invisible hand to aspects of computation and execution is the way in which a concealment and removing from political and discursive contestation such as this can be compared with things like Kittler’s discussion of how the implementation of various inaccessible privilege levels (such as that of technical implementation of a protected mode in memory) have highly discursive effects, and that these effects “draw their power precisely from mute efficacy” (Kittler 2006, 354). Such a mute invisibility is a key and rather ideal feature for any executable mode of operation, enabling as it does prescribed and given acts of exclusion on the part of the executing system in question. In the notable neoliberal mobilisation of Smith’s economic figuration and their characterisation of the ideal economic model as a kind of automated and seemingly driverless system of self-interest, the executable model in question will often be able to continue to channel existing and emergent forms of systemic bias, discrimination, manipulation and other forms of age old and ongoing feedback loops that were and continue to be at play in the production of such models – only now with a potentially more unregulated, and thus potentially more extensive scope to its executability.

While discussions of invisibility and power typically highlight its ability to cloak the more unsavoury work of any particular will towards domination, it is worth remembering that acts of black-boxing and making invisible are also implemented in the name of practical efficiency. Adam Smith and other rising stars of liberal economist thinkers at this time were notable for their powerful new formulations of utilitarian economic rationality and self-interest, devising what quickly proved powerfully attractive models for both the operational manufacture of goods and the interpretation of the flow of such goods within the economy. Among these developing models was that of geometrically plotted supply and demand curves, relatively simple mechanisms for determining optimal forms of production according to the ideal price points (key sites for execution in a capitalist economy) that these models revealed.

Figure 4.1. Antoine-Augustin Cournot's 1838 scissor diagram, part of a series of what are thought to be the first recorded uses in economics of geometrically plotted supply and demand curve analysis. Image from Humphrey (1992, 5)

Armed with such powerful and relatively accessible algorithmic-style decision making methods for calculations and determinations of economic efficiency, liberal economics—as both discipline, instrument and ideology—takes off, providing as it does a relatively uncluttered road map for the emerging capitalist forms of production at the time.

Amidst this bustle of early capitalist endeavour, computing pioneer Charles Babbage finds himself at a moment of transition in his work on his Difference Engine and that of the emerging ideas forming in his thinking around a completely reworked version of this computing machine in the form of what he would call his Analytical Engine (regularly cited as the first fully formed and also partly materialised version of a general-purpose computer). Babbage decides to take a much-needed break from his work on these machines and switches his attentions to an extended study of the workings and effects of automated machines used in various forms of manufacture, both in England but also throughout Europe. The research resulted in the text *On the Economy of Machinery and Manufactures*, published in 1832 to relatively popular acclaim. This influential text features accessible explanations of basic techniques relevant to the mechanical operations of machines, particularly as they are put to work in the factories and emerging capitalist economies of Babbage's time. Taking into account that Babbage was first and foremost a mathematician and mechanical engineer, the book is an impressive transdisciplinary achievement, weaving together a comprehensive range of topics under chapter titles such as “*Exerting forces too great for human power, and executing operations too delicate for human touch*,” “*Of copying*,” “*On the methods of observing manufactories*,” “*On Price, as measured by money*,” “*Of raw materials*,” “*On the division of mental labour*,” “*On the duration of machinery*,” and

more. By studying and writing on a range of different forms of machinery and their application on the part of manufacturing, Babbage's stated aim is "to point out the effects and the advantages which arise from the use of tools and machines; to endeavour to classify their modes of action; and to trace both the causes and the consequences of applying machinery to supersede the skill and the power of the human arm" (Babbage 1989, 3). As is indicated by Babbage's distinction between "making" and "manufacturing," this attempt at classifying and abstracting out certain general modes of making in regards to combinations of labour and machinery is of necessity in the drive to scale up manufacturing in the name of greater production and newly emerging thoughts around economies of scale and "the powerful stimulus of competition" (86). These are thus "economical methods" in both conception and practice.

The influence of Adam Smith and emerging thoughts around economic models of efficiency is particularly evident, with Babbage citing Smith's formulations on the benefits that might be achieved with the division of labour: "Perhaps the most important principle on which the economy of a manufacture depends on is the *division of labour* amongst the persons who perform the work" (121). From the perspective of moving in the direction of more automated and efficient forms of mechanical production, Babbage posits that

The division of labour suggests the contrivance of tools and machinery to execute its processes. When each process, by which any article is produced, is the sole occupation of one individual, his whole attention being devoted to a very limited and simple operation, improvements in the form of his tools, or in the mode of using them, are much more likely to occur to his mind, than if it were distracted by a greater variety of circumstances. Such an improvement in the tool is generally the first step towards a machine. (124)

While various mechanical solutions and improvements can present themselves to the "workman" as a result of this attention on specific operations, a more general synthesis on the part of a "master manufacturer" (125) is needed for the comprehensive unification of machinery in the name of production.

When each process has been reduced to the use of some simple tool, the union of all these tools, actuated by one moving power, constitutes a machine. In contriving tools and simplifying processes, the operative workmen are, perhaps, most successful; but it requires far other habits to combine into one machine these scattered arts ... in order to make such combinations with any reasonable expectation of success. (124)

Babbage then, like many of this age, in looking to find generally applicable correlations amongst “these scattered arts,” is another example of what Foucault describes as the age’s ongoing investigation into “the art of distributions” and a disciplinary machinery that builds upon principles of “partitioning” and the organisation of “analytical space” (Foucault 1991, 143). In doing so, model forms of abstraction in the name of efficient arrangements and execution of materials and bodies can be seen to be taking form, whether one is speaking of the materials and bodies on the assembly line or those working with the maintenance and further processing of these bodies as they pass from one set of hands and one machine to another. Furthermore, this separation of planning from execution that Babbage speaks of will also become key in later formulations and practices aimed at achieving efficiencies in production, such as in Frederick Winslow Taylor’s writings and implementation of “planning departments” staffed with engineers and researchers whose work it is to develop further forms of “scientific management” (Taylor [1911] 2003, 110), with the breaking up of a task into smaller and smaller tasks being one key model of efficiency. As indicated earlier in Foucault’s discussion of the move of techniques of disciplinary control from a focus on the physical body to that of the abstraction of the soul, abstraction has the quality of opening up distributive and dispersed methods of productivity and control. Thus Taylor’s planners, like Babbage’s master manufacturer, are set to work with devising such divisions of labour in the name of efficiency. Taylor: “The man in the planning room, whose specialty is planning ahead, invariably finds that the work can be done more economically by subdivision of the labour; each act of each mechanic, for example, should be preceded by various preparatory acts done by other men” (110).

Of additional interest for this research is how bodies and workers are treated here both as highly specific materials in an overall process at the same time that they take are abstracted as interchangeable, moving parts. Such abstractions open up potential trajectories of exploitation and violence, just as they also remake notions of labour and the labourer as they exist in these models of divide and rule, whether one is speaking of industrial or post-industrial modes of work. In the practical but always discursive (and thus political) move of black-boxing in order to simplify complex tasks, abstractions and plans of this form often work to posit themselves as seemingly necessary, unavoidable aspects of efficiency, and in the case of the invisible hand help to rev up the motors of capitalist endeavour. That one can still find these techniques and practices in today’s economies and technologies is a sign of their long-lasting effects and power (specific examples of which will be given in the next section). In the case of computing, abstraction and a practical method of divide and rule

goes on to become a key element in the development of various forms of programming languages. As Barbara Liskov and John Guttag describe in a section on “decomposition and abstraction” in their book on program development in the Java programming language, “The basic paradigm for tackling any large problem is clear – we must ‘divide and rule’,” a matter of practicality that allows programmers to “work on different modules independently, without needing much communication among themselves, and yet the modules work together” (Liskov and Guttag 2000; also discussed in Gehl 2014, 75). A large range of programming languages and accompanying economic models can be seen to sprout from such operational models of divide and rule.

Returning to Babbage, one can trace a very particular form of computational abstraction and correlation in the name of efficiency, as witnessed in a passage of his describing Gaspard de Prony’s work with turning unemployed servants and wig dressers into human “computers” capable of calculating logarithmic and trigonometric tables by means of addition and subtraction. Working at a time when the revolutionary French National Assembly was, amongst other things, pushing for the introduction of a metric system that would unify the multiple existing measurement and standards used throughout the nation, de Prony set out in 1791 to create logarithmic and trigonometric tables that could both facilitate the application of the newly standardised decimal system as well as aid with the large scale cadastre effort being carried out at the time, aimed as it was at creating more precise land surveys. As the French pamphlet on de Prony’s work that Babbage quotes at length describes it, de Prony, upon reading a copy of Smith’s *Wealth of Nations* and its description of the division of labour in a pin factory, immediately sets on the idea of “*manufacturing* his logarithms like pins” (de Prony, cited in Babbage 1989, 136). De Prony’s method was thus to break up these complicated mathematical tasks into simpler mathematical parts that could be computed by relatively unskilled labourers (many of whom would begin such work knowing little more than addition and subtraction). The etymology and genealogy of the term computer is, as this example shows, simply a person who computes such tasks.

Having studied the influential work of de Prony’s and others’ efforts, Babbage is quick to pick up on the importance of de Prony’s key correlative leap of abstraction,¹⁹ one in which the division of what Babbage describes as “mental labour” (135)—namely the cognitive labour of human computers—is to be broken down and organised in accordance with the specific nature of the mathematical operations in question. The idea can be seen to take hold on Babbage that such factories and strategically partitioned forms of labour might be understood as schematics and material setups for entirely mechanical forms of computation, and Bab-

19 Though it is worth pointing out that such was Babbage’s focus on economics and calculative processes of efficiency, that he was not quite so decisively able to grasp, as Ada Lovelace was, the way in which such powers of abstraction, correlation and transposition could be applied to a whole range of endeavours far beyond just the calculative practices of mathematics, economics and manufacture.

babbage would later look back on these early factories as insightful prototypes for his attempts at materialising a general-purpose computer – with his designation of the “mill” as the central processing unit for his Analytical Engine figuring as the most obvious token of this influence on his combined computational and material thinking.

This is not to paint Babbage as some sort of precursor to emerging and now dominant forms of exploitative neoliberal economics. Indeed, later on in the book Babbage advocates for what can be seen as (in the perspective of his time) relatively considered suggestions regarding the sharing of profits amongst all labourers employed in factories (177-181), as well as an open perspective on the meeting of various social classes in the factory floor and also some thoughts on the position of unions in these economic endeavours. Nevertheless, as Babbage admits in the preface, the book has certain blind spots, notably in regards to the political economy that such models open onto: “Still less have I attempted to examine all the difficult questions of *political economy* which are intimately connected with such enquiries” (v). As the example of Babbage indicates, and in examples such as Nicholas Mirzoeff’s (2016) recent reading of debt’s key role in contemporary media’s origins highlight, economics acts as a crucial and notably concurrent and ongoing point of reference for computational thinking and practices.

In addition to the example of Babbage’s studies of factories and liberal economically driven modes of production, one can also point to other foundational figures in computing and their direct ties to studies of economics. One notable case being that of John von Neumann and his significant contributions to economics, including his influential models of game theory and utility theory (theories of decision making that have highly algorithmic qualities to them), as well as further significant work in demonstrating how mathematical modelling could be practically applied to economics. Beyond such individual examples, one can further point to the economic substrate of much of venture capital’s particular logic of funding that sprouts and orientates so many of the silicon valleys in today’s digital economies – while rarely funding the crucial interventions and work of the many “venture labourers” (Gina Neff, cited in Nakamura 2015) who help to support, curate and maintain these very economies. This integral influence of economics in encouraging certain practices of execution rather than others will be looked at in further detail in later chapters, such as the example of various models of cognitive capitalism in networked practices as well as economically motivated forms of risk analysis used in policing migration in the Mediterranean Sea. As one sees in the example of the supply and demand curve discussed earlier and in the use of mathematical functions for computational forms of interpretation, it is also worth noting just

how tightly interwoven techniques of mathematics and this particular brand of economic practice are with both these early and also present forms of computation.

Just as Babbage's model for computing proved in many ways prototypical of those that were to come, so too would the partitioning and, in many cases, making largely invisible of the work, materials and energy expended in creating and sustaining seemingly seamless automation persist into the present, whether one is speaking of de Prony's above-mentioned servants and wig dressers, Ada Lovelace programming under a gender neutral pseudonym in her public explanations and further of development of Babbage's machine, or the many other marginalised figures and often precariously employed workers involved in materialising these master plans. When, for instance, a smart phone using the minerals mined from noted conflict zones and put together in factories known for extreme working conditions eventually arrives in the shop window with all of these factors concealed from view, there is a whole range of concealments at play, all of which are factors of a political economy that is orientated very much in certain ways rather than others. In such carefully orchestrated arrivals, as Sara Ahmed highlights, the histories of descent and domination at play in their particular arrival are notably absent:

The object is “brought forth” as a thing that is “itself” only insofar as it is cut off from its own arrival. So it becomes that which we have presented to us, only if we forget how it arrived, as a history that involves multiple forms of contact between others. Objects appear by being cut off from such histories of arrival, as histories that involve multiple generations, and the “work” of bodies, which is of course the work of some bodies more than others. (Ahmed 2006, 41-2)

These arrivals and concealments speak to the many cuts, hierarchies of access, partitioning and making invisible of the work, labour, materials and energy expended in sustaining seemingly seamless automation and can continue in many instances to be a central force in contemporary computationally-informed endeavours.

As discussed in the previous chapter, it is important to pay heed to the way in which any cut in the name of execution is also always a cutting out. From the very beginning, the many marginalised bodies involved that continue to remain at best as footnotes in histories and practices of computing (Plant 1995, 63–4). This despite their crucial role in the creation, running and sustaining of computational economies, whether at the level of manufacturing (Nakamura 2014), programming (Plant 1995; Chun 2005) or networked community management and support (Nakamura 2015). In what could be read as a tellingly dismissive aside during his paper on computable numbers, Turing himself characterises

the labour of the human computers of the 1930s as working “in such a desultory manner” (Turing 1937, 253). Each one of such examples can be seen to point to the way in which automation is of course never actually automatic, but rather requires continual maintenance and work to sustain the many processual, material discursive parts involved in any form of execution. From ENIAC Girls to Mechanical Turks, the many obscured bodies and invisible hands²⁰ of execution.

Despite such potential displacements and disparities, as Babbage correctly surmised in the preface to the second edition of his book on machinery and manufacture, these methods of the division of labour in the name of efficiency, if well implemented, would prove hard to resist given its highly instructive and executable qualities:

The system would naturally commence in some large town, by the union of some of the most prudent and active workmen; and their example, if successful, would be followed by others. The small capitalist would next join them and such factories would go on increasing until competition compelled the large capitalist to adopt the same system; and, ultimately, the whole faculties of every man engaged in manufacture would be concentrated upon one object – the art of producing a good article at the lowest possible cost – whilst the moral effect on that class of the population would be useful in the highest degree, since it would render character of far greater value to the workman than it is at present. (Babbage 1989, x)

Like so many of this generation, Babbage, via a deep integration of liberal economics and pragmatist Enlightenment invention and morality, is able to call forth both an unwritten code and practical method for its application via new forms of labour, computation, machinery and production. As tends to be the case, these new forms are presented as inevitable and singular forces that would compel all into their executable pursuits. Furthermore, while the specifics of each element in these material discursive networks of relations should always be attended to, in thinking through their composition and emergence, one cannot separate one element (e.g. a mechanical discovery) out from another (e.g. liberal economics or the moral sentiments of the time). The compositional affordances and agencies of particularly directed materials find their processual forms and ongoing resolutions in tandem with the material discursive orientations of the time, with each agential element enacting an ongoing negotiation with these situated orientations. Babbage’s engaged curiosity and attentiveness to material processes of construction and computation are a testament to a general period of highly productive inventiveness and enquiry, just as they also highlight prevalent blind spots of the time regarding the existing and emerging forms of exploitation

²⁰ In addition to Nakamura (2014), see also Gallardo and Samson (in Pritchard, Snodgrass and Tyžlik-Carver 2017) on the presence of hands in contemporary capitalist modes of production. And also Martin Howse’s remarks on the “handlessness” of self-executing “earth code” and “that which just does” (Howse 2013b) for another way of thinking through and potentially opposing or rejecting the anthropocentric emphasis on handedness, what one might think of as propensity for the making of things as ready-to-hand.

that these methods put into further motion (as a range of writers, from Marx and Engels to Frederick Douglass, would provide counterpointing exposition on). And while having undergone many subsequent mutations, it would seem clear that certain aspects of their coercive legacies continue to mark and inform computationally-informed practices of the present.

5 WHAT IS EXECUTING HERE?

The point of these opening chapters is not to resolve what is described here as the compositional questions of execution, but rather to pursue their productive pulse across these multi-sited vignettes of execution. In doing so, the chapters also work to capture some overarching and recurring themes that arise and which will be returned to in the chapters to come. This third and final chapter of this opening section will now look more directly at a particular question of execution: that of interpretation as it specifically occurs in the process of making things interpretable within computational systems. This will involve looking at another piece of Martin Howse's that explicitly works with the notion of interpretation in computing. This chapter and the section as a whole will conclude with a return to a general theme of the inherent material discursive challenge in the studying of forms of execution, namely, that of the way in which any particularly defined executing practice is in the end always caught up by other impinging relations and interpretations which it can never fully account for and is nevertheless mutually constituted by.

INTERPRETERS

In this summer of 1915 [a three-year-old Alan Turing] made his first venture in experimenting: as one of the wooden sailors in his toy boat had got broken he planted the arms and legs in the garden, confident that they would grow into toy sailors. —Sara Turing (2012, 10)

The code of nature maintains consistency and flexibility by repressing itself from one level to the next. —Jack Burnham (1974, 74)

As highlighted by Barad and further iterated upon over and again in these opening chapters, "Matter and meaning are not separate elements. They are inextricably fused together" (Barad 2007, 3). Discourse and interpretive efforts are themselves composed in tandem with intersecting and interstitial energies of matter, devices and networks of relations. Forces that are in turn moulded over and interpenetrated by further embodied, technical, social and nonhuman energies of the situation in question. In order to both address and expand upon this ongoing question of execution, and also with the purpose of covering some more of the specifics of execution in computing, a final work will be brought in for discussion here: Martin Howse's *Dark Interpreter* (2016) series of effects processors.²¹

In computing, an interpreter is a program that executes source

²¹ Note that these effects processors are not simply artistic experiments but actual instruments available for purchase, hence the reason for not italicising their names.

code in what is an ostensibly more on-the-fly-fashion, specifically because an interpreter doesn't fully compile a program's instructions into machine language prior to execution. As Abelson et al. characterise it: "An interpreter raises the machine to the level of the user program; a compiler lowers the user program to the level of the machine language" (Abelson et al. 1996, 607). Given Howse's aim of bringing the workings of machines into a closer and more direct proximity with their users, it is clear why his interrogation of execution would lean towards a focus on interpreters rather than compilers. In a recent essay, "Dark Interpreter – Provide by Arts for the hardness of Nature," Howse provides his own take on interpreters and interpretation:

What is an interpreter or an interpretation? Within the realm of computer science an interpreter exists as a program, devised in earth, in hardware, which instantly translates language into action, into execution and material or breath, either directly or through an intermediate translation. The interpreter must itself be described in a language, which, Orouboros-style can perhaps be the very same language which is interpreted, thus slowly and seasonably bootstrapping itself into a wordy autumnal existence and a cycle of development. It seems as if interpretation must always come after a writing; seasons are not reversed or coming before. Yet, following the season/reason of the lake (the return), what is to come is what has happened - it is always repeated and returning; the base principle of scrying is reading the palimpsest which is the Dark Interpreter, and like-wise interpretation in this sense is nothing but divination, knowing how to execute that which comes later to be uttered. (Howse 2015)

It is a rich and characteristic passage of Howse's, highlighting an ecological take on execution as seasonable cycles of sedimentation in which interpretation is simultaneously a divination of future utterances and a palimpsestic bootstrapping onto sets of already existent, sequential yet also cyclical processes of execution and interpretation in the world.

The notion of a dark interpreter is adapted from a posthumously published essay that appears in Thomas De Quincey's collection of numinous prose fantasies, *Suspiria de profundis* ("sighs from the depths"). In short, De Quincey's Dark Interpreter acts as a stand-in figuration for what De Quincey views as the necessary experience of suffering that any would-be intellect must go through: "Pain driven to agony, or grief driven to frenzy, is essential to the ventilation of profound natures ... it is in such cases that the Dark Interpreter does his work, revealing the worlds of pain and agony and woe possible to man"²² (De Quincey [1891] 2009). In a knowing appropriation of De Quincey, Howse further develops his thinking on execution in relation to his new set of noise processing sound generators, to which he gives the name

²² While Howse did not make reference to this text of De Quincey in his writing on *pain registers* at the time of the creation of the piece, it makes for an interesting reference after the fact.

of Dark Interpreter. In doing so, Howse repurposes De Quincey's shadowy figuration of interpretation by shifting it into the realms of computing and noise generation via a "skin-sensitive electronic instrument or effects processor" capable of translating, or rather interpreting, the conductions of body capacitance, skin resistance and biological micro-voltages into noise generation. Crucially for Howse, "The Dark Interpreter is thus not to be controlled. It is an obsidian electronic mirror, the earth and skin itself" (Howse 2015). Howse is interested here then not necessarily in the registering and working with the "dark" powers of frenzy and grief such as De Quincey would have it, but rather in the sense of uncontrollable ventilations and on-the-fly interpretations of what might be understood as the (comparatively) nondiscursive abilities of the body's capacity to continually conduct energies all of its own accord.

Figure 5.1. Mater Tenebrarum, the third of Howse's three dark interpreters. Image courtesy of the artist 2016

Howse (2015) also situates his series of Dark Interpreters in a direct comparison with the CPU of computing: "But what is exactly this hidden place of the now, where symbolic orders, where language becomes material change at a quantum level? Where words are subjected to literal and not literary un-angelled noise ... This non-place is the CPU or Central Processing Unit, anchoring any technology, AKA. the Dark Interpreter" (Howse 2015). This lively presencing mode of Howse's Dark Interpreter can be read in multiple ways: as a referent for the moment of the infusion of discursive logics (e.g. information, mathematics, code) with their discursively displaced but formative substrates (e.g. entropy, noise, matter); as the act of live interpretation and execution as it unfolds in the world and in the moment of the now; as a processual, "autoevolutionary machine" and executor of Gnostic style programs of universal organisation (Howse 2013b, making direct reference to science fiction writer Stanislaw Lem's *Summa Technologiae*); or as an incessant drive towards creation, as witnessed both in the kernel of inspiration that inspires a young

Turing to plant the limbs of his broken soldiers in the ground and in the dark, creative responses of the soil within which these limbs are inserted.

As a notion of the Dark Interpreter hints at, a key issue that can be seen to arise in Howse's works is the interplay of discursivity and its displaced substrates of the comparatively nondiscursive, and the way in which each charges and infects the other. As Abelson et al. remind readers of their well-known textbook on the structure and interpretation of computer programs, "the most fundamental idea in programming" is that "The evaluator, which determines the meaning of expressions in a programming language, is just another program" (Abelson et al. 1996, 360).²³ In their work to materialise Turing's and others' formulations on computation into reliable executing machines, engineers of the time had the challenging and essential task of making matter and phenomena such as electricity into necessarily reconfigurable and controllable elements that could consistently carry out the tasks of mathematics and logic that would flow through them. In his essay on this key phase in electrical engineering, artist and researcher David Link highlights how this engineering of matter as reconfigurable can be seen as the culmination of an intense history of experimentations with electricity, leading to a situation in which engineers "no longer understood natural phenomena, such as electricity, as fate and fact to be grasped descriptively, but as material that could be formed in any number of ways" (Link 2006, 41). Combined with Claude Shannon (1938) and others' work on both formalising and materialising techniques in which relays and switching circuits could be utilised for performing the logic functions of Boolean algebra in ways that, regardless of the unreliable components involved, could be made to remain reliably functional from one cycle to the next, a kind of decisive tipping point can be seen to be crossed, one in which a powerful mode of discursivity becomes materially executable on these new computing machines.

Turing's (1946) own proposal and work on an Automatic Computing Engine (ACE) ably highlights this flexible mobility of meaning and matter. In it, Turing outlines how mercury-filled acoustic delay lines²⁴ can be used to form a high-speed storage component in the machine. According to this setup, five-foot-long tubes of liquid mercury (or other liquid alternatives) with quartz crystal transducers are injected with carefully controlled pulses of electricity (about a microsecond apart) that, via crystals on one end, propagate ultrasonic wave patterns along the length of the tubes, whose varying amounts of energy can then be reconverted, via crystals on the other end, back into electricity and whose resultant voltage must in turn be sufficiently amplified so as to give a readable output that can be then be used to gate a second standard pulse generated by the clock. In this creative manipulation

23 Evaluator being another term for interpreter. In speaking of execution, it can be helpful to compare and contrast the many alternative phrases invoked in its place within computing. For instance, if execution has a sense of suggesting a kind of decisive moment, the common terminology of "running" a program brings more readily to the fore the more durational aspects of live execution ("runtime") and the ongoing and necessary processes of upkeep involved in any processes of computation.

24 Turing later acknowledged the influence of J. Presper Eckert's pioneering work on mercury delay line memory in this particular setup of his.

of matter, logically encoded bits of information are progressively shifted across metal, rock and liquid, at one point riding upon sound waves that are themselves propagated via the undulant affordances of mercury. Combined with Turing's insight that each computing machine can itself become the ground for some other computing machine, a kind of tectonic material discursive rumbling can be seen to be working its way across the exponential range of practices infused by this model of computability and its execution in the world. This highly transducible form of information processing, one that, despite its many prickly, error-prone and difficult to control physical elements, begins to call forth a diverse array of materially switchable and relayed forms of executable operations into the world. That such codeable qualities of the material world were also being further unveiled in concurrent discoveries in genetics around DNA only further highlights this infusion of a powerful new mode of material discursive interpretation at the time.

Such highly flexible and mobile forms of transduction and recursivity in the execution of programmed material discursive pursuits also has the effect of further highlighting a need to think through the way in which such practices can work themselves across various compositional layers and actualisations of matter and meaning. In his article on stack software structures, Rory Solomon asks the question of "whether it is truly possible to access nondiscursive layers of media, and what that even might mean" (Solomon 2013). Using the examples of both the functional call stack within programming languages and the more general-purpose diagrams of application stack software architectures (with their pyramids, cones, cylinders, and other diagrammatic heaps of sedimented computational layers stacked one over or below the other), Solomon highlights the way in which a mode of last in, first out interpretation and execution, as well as other stack-like models, can serve as a helpful reminder of how one discursive system can bootstrap and further build itself off of other discursive systems, a cycle of layering and sedimentation that points to discourse as both historically sequential and highly contingent.

Benjamin Bratton (2015), in his extended study into the geopolitical relevance of a notion of stack architectures as they operate in relation to computing, highlights the importance of thinking through the way in which various forms of power work to extend across and infiltrate through from one executing layer of operations to another. Drawing inspiration both from Carl Schmitt's writing on sovereignty and also application stack software architectures in software, Bratton's model highlights seven interdependent layers for consideration: earth, cloud, city, network, address, interface and user. Each of these executable operational layers instantiate certain logics and forms of organisation and address. As in Deleuze and Guattari (1987), there is a geological sense of

ongoing movement between the sedimented layers and their particular prospects for interoperability, one in which aspects of each layer might be “harder” or “softer” according to the conditions at any one point in time or in regard to any particular operation in question. A key point in Bratton’s invocation of such a stack architecture as a diagram for the study of computation and power is the way in which it asks one to take into account both the specific operations of each individual layer, at the same time that it highlights a need to work through the further multi-scalar and interpenetrative relations that extend and develop across each layer. Again, part of the task in such an approach becomes to consider how the architectures of each of these layers contain their own forceful compositional affordances that, when successfully able to gain operational purchase, enact a kind of terraforming and moulding of those entities that come into their scope. In some instances by design, but also in the unforeseen productive outgrowths that inevitably emerge along the way.

This sense of parasitic layerings in a stack architecture indicates in turn not simply to processes of sedimentation, but also to the co-constitutive interfacial transductions that open up across and between each layer. Adrian Mackenzie (2002) describes transduction as the processual and provisional resolution of an informational transfer across different communicative orders. Such a resolution may or may not be given material discursive purchase or meaning within a particular interpretive system, and any transduction is both dependent on a perspectival viewpoint in order to be identified as a transduction, at the same time that transductions can also be seen to just happen in the ongoing ecology of executing relations, regardless of whether one takes note or not. In the case of Howse’s *pain registers*, one could say that in transposing the executing processes of a CPU over to the skin, Howse is not so much resolving the issue of the black box in computing, but rather bringing its questioning, opaque aspects more directly to the fore, beating out their still obfuscated rhythms of information processing onto the layer of skin via the sharpened inquisitive form of a needle, the ensemble of elements remaining in a pointedly intensified state of potential transgression and breakdown.

This quality of perspective and the mobilities of matter and meaning hints towards a certain vertiginous post-structural or even postmodern arbitrariness or contingency at the heart of such interpretive endeavours. And it is here that the call to considering the power and implication of the agential cut comes into play. In attempting to think through and question where one might make the material discursive agential cut in question, one might, for instance, return to the importance of sequence. Thus, Marshall McLuhan’s ([1964] 2003) statement “the medium is the message” can be read as emphasising the way in which the medium

comes prior to the message and thus acts as precondition for any content. Where McLuhan speaks of media as extensions of man, Kittler's simple but productive move is to forcefully emphasise the reverse directionality that McLuhan's interpretation begins to bring to the fore, positing human subjectivity as extensions of the technical affordances of the discourse networks of any particular time. Artist and writer William Schrimshaw points out how media as tools for "anthropic orientation" and communication always in a sense "undermine" this human-centred orientation by their very "indifference" to the human projects towards which they are put to use (Schrimshaw 2012, 101). This undermining indifference can be seen as having a productive element all of its own, in that it opens up a human-centred perspective onto an "inhuman exteriority" whose very indifference to human endeavour and the symbolic registers with which a tool like the computer operates via provides an opportunity and new ground from which to reconsider notions of the human via the technological and qualities of matter that underpin it. Indeed, one of the benefits of moving more readily into a study of the mattering elements involved in media is that it is possible to discover not a kind of perspectival undifferentiated indifference, but rather whole layers of executable processes and properties that are in fact teeming with identifiable differences that make a difference.

One aim in this section as a whole has been to highlight the way in which each material discursive pursuit builds off of, propagates and opens onto other possible pursuits. Just as the meaning of expressions in a programming language are themselves determined by other programs, one can also highlight a whole range of other such recursive relations. As Alexander Galloway emphasizes in his work on network protocols, "the content of every new protocol is always another protocol" (Galloway 2004, 10). Or, as in the example of source code that Wendy Chun deconstructs, a notion of software code as "source" is a distinct glossing over of the "vicissitudes of execution," in that it ignores the fact that source code is historically posterior to object code, as well as the more direct matter that source code is not itself executable, but rather must be compiled or interpreted and thus is subject to other elements, operations, protocols and institutions that could themselves be posited as source (Chun 2011, 53). Paul Kockelman captures the crux of the matter:

just as a bicycle (as a relatively large instrument) provides an interpretant of the function of the smaller instruments that make it up (e.g., spokes, pedals, chains, etc.), and just as these smaller instruments provide interpretants of the purchases provided by the affordances they incorporate (e.g., steel, plastic, rubber), an accumulator provides an interpretant of each of the logic gates that make it up, and each of these logic gates

in turn provides an interpretant of the purchase provided by the affordances it incorporates (from silicon to solder, depending on the current state of technology). In short, just as one can zoom out to the function served by many interconnected digital computers (qua the Internet), however wide, one can zoom in to the purchase provided by many incorporated silicon atoms, however narrow. . . In other words, do not get hung up on the fact that instruments are “derivative” agents. There is no life form that is not a derivative agent in this account. (Kockelman 2011, 723)

All of which serves to highlight a perspectival nature of discourse and its mutually constituted material purchase; how any agential cut and interpretation is itself built upon certain black-boxed, displaced supports that are nonetheless interoperating and potentially discursively mobile entities of their own. Gödel’s insight on incompleteness, that any hierarchy of formalisations always remains open and ultimately undecidable, can be read as this generative call to action that continues to propel execution.

While acknowledging such an open-endedness, a particular interest in this research is specifically to highlight the limits and exclusions of any particular series of executable processes and interpretations, so as to keep to the fore particular asymmetries in the power relations and dynamics mobilised by any mode of execution, and also to remember the contingencies of these dynamics and the possibilities of alternative practices of the executable. Howse’s practice can be seen as one such empirical commitment to study computation and its mattering qualities while continuing to keep the contingencies of execution to the fore. In his method of applying forms of engineering towards the creation of contraptions in which computational logics and materials are made to unravel their own enclosing drives, one might say that’s Howse’s implementations veer towards what could be described as a *promiscuous mode*²⁵: an intentionally perverse mode of inquiry and method of execution aimed at unsettling the more stratified interpretive modes of executing machines as they have become. To this end, Howse launches his materials (code, chemicals, software, needles, hardware, soil, circuit boards, crystals, EEG readers, *Amanita muscaria* fungi, etc.) up to their stratic limits, pushing them to their perceived frictional and/or fictive constraints. Like the unruly particle of physics, potential sites of executability flash back and forth across these various works: surfacing as a computer crash; a needle pressing the skin to its breaking point; a slime mould becoming runny and separating itself from a sufficiently stratified solid. Each instantiation, leakage and interpretation suggesting both further routes for transgressive expression and new potential supports for material and endophysical enclosure.

What is executing here?... The command line’s pushy prompt.

25 See Wendy Chun and Sarah Friedland’s (2015, 4-5) joint piece for a further reading of a notion of promiscuous mode as it applies to the computationally necessary “leakiness” of wireless network cards.

In each and any shift enacted in Howse's works, there is a bringing to the fore of materialised sites of contact and exchange that inscribe and articulate their particular compositional capacities amidst a range of ongoing, active ecologies of execution. In Kittler's exposition on the implementation of protected modes that work to solidify perceived divides in hardware from software, one example was given of a creation and sedimentation of certain kinds of hierarchies and layerings between the material and discursive. Howse problematises such divides and cuts of computation while also putting them into further experimental use. In *pain registers* computational execution is palimpsestically traced off the computer's operational codes and transduced via a needle onto a layer of generative skin. In *Earthboot* (2014) it flows from the soil into the circuits of a bespoke trowel of a motherboard. In *The Dark Interpreter* noise processors, the skin's promiscuous capacities become themselves executable inputs for contagious, noisy divination. In *Diff in June* (2013) a summer day's worth of executorial traces are excavated from the changes in the register of an IBM x60's file system and spilled out into a 1,673 page graphomantic archive and tribute to micro-instructional executive ardour. And in *Sketches for an earth computer* (2014-2016) collections of unrefined earthly materials and naturally provided for telluric flows and atmospheric inputs code an embryonic assemblage that regardless of its own comparatively unrefined state will inevitably execute these inputs in one way or another. In any lingering sense of doubt at times as to their executability, the very potential of the executable. Its needle furrowing across a sedimented surface, unearthing unstable interpretations and potential leakages in these stacks that bury and unbury.²⁶ The code and materials growing wild, producing opaque excess and new "alliances of bastard components" (Fuller 2005, 103).

This becomes that. Information, entropy and the liveliness of materials bring forth ongoing encounters and sites of execution. Amidst such an ecology of executions, interpretation can be understood to "haunt" (Gitelman 2013, 3) the acts of processing, even if only in its basic effect of mobilising certain energies and their further generative and questioning prompts. Thus, the discourse network, as a result of its own demonstrative interpretive power, can be seen to unsettle long held notions of a human-centred interpretive agency. At the same time, emerging from the mills of Babbage's beloved nineteenth century factories, the many invisible hands and instruction pointers of capitalism and Moore's law steadily accumulate their own uneasy returns in the geological record.²⁷ The dark, painful and material discursive interpretation of the moment: Anthropocene.

26 In outlining his implementation of a last in first out stack data structure as part of the design for his Automatic Computing Engine, Turing (1946, 11-12 & 30) designates the terms "bury" and "unbury" for the calling and returning from subroutines (what were called "subsidiary operations" in Turing's terminology).

27 See Babbage's short essay "On the Age of Strata, as Inferred from the Rings of Trees embedded in Them" (originally published in 1837) for a brief reflection by Babbage (himself a friend of Darwin's) on how, via the study of tree rings, "we might trace back the history of the ancient forest," and in doing so, "possibly connect them ultimately with the chronology of man" (Babbage, in Morrison & Morrison 1961, 370).

OPEN MACHINES, OPEN QUESTIONS

In an admiring moment of reflection in his “Computing Machinery and Intelligence” essay, Turing comments on the way in which “machines take me by surprise with great frequency” (Turing 1950, 450). Turing admits that this partly reflects his own tendency to work quickly and risk the inevitable calculative inaccuracies and missteps that come with such a practical desire to get on with things. But he is also asking one to take seriously the generative quality of experiment and the impossibility of being able to fully predict in advance the machinations of computation and its lively executions in the world. In a different context but with a similar point in mind, Jennifer Gabrys speaks of a certain “perverse performativity” that can be seen to play out in the emergent “after-the-fact effects” that arise as a result of the ways in which “Electronics continually perform in ways we have not fully anticipated.” And how, by doing so, “such perverse performativity can provide insights into technological operations that exceed the scope of assumed intentionality or the march of progress, and it can further allow the strangely materialized, generative, or even unpredictable qualities of technologies to surface” (Gabrys 2013, 4).²⁸ For instance, as Gabrys highlights in her book *Digital Rubbish* (2013), the very excess of productive zeal that pushes out so many new technological assemblages of materials and code has the effect of rapidly outdating previous such configurations, leading to predictable but nevertheless emergent political economies and problematics of technological waste and its various forms of damage that work across and through nature and culture. Processes for which the concept of Anthropocene (Steffen, Grinevald, Crutzen and McNeill 2010; Haraway 2014) is currently working to both name and do scientific and critical work on.

While attending to modes of coercion in the name of executability, these opening chapters have at the same time indicated towards the generative qualities of computation’s executing encounters in the world. Formalisation always opens itself onto that which it cannot account for. Practices and processes of execution in the world, at the same time that they potentially consolidate into metastable material discursive practices, standard objects, or modes of dominance (each with their own genealogical lineages of descent), also promiscuously open up in each execution to emergent potentials of the executable.

As Erich Hörl has been describing in a series of texts on cybernetics, philosophy and ecologies, the particularly central position of technologies in contemporary endeavours has the effect of bringing more starkly to the fore a seeming problematic of an “inescapable artifacticity” of world perceiving and world-making (Hörl 2013a, 122). In Hörl’s words, such developments and their coming to a particular head in the “computerization of life ... exposes mediation *as such* for the first time in history,

²⁸ See also Ståhl, Lindström and Snodgrass (2014) for a further discussion of the performativity of the obsolescent materials and contents of foraged for mobile phones.

forcing the question and the problem of mediation out into the open and making its organization the central issue of the era” (122-23). Hörl is partly interested in addressing the issue of how this proliferation of technologies involved with modes of sense-making in turn highlights questions of how knowledge and meaning in general are variously composed, a compositional question that is key to this research as well. Pointing to cybernetics, Hörl highlights the arrival of what Gilbert Simondon characterises as “open machines” (Simondon 2009), an understanding of machines and objects as no longer self-contained, but instead always impinged upon by both a formal undecidability and general exposure to the compositional contexts in which they develop from and also operate within. This change in focus in the designing and thinking of machines and also that of meaning making in general is, for Hörl, “a shift from a closed world of meaning to an open world of sense,” one in which “the technical object no longer features as a meaningless tool, or as an instrument that is a mere means to achieve the ends of an already constituted and meaning-giving subject” (Hörl 2013b, 12).

While celebrating the ongoing potential in such reframings and continual negotiations of sense-making that such an engagement with openness involves, Hörl highlights how such a proposition—particularly as it manifests itself in cybernetic models—is multifaceted, in that it “enlightens the open processes of social and individual life” at the same time that the new “all-encompassing cyberneticization and computerization of our form of life has brought with it a new form of closure, a new dogmatism, and a new form of bondage through mediation and processuality” (Hörl 2013a, 123). Such a sense of openness does of course not fall out of the sky. Like with the resurgence of a focus on materiality that notably coincides with that of “immaterial” networked communications (Hui 2015), a notion of the possibilities of openness unsurprisingly finds particular and pressing purchase in the context of a surrounding sense of various forms of enclosure. The concurrent rise to prominence of both the fields of cybernetics and ecologies in the mid-twentieth century can in this sense be seen as an expected turn of events, given that each in their own way address these prompts of a certain unavoidable interconnectedness and impinging relationality; not to mention the many recent decades’ evidence worth of a nihilistic will to technologically-aided destruction that further pushes such questions to the fore.

This direct and co-evolving question of the relation between humans and machines, but also of openness and enclosure, can be seen to take hold in a range of thinkers of the age. For Martin Heidegger, it becomes a fundamental “question concerning technology” (Heidegger [1954] 1992). McLuhan’s seemingly novel claim at the time to treat media as “extensions of man” can similarly be seen as another product of this general strain

of thought and movement to work through the promiscuously open question of where the human ends and where technology begins. For Gregory Bateson, it highlights an ecology of relations between organism and environment, one in which the butterfly effects of relationality expand out and across these organisms and system of transform in general (Bateson [1972] 2000, 317-318). The point of such considerations is to consider the place of computing machines as also emerging and existing within this ongoing, fluctuating circuit of relations, with computers and the contours of the computational adding their own compositional energies to ongoing questions of execution and the executable.

Where much of early cybernetics emphasised an aim towards achieving homeostasis and relatively stable and controlled forms of equilibrium within such a circuit of transforms, the ongoing unpredictability of the supplement within these interactions between unpredictable actants rejects any such neatness. Georges Bataille, in a somewhat similar manner to Bateson, also speaks of an ongoing situation of transforms and the need for giving account for a “general economy” of the ongoing play and “movement of energy on the earth” (Bataille [1949] 1989, 21). Bataille however isn’t interested in thinking through this general economy in relation to ideas of stability and control, but instead emphasises the need to “take into consideration a play of energy that no particular end limits: *the play of living matter in general*” (23), and the way in which the excess of energy feeds into a general “effervescence of life” (10). This continuous play of energy is also to be understood as compositional, in that it presents a particular problematic to its human subjects: the question of what to do with what Bataille describes as the “accursed share” of such excesses of non-productive energy. Both everyday discourse and modes of experimentation aimed at shifting the perceived executable limits of a particular discourse draw further energy and tangible density from this sense of the limit and its potential transgression. Tools and interfaces are developed so as to further mediate between the limits of one executing practice and another, with Babbage, Turing and co.’s universal machine being one of the most adaptable and open machines for doing so in this respect. Such open-ended and compositional movements of energies and mattering continue to generate ongoing and mutational ecologies of the executable, each conjunction and encounter of forces suggesting both potential forms of consistency and coercion while in the process generating further forms of uncomputable excess.

The key point of the material discursive as developed upon in these chapters is to point to this way in which discourse, like its typical human host, aims to be a kind of “body-in-control” (Grosz 1994), shoring itself up via a species-like process of hardening and enclosure, at the same time that it must necessarily partake in a

continuous and open exchange of matter and energy. It is partly this latent perceived threat of excess and escape, bodily or otherwise, that drives many of the functions of discipline and coercion that were discussed throughout, just as the enticing possibilities of perceived transgression and other forms of exchange continue to have the effect of threatening forms of domination with other emergent, executable alternatives. Such dominant and emergent relations feed into and off one another, just as they can be manipulated or orientated in certain ways over others, pointing to the way in which a “general ecology” (Hörl 2013a) or economy leads one directly to discussions of political economy and its discussions of excess and scarcity.

The always partly open-ended, perspectival question of “What is executing here?” draws permutational force around it; the situated material discursive affordances of the question feeding its potential acts of world-making. In the words of Sadie Plant, a computer, like Luce Irigaray’s woman who “doesn’t know what she wants,” is “always more—or less—than the set of actual functions it fulfils at any particular time” (Plant 2000, 270). And in response to the question of “what are you thinking?” can be seen to suggest a similarly nonconclusive yet energetic response: “Nothing. Everything” (270). This is the inherent challenge of a material discursive approach to execution: to attend to the situated specificities of executing practices, while acknowledging the fundamental challenge of openness to any applied perspective and the impinging quality of the many mutually constituted relations that participate towards the manifestation of a particular perspective.

A key decision in this research has been to focus attention on certain dominant computationally-informed practices of relation making, and to work to describe the way in which they participate with practices of power and the privileging of certain perspectives and relations over others, and the marking of certain bodies in certain ways. As part of this discussion, brief mention of Turing’s own fate was also given earlier, and we can conclude with a shift to a final, short vignette on the fate of one of computing’s founding figures.

Turing, after his crucial contributions to the British codebreaking efforts during the Second World War, could nevertheless not be granted any public recognition for his work because of a desire on the part of the British government to keep the specifics of these codebreaking capacities secret. Furthermore, while growing awareness amongst the institutions Turing worked in of his homosexuality was tolerated because of his ability to contribute to the war effort, its continued expression following the war led to a series of events in which Turing was eventually questioned by police, and, after a very open admission of his homosexuality, sentenced by the British legal system. As is well known now, the

conditions of probation given to Turing required him to agree to hormonal treatment designed to reduce the excesses of what in the blunt terms of this medical treatment was effectively treated as a badly programmed libido. The hormonal treatment rendered Turing temporarily impotent and also induced a bout of gynaecomastia, the temporary increase in size of male breast tissue, fulfilling Turing's own premonition in a letter to a friend after his sentencing that "no doubt I shall emerge from it all a different man, but quite who I've not found out" (Turing, in Hodges 2012, xxviii).²⁹

29 Turing signed off the same letter with the following characteristic bit of good-humoured syllogistic wordplay: "Turing believes machines think / Turing lies with men / Therefore machines do not think" (Turing, in Hodges 2012, xxviii).

His body criminalised and subject to a medical imposition that aimed to discipline his bodily urges, Turing was further stripped of his security clearance and consultancy work with Government Communications Headquarters (GCHQ). Two years passed and on a June day, Turing's dead body was found by his housekeeper with a half-eaten apple beside it. The death was pronounced as a suicide, with the cause of death being cyanide poisoning. The suggestion was given that Turing had doused the apple in cyanide before consuming it, as a knowing tribute to what was known to be a favourite scene of Turing's in the animated film of *Snow White and the Seven Dwarfs*, in which Snow White takes a bite of a poisoned apple (though the apple itself was never tested for cyanide and debate continues to this day as to whether Turing's death was in fact a suicide).

In Turing's fate, we see the mechanisms of domination and a disciplinary punishment and attempt to coercively control what it sees as a problematic excess. The mythic overdrive that the image of the bite of the apple puts into motion is perhaps an almost too convenient image in the context of this chapter's theme of interpretation, with the material discursive act of biting from the mythic apple of knowledge enacted here by one of computation's most important figures. But, as Jack Halberstam has helpfully interpreted it, Turing's life work and his experience of gender instability points to the originary organising *and* interruptive energies that ongoing "interferences" of excess and noise introduce into discursive systems of knowledge, and which Turing thought might eventually play a part in birthing thinking machines (Turing 1948, 1950; Halberstam 1998, 470). Just as the biting of the apple of knowledge of Genesis feeds into an eventual ability of subjects to break out of one system's hegemonic hold on them, one can see in Turing's work on giving life to computing machines a further potential for breaking away from other discursive purchases of anthropocentric (not to mention heteronormative) thinking around productive forms of meaning making (while also still paying heed to how, when under threat, these dominant discourses will often strike out in various, often increasingly violent, modes of self-defence). Turing's willingness to embrace seeming artificiality and give it executable life might

in this context be productively interpreted as a rejection of giving into the temptation of discourses of the natural and given. As Halberstam indicates, this biting of a chemically modified apple provides a fittingly performative act of a life that resisted compulsory designations of the natural in its pursuit of an ongoing love for promiscuous infusions of maths, machines and bodies.

SECTION SUMMARY

“How do you serve the question?” rapper Kendrick Lamar asks his audience in a verse from his most recent album (“PRIDE,” Lamar 2017). Through a multi-sited series of historical and contemporary vignettes, this opening section has followed the emergence of particular forms of what it characterises as computationally significant problematics and their correspondent compositional techniques of power and expression as they gradually take executable shape in the world.

This question was proposed again and anew, with some recurring themes arising in the process. Of central note were the formative compositional qualities involved in questions of execution. This included a consideration of the many different forms of affordances that inform any given act of execution, with this research focusing on the material discursive nature of such affordances. The chapters adopted a particular method of looking at particular sites of execution, looking at the way in which certain kinds of bodies, entities and practices become substantiated and inscribed within a particular executing practice. This delimiting of sites and marking of such bodies was described as the enacting of agential cuts within an executing process. Such cuts are able to make certain elements effectively separable within the executing practice in question, but are nevertheless themselves situated within particular perspectives and relationally situated contexts.

In this research’s focus on power relations and techniques of execution, one technique of note in computationally-informed practices was that of coercion, the disciplining act of making sufficiently stable and processable the various executable elements involved (e.g. bodies, data, electrical currents) in a fashion that aims to make them aligned with particular acts of execution in the world. What was described as the processing power of a particular executing practice. In the examples looked at, this involved the application of coercive techniques such as the marking and pressuring of bodies towards the fulfilling of certain executable tasks, with the technique of differentiating and dividing into discrete parts, so as to make efficiently executable, being a particularly notable method involved. Such a coercive drive and ongoing negotiation of the encounters that arise in making things executable was shown to be one that spreads across technologically-informed practices of various kinds, enclosing, refashioning and moulding over the various bodies and procedures it hopes to

include in its executable domains.

In the repeated practice in this opening section of tracing trajectories from historical examples into the present there was also an explicitly genealogical approach adopted, one that aims to consider how such techniques and practices of making things executable might offer ways of interrogating and also engaging with present forms of computationally-informed processes in the world. The making amenable of bodies and processes to an executing practice was shown as something that required continued negotiation and whose tensions pointed to various interstitially defined forms of difference, and the next section's discussions on interface and platforms will continue to develop upon this ongoing question and process of negotiation that the computational involves.

A further key point of the material discursive and genealogical approach adapted in this research is to show how executions always come into being amidst already active ecologies of established relations of power and expression, emerging from and plugging into many existing and potential valences (material, cultural, technological, economic, etc.). Such a situating of technologies within already existent orientations and active networks of relations will also continue to be a regular theme throughout the following chapters, with much of the work in each chapter being that of setting out some of the context within which a particularly dominant process can be seen to descend and emerge from.

At the same time, the impossibility of even the most dominant regimes of relations to contain all of its own productive powers was also highlighted as a processual manner in which executing practices are always open to forms of drift, excess and contingency. Interpretation was situated within ongoing and always potentially emergent encounters of matter and meaning. Material discursive regimes of relations and practices were shown to be multiple, with one executing system or process overlapping, spilling over and cutting into others. The making executable of various forces and entities was portrayed as a processual act of world-making, a world-making that participates and contributes to ongoing ecologies of other such acts of world-making, each with their particular historically situated and contested material discursive propensities. Capturing these many different compositional and negotiated acts of world-making was one of the key points of the continuously shifting and multi-sited approach of these opening chapters, with their aim of building up a sense of and feeling for certain qualities of the computational as it takes lively executable hold within various settings.

Having hopefully developed a certain sense of execution in both a computationally specific but also more general material discursive perspective, the chapters to come will now look, in a more sustained fashion, at more specifically defined terrains of

execution as they transpire in well-known media and technology examples of the present.

PLATFORM AND PROJECTION

6 ONE / EASY / CLICK: FACEBOOK'S LIKE BUTTON

The chapters in the previous section progressed by shifting from one site of execution to another, tracking various computational practices of execution. These different examples and practices were selected so as to give a sense of the trajectories and productive dynamics of computational forms of execution, working to capture certain formative techniques and compositional propensities at play in computationally-informed practices of various kinds. In following on from these themes, this next section will involve a more directly sustained investigation of the coming into being of Facebook as a dominant networked and computational platform for executable interaction, looking into some detail on the workings of its operations.

A strategy used throughout this research for dealing with its complex and dynamic topics of study is to highlight and focus on particularly notable sites within such the topics under investigation. As a result of its continued expansion into many different fields of interaction and because of its rapidly developing nature, Facebook and its many different connected services can be seen to represent one such complex topic of study. In order to begin to trace some of the computational contours involved in Facebook's platform for networked interaction and expression, this chapter will begin by looking at one of its most iconic and well-known features: the Like button. The focus in the chapter will be on the implementation of the Facebook Like button as a central, highly effective site of execution around which to then further trace out some of the overall workings and structural features of Facebook's platform. This will include a consideration of the mutually constituted computational and economic models that an interface such as the Like button can be seen to point to, highlighting again a sense of the compositional forces that can be seen to inform the creation of certain forms of expression over others and the corresponding relations of power that they involve.

This chapter will be followed by a chapter looking at certain techniques and relational flows established by Facebook's Social Plugin APIs (of which the Like button is one example). The chapter on Social Plugins will also look into computationally-informed and politically charged practices (specifically the phenomena of "fake news" and voter microtargeting) that are able to plug into and manipulate some of Facebook's own mechanisms of engineering social relations. The final chapter in this section will look into a user-created Facebook livestream video of a police shooting, continuing the attempt in this research to consider specific politically-orientated issues that come up in questions of execution.

All three of the chapters in this section are particularly interested in how Facebook has successfully projected its particular technical model and platform for computationally mediated connectivity and social interaction out across the internet as a whole. The chapters will draw from concepts raised in the previous section, particularly the theme of the ongoing material discursive negotiation between users and machines, and also that of techniques aimed at efficiency and their economically-informed contours. As is the case in all of the sections in this research, a primary aim here will be to continue to examine certain executable techniques and practices, so as to highlight some of their particular projective pursuits and in order to consider certain broader issues of power and expression in networked and computational practices as they are developing at present.

INTERFACE AS RELATIONAL THRESHOLD

The Facebook Like button and other social buttons similar to it are everywhere in the networked environments of the present. They appear as appended items for interaction all over the pages of the major platforms that create them, but are also dotted throughout the many forms of connectivity available today. These digital objects present their thumbs, hearts and stars that ask to be engaged with via the simple act of a click. They are clicked on constantly, updating their platforms, users and much of the network as a whole with a regular stream of interpretive and affective inputs. As such, they represent one of the more visible, prominent and indeed influential sites of execution within networked and computational media. This familiar button can be addressed from a variety of angles, and this chapter will attempt to take some of these in turn, with a particular focus on its quality as interface, sociotechnical unit of expression and participant in collective affective but also economically orientated modes of interactivity.

The Like button is described as a button because of its clickable representation that is either on or off, but is also an interactive object described in software and should more generally be understood as an interface. A notion of interface can be understood in different ways, but in a pared down version, an “interface is any distinction made between something and something else” (Galloway 2015, 138). An interface helps to define the executable actions that can be made as a result of this distinction and its functional articulation in one form or another. In the case of a typical computer interaction, such as the moving of a finger across a touch screen, typing of a key or clicking of a button, a computational interface specifically aims to provide a way of gathering an input that can alter the current discrete state of the machine in one way or another.

At the material discursive level of a typical electrical computer,

the framed interaction of a button press becomes one of “the intersection between gestures and the temporal and topological organization of electrical currents” (Mackenzie 2002, 53). An interface thus acts as a transducer between perceived and established differences in the material discursive capacities of various executable entities (e.g. to open up for exchanges between the clicking finger of an organic nub of human flesh and certain intricate arrangements and manipulations of the affordances of silicon), providing a detectable “surface” point of contact known as the user interface (e.g. a pixelised thumb representation that indicates its status as clickable) that itself facilitates a transmitting of information (e.g. a protocologically formatted “packet” of information sent back and forth across variously sized lengths of connected fibre optic cables). Thus, the gesture of clicking on the Like button changes the state of the Like counter, a change of state that provides both further information and itself takes on specific meaning within a range of executing systems, particularly as interpreted by Facebook’s algorithmic and relational systems of meaning making, and as further influenced by other actors for whom the collected profiles of all of the many such interactions and active changing of various states might be of interest. As the different examples looked at in the previous chapters aimed to emphasise, a crucial part of computation is this emphasis on material discursive transductions, shifts and the various differentiations that they can instantiate and make further executable.

In its situation as an executable option for interaction within a computationally established system, an interface such as the Like button provides a threshold for interaction between those forces and entities for whom the Like button becomes a site and event for the relational transduction and articulation of information and meaning making. The variously defined executable contours of interaction are typically agreed upon because of particularly ascribed relational asymmetries between the two interacting agents involved. Indeed, it is the very condition of deemed difference and asymmetry between the interfacing agents that informs the reasons for the creation of an interface in the first place.

In attempting to map out the emergence and spread in use of the Like button, this chapter will trace how the Like button emerges via specific forms of sociotechnical engineering as a difference that makes a difference, in this case in its combined ability to both differentiate and also connect such differentiated clicks to the actions of others and further sets of defined relations. The popularity of such a simple button function is emphasised in the continued implementation and user interactions with many other similar such social buttons, including the share, the heart, the star, the upvote, the +1 and so on. Here again, it is important to highlight the way in which this executable cut of differentiation is a relationally established differentiation, with the activating of

the Like button differentiating at the same time that it makes connectable and relational this differentiation. Tiziana Terranova speaks of this quality of the relational impact of affective information in a network as being topological in nature: “A piece of information spreading throughout the open space of the network is not only a vector in search of a target, it is also a potential transformation of the space crossed that always leaves something behind – a new idea, a new affect (even an annoyance), a modification of the overall topology” (Terranova 2005, 51).

In its being situated within and connected to other interactive grammars and architectures, an interface is one site within a compositional assemblage of other affordances, relations and forces. Such relations come with already active material discursive orientations and tendencies with which interface designers, systems engineers and other involved parties will inevitably be working through. One interface is situated within a range of other interfaces, protocols and infrastructures of interaction. Matthew Fuller, in his discussion in a chapter on “the impossibility of interface,” addresses this quality of interface as a form of control that is itself nested within and distributed across other systems of control (Fuller 2003, 99). As Fuller often emphasises in his work, and what is an oft repeated point in the pages of this research, the question continually arises, both for the programmer and researcher, as to where exactly one is to position and delimit this distributed quality of objects and their relations. In this case, it is because of its very prominence in Facebook’s engineering of its platform that the Like button is treated here as an interface in which much of the entire operation and apparatus of Facebook as a platform can be seen to be concretised. In his book on interface, Branden Hookway points out how this concretisation of the relational attributes involved in an interface is part of its operative and decisive nature. Hookway: “While the interface operates in space and time, and on occasion may be described as a site or an event, it also governs the production of sites and events; it describes the site or moment in which the full operation and apparatus of systems, networks, hierarchies, and material flows are distilled into concrete action” (Hookway 2014, ix).

As already discussed in the previous section in regard to Karen Barad’s characterisation of the agential cut, an interface, in addition to being an operational form of relations between various entities, is always also a cut, in that it “actively maintains, polices, and draws on the separation that renders these entities as distinct” (Hookway 2014, 4). Thus, an interface is a form of relation that both maintains the cut of separation as well as its computational changing of state while at the same time producing an agential mutualism that in one way or another satisfies the need for such a productive separation and its attendant forms of mediation. As Hookway summarises it, “The interface is defined in its

coupling of the processes of holding apart and drawing together, of confining and opening up, of disciplining and enabling, of excluding and including” (4). One agrees to the prescribed conditions, terms of service and delimited interactive contours of Facebook because of this opening up to and facilitation of a mediated agency that is deemed worthwhile. Anyone wishing to critique Facebook for things such as its monopoly of the contours of networked social expression, commodification of the social and so on, must always keep in mind that an interface will always enact cuts and separations in the name of an executability of one kind or another. One might make a call for “better” executable cuts, but cuts, exclusions and abstractions remain as salient properties of executable agency and interaction. Part of the intention of this chapter and the multi-sited nature of the research carried out throughout these pages is to follow the linkages and generative genealogies of how one interface emerges from and in relation to others, and also to highlight the ability of newly emergent interfaces and their associational structures of interaction, expression and control to both influence and structurally reconfigure other interfaces, associational structures and forms of interaction, expression and control.

UNITS OF EXPRESSION: CLICKS AND COUNTERS

As its name suggests, Facebook’s now ubiquitous Like button is specifically a button interface. In this case, it is a button interface programmed initially with two settings for its user: on and off. For all the power that it has achieved as a propagative method of interaction, the example of the Like button can be understood in one sense as a rather natural extension of that elemental building block of computing: the ability to switch between discretely configured binary states. Implemented as “flip-flops” executed via logic gates used to store and control data flow, such switchable states of on and off (0 and 1, TRUE and FALSE, YES and NO) constitute an executable basis that allows for the writing and running of the binary instructions of machine code upon a computing machine.

In the case of the Like button’s being situated within Facebook’s many other executing processes of computational meaning making, the clicking of this particular button has the effect of launching programmed scripts that will involve the switching of many more programmed on and off states activated by the particular logical functions called by such scripts. In this relation of the one to the many, the Like button and button interfaces in general can be seen as involving a particularly tight symmetry, compatibility and reciprocity between its potential users and the machines tasked with actioning and interpreting this action. Indeed, the discretely defined clickable target, whether in a button form or otherwise (e.g. a graphical user interface object, a

hyperlink, an “Enter” key, the on and off button for powering up or down a machine, etc.), can be seen as one of execution’s most notable sites, with the click as its actionable trigger.

A brief consideration of some aspects of interface theory can be helpful here for further considering the executable qualities of a button interface such as the Like button. In a short entry titled “Button” in the collection *Software Studies: a lexicon*, Søren Pold discusses the way in which buttons—with their introduction in the early graphical user interfaces (GUIs) such as those of Xerox’s SmallTalk and the Xerox Star computers in the 1970s and early 1980s—steadily become a dominant and ubiquitous feature for user interaction and control within the majority of modern GUIs (Pold, in Fuller 2008, 31). The invention in the 1960s of the mouse by Douglas Engelbart’s team already heralded a compositional need for reactive things to click upon, with these clickable items originally being text and hypertext links before the later introduction of buttons in emerging GUIs. The typical design of a button in a GUI involves a graphical representation that attempts to simulate “a physical, mechanical cause-and-effect relationship” via not only its visual representation but also in things such as the generation of an audible click³⁰ that accompanies the press of such a button. Each of these programmed effects are aimed towards emphasising the action of a button being activated.

Pold points to computer graphics pioneer Frider Nake’s characterisation of the computer as an instrumental medium that is simulatenaously a machine and mediation. In Nake’s conception, a crucial compositional quality of the computer as an executable interface for interaction is the way in which it both instrumentalises and mediates, creating a situation in which, as Pold describes it, “function becomes mediated and the mediated representation becomes functional” (33). A key functional aspect at play in an example such as the Like button is the way in which it mediates and funnels a cultural decision (e.g. I “Like” this) into an instrumentally actionable form of a binary choice. All computationally-informed mediations involve such instrumental affordances that have the quality of funnelling forms of expression into what can be understood as certain computationally executable units of expression. While executions can be highly generative, reductions and exclusions are part and parcel of every executable action, with execution being the very decision to do “this” as opposed to “that,” “that,” or “that.” This compositional task of both the engineering and aligning of the intersections of various forms of mediated expression into functionally executable units of expression that can in turn be connected to other such networked and computational forms for interaction will be a key point of consideration throughout the chapters in this section on Facebook.

Pold describes the way in which buttons often have a way of

30 With the spread of familiarity of GUIs, this added auditory simulation in software of clicking on buttons has notably rescinded, with clicks now often muted by default and the decision left to the user to activate this particular auditory effect.

instigating a “trigger happy” sense of power and control on the part of their users, creating a situation in which “the interface button becomes an emblem of our strong desire to handle the increasingly complex issues of our societies by efficient technical means—what one may call the ‘buttonization’ of culture, in which our reality becomes clickable” (35-6). One can think here of the way in which, as Jussi Parikka writes, the nature of interfaces, algorithms, and computation in general is partly this calling forth of things to be constantly actioned upon so as to instigate the crucial threshold event that is the changing of a current state of the machine (Parikka, in Hillis, Paasonen and Petit 2015, 105).

This imparting of a certain call towards interaction and its promise of exchange and potential control is in many ways what gives a machine interface, such as that of a clickable button, its sense of charge and meaning. In the piece *Facebook Bliss* (2012, <http://www.anthonyanonellis.com/bliss/>), artist Anthony Antonellis ably captures the seemingly simple pleasure that is the clicking of an interactive button, at the same time that he indicates to the particularly resonant and now highly internalised forms of sociotechnical feedback at play in some of Facebook’s core interfacial elements. Against a background of Facebook blue (color hex: #3b5998), the three recognisable notification icons of Facebook—Friend Requests, Messages and Notifications—can be slowly triggered by repeated clicks on a rudimentarily represented “Bliss” button at the centre of the screen. Gradually, as one continues to click on the button, the number count of these three notifications grows, with the only other interaction available to the user of the piece being that of clicking on each of these notification counters, thus resetting them for running up again as one likes. Extracted as these highly familiar interactions and notifications are from the social and interpretive contexts of things like what content one is actioning and who it is that is responding to one’s presence and interactions, the button clicker in *Facebook Bliss* is left with the ability to ponder the blissful simplicity of clicks and their attendant, jaunty and upwardly mobile counters. The clean signal of a click finding a similarly discrete and closely corresponding equivalent in the agreeable rationality of integers.

The Like button is a site of execution, one given a notable prominence within Facebook’s platform for the sharing and capturing of information. It is a point in which material discursive possibilities are collapsed into the critical particularity and executable event of clicking, or not clicking, on this button. When implemented across a network of other users able to click on such a Like button, the on/off state takes on a further dimension as a counter able to metrify user affect and engagement by visually displaying information on the number of likes for the content in question. Thus, the counter function, by infusing the Like with the relational processes of numbers and enumeration,³¹ readily

31 Enumeration being the specifying of individual units in relation to compound group processes of relationality (Whitehead 1968, 93).

opens up the Like button to the executable powers of mathematical interpretation. The Like button and its countable functionality becoming a stabilised datum in the overall referencing system that is the Facebook platform; a particularly defined premise of affective quantification from which a variety of inferences and operations may then be carried out. As Gerlitz and Helmond put it in their helpful article on what they describe as the “Like economy,” the Like button is in this way able to become a “composite entity” that “collapses a variety of affective responses” into its intensive modes of both metrification and multiplication (Gerlitz and Helmond 2013, 1358). These “performative and productive capacities” (1358) of numbers in a socially orientated platform such as Facebook’s plug into and also put into motion a range of metabolisms and momentums, many aligned closely to the specific engineering of a tight and productive relation between user interaction and information processing.

Artist and researcher Ben Grosser brings this nature of the sociotechnical dynamics of Facebook’s forms of quantification to the fore in his work *Facebook Demetricator* (2012-present). The piece is a browser extension that hides all visible metrics in the Facebook interface. Thus, when installed and activated, rather than being informed that 24 people have liked a particular photo that one has also liked, the information under such a photo would instead read “You and other people like this.” Similarly, “8 mutual friends” would become “mutual friends”; “23,413 people like this” subtly transmuted into “people like this”; and so on. As Grosser describes in an interview, the *Demetricator* can be seen to problematise Facebook’s quantification of social interactions, asking its users to consider what their experience of the platform might be like in the absence of such continually present forms of quantification. Would the typical initial splurge of adding contacts (and contacts of contacts) upon joining the platform be as voracious without the number of friends metric being visibly displayed on one’s profile page? Would one compose status updates as frequently or in the same way without this aggregation of value in the form of prominently displayed Likes? As Grosser reflects on his own experience with Facebook, “the site’s relentless focus on quantity leads me to continually measure the value of my social connections within metric terms” (Grosser, in Grosser and Fuller 2012).

As will be continually emphasised throughout this chapter, the engineering of answers to these questions is in the case of Facebook almost always the result of finding optimal meeting points between the social, computational and economic factors involved. In his work on programming the actions of the *Facebook Demetricator*, Grosser began to notice how not all counts are displayed to the user, raising pertinent questions such as, “which metrics does Facebook reveal to its users and which does it keep to itself? What

is the difference between them? Further, what drives those decisions?” For Grosser, the unsurprising answer is that Facebook’s engineering and design decisions in relation to metrification can usually be seen to be based on their sense of whether a particular count will increase or decrease user participation. Grosser: “Am I more likely to click on a ‘trending article’ if I only see its title or if that title is accompanied by a message indicating that 131,394 other people read it before me? If the latter then the metric is revealed.”

That quantification has become so common and dominant a feature in online spaces of social interaction is something that can be bemoaned and questioned. Certainly, it maps on well to capitalist endeavours to unearth and monetise further aspects of living, in this case freely proffered affective and cognitive forms of social interaction. But again, even if a seemingly banal point to make, it is worth reiterating how computers have been structured and developed from their earliest days for the specific goal of carrying out the often arduous and monotonous tasks of counting and mathematics. Given how deeply quantification and the applying of mathematical functions to the evaluation of numerical information is engrained in the use to which computers have been put since their beginnings, this trajectory into a present mania for the mass quantification of content should in one sense hardly come as a surprise. Enumeration is itself a fundamental and basic quality lying at the centre of the computational endeavour from its first inception, and thus quite naturally presents itself as an ever-ready task towards which computational efforts can be aimed. Key computational features such as those of the relation database structures underpinning Facebook’s platform readily evolve out of this enumerative functionality of computing machines and the database as technical object is itself one of a series of influential forms that helped to inform a drive towards the capture, tabulation and analysis of large quantities of statistics, which in turn helps to partly drive forward a demand for electronic calculating machines. As Grosser points out, “counts are already there, so why not add them to the interface?”

One may critique the qualities of this seemingly limited form of expression, but with the material discursive contours and historical trajectories of computing as they have been to date, it shouldn’t come as a surprise that one ends up with this particular unit of executable expression. In addition to this computational call of enumeration and quantification, it is also important simply to acknowledge the powers and pleasures of quantification as they can be experienced on the user side, whether one is speaking of Likes, site visits, view counts, academic citation metrics or the various and often highly enticing forms of progression tracking in everything from video games to fitness tracking.

Figure 6.1. Image from SHARE LAB's (2016) "Immaterial Labour and Data harvesting" report. Similarly large figures of user interaction can be found for Facebook's other platforms such as WhatsApp and Instagram.

As will be discussed in further detail later on in the next chapter, perhaps the most significant aspect of what have been called Web 2.0 services is their ability to instil technically efficient forms and processes for encouraging both the generation and capture of user engagement that might be fed into such databases in order to generate forms of value assertion, with the Like button being one notable example of this. In this transition towards big data style forms of aggregation, the once largely backend visibility for webmasters of things like site visits³² now pushes to the fore on the pages of Facebook and the many other sites integrating counts of Likes, hearts, +1s,³³ stars, retweets, Pins and so on, creating an unavoidable sense of a strong relation to, and in many cases, an ongoing compositional dialogue with quantification as one moves across the network.

PROPAGATION

In its putting into place of a practical and ready accumulator of a quantified measurement of affective response, the Like button opens up one easy algorithmic and highly scalable method for determining demand so as to make decisions regarding the supply of content across its platform. The explosive popularity of this functionality can in turn be further explained by the way in which the action of a Like can so clearly be interpreted by multiple key actors in the network—be they other friends, Facebook's various algorithms, third-party advertisers and so on—as a seemingly clear difference that makes a difference. Situated as the Like button is in a platform that captures all manner of details

³² Though it should be noted that visibly integrated site visit counters did go through phases of popularity in the pre-Web 2.0 times of the first decade of the World Wide Web.

³³ That Google opted for "+1" as the naming for their social button says something about the particularly pragmatic, if occasionally rather blunt, computational worldview that Google can be seen to promote.

in relation to an individual user, their connections to other users and the various kinds of content these users can be seen to interact with, the seemingly simple click of a button can be mapped (e.g. users *like* you *liked* items *like* this) across these users and content in what is referred to as a social graph, thus exponentially increasing both the Like button's granularity and scope as a metric. In such a manner, the Like button produces a notably lightweight yet potentially relationally rich expressive data point in its form as a quantitative metric that is immediately open to many of the powerful logical and mathematically-orientated functions of computation, as well as providing an efficient and readily scalable technique for the capture of sentiment and affect in massively networked environments.

The Like button is of course only one way in which Facebook is able to capture user sentiment. Users can also comment on content via typed forms of alphanumeric communication, emoji, response images, videos and so on, all of which can be potentially computationally mined and interpreted in their own ways. But these user comments, as with the originally posted content, are also appended with Like buttons, emphasising just how much value Facebook puts on the power of the Like function. Of further note here regarding the newly introduced Facebook Reactions extension of the Like button in February of 2016, an added feature in which users can long press the Like button to bring up different forms of emotive graphical reactions (specifically a "love" heart and "haha," "wow," "sad" and "angry" smileys), is that while one can add reactions to the original content of the status update, it is currently (as of April 2017) only possible to Like comments, one more indicator of the centrality of the primary function of the Like in Facebook's thinking.

In addition to being "close" to workings of the machine, the Like button can also be seen as, in some senses, close to the situation of many of its users. First and foremost, it's meaning to the user as an interface is simple and its activation straightforward. Furthermore, situated as so many Facebook users are in the multiple and intensive attentional economies of the present, a quick button press is a relatively costless proposition. To Like is to be able to acknowledge while moving on. To propel and be propelled via the grammar and rhythm of this pared-down interaction. A "Dislike" button would seem to put unwanted emphasis on a further need for explanation and justification, disrupting the carefully streamlined and orientated flows that Facebook aims to establish between its users, its advertisers and its other relational forms of executable data points.

The propulsive forward momentum of the Like button is echoed in the way in which a Like on a platform such as Facebook typically means that this liked content will be shared with an algorithmically decided upon set of other relations in the user's network,

propelling the content in question onto Timelines, News Feeds, recommenders and so on for further Liking and other propagative vectors of cross-syndication. In the Like economy of Facebook, such an interaction can be understood as feeding, at least from Facebook's perspective, what Gerlitz and Helmond describe as an aim towards "facilitating a web of positive sentiment in which users are constantly prompted to like, enjoy, recommend and buy as opposed to discuss or critique – making all forms of engagement more comparable but also more sellable to webmasters, brands and advertisers" (Gerlitz & Helmond 2013, 1362). Of course, the interpretation and meaning that any individual assigns to their particular clicking of affective buttons in relation to a particular piece of content will vary and in many cases might differ significantly to the interpretation that the platform in question attributes to such a button. As witnessed in user reactions to examples such as Twitter's decision to change the visual representation of its starring button to that of a heart icon, the official and individual affordances attributed to such emotive buttons can vary quite significantly – which indeed was one of the motivations that Twitter gave for this particular change (Bucher and Helmond 2017). The material discursive task for platforms in the design of such executable buttons is to make interaction with the button in question an engaging and meaningful one for users, while at the same time to be able to interpret what the triggering of such a button can be taken to mean when working to program for computational interpretations of these interactions. Thus, Facebook works to make its interfaces adaptable to the users at the same time that it works to make users adaptable to the interface, an ongoing negotiation that lies at the very core of attentional-focused systems such as social networks. As Bucher and Helmond advocate, it is important to attend to "the multi-directionality of agency and connectivity at play" (Bucher and Helmond 2017), specifically that of the co-constituted and compositional relation of users and computational systems, but also of the further relations that inform decisions made in regards to the particular contours and affordances of the platform in question.

PROTOTYPING LIKES

The emergence of the Like button as a seemingly ideal computationally-informed unit of expression within the Facebook platform has a relatively traceable lineage. Gerlitz and Helmond (2013) situate its genealogy within that of social buttons that allow one to share, recommend, like, upvote or bookmark content, posts and pages across various social media platforms. They focus particularly on the social buttons that emerged on social bookmarking websites such as Delicious and content aggregation websites such as Digg and Reddit (who introduced their buttons in the Autumn of 2006), each of which can be seen to help to pop-

ularise socialised acts of sharing and valuing various forms of content from around the web in the form of simple, predefined and clickable buttons that can be embedded on a website. Facebook's own implementation of a Share button occurred around this same time. Such buttons often included counters showing the current total number of activities performed on the objects to which such buttons were attached to. As highlighted in Gerlitz and Helmond's article, these types of social buttons "facilitate the cross-syndication of web content and, compared to expert linking practices, introduce a participatory and user-focused approach to recommendation and the creation of links between web objects" (Gerlitz and Helmond 2013, 1351), key features that would eventually be further implemented and expanded upon by Facebook with their own Like button.

One notable precursor to Facebook's implementation of the Like button includes the introduction in 2007 of a Like button onto the FriendFeed real-time feed aggregator of updates from social media, bookmarking, blog and microblog updates. As announced on the official blog of FriendFeed on 30 Oct, 2007, "People use FriendFeed to socialize and comment on the stuff they share from sites around the Web (like YouTube, Google Reader, or Last.fm), and a lot of our users said they wanted an ultra-quick way to share their appreciation for the most funny/interesting/useful entries from their friends. Now you can tell your friends which entries you like with a single click" (Taylor 2007). The button in this case was a button with "Like" printed upon it, nestled in between "Comment" and "Share" buttons.

Meanwhile, services such as YouTube's popular video-sharing platform were switching, in 2010, from five-star rating systems to Like/Dislike buttons (often cited as an early instance of a Dislike button on a major social media service), with YouTube arguing for the change partly based on the fact that the 2-, 3- and 4-star ratings were being used at a markedly less frequent rate than 1- and 5-star ratings (YouTube 2009). The YouTube Like and Dislike buttons are also noticeable for being in the form of the thumbs up and down representations. Other examples of Like button style features on social networks of the time include Myspace's "give kudos" button, Tumblr's and Vimeo's heart buttons, Tinder's system of swiping left and right, to name just a few.³⁴ And Netflix's recent swapping out of its five-star rating system to one of thumbs up and thumbs down only further points to tech companies seeing such relatively pared down systems as being the current optimal algorithmic strategy for generating and capturing user sentiment in the name of collaborative forms of filtering and machine learning predictions of user interests based on such inputs.

According to an account by Andrew Bosworth, a key figure at Facebook known for his work as engineering director working

34 For anyone wanting to go a bit further back in the history of such a functionality, one might look at examples such as Dr. Nevil Monroe Hopkins' "radiovota" (i.e. radio voter) proposal, in which Hopkins experimented with the creation of a box with three buttons—Present, No, Yes—that one could attach to the radio and use for expressing whether one liked or disliked a song, advertisement, or other segment of the radio broadcast (Novak 2014). Hopkins got as far as being granted two patents for the proposals in 1937 and had even formed a company, National Electric Ballots, focused specifically on implementing this new form of remotely delivered direct feedback. But in the end the implementation never got further than this proposal stage, representing yet another example of the thwarted two-way potentials of radio's history, such as Bertold Brecht ([1932] 2001, 41–46) famously highlighted.

35 Other notable FriendFeed features that were incorporated into Facebook's own interface include the ability to import activity items from third party sites into activity on one's news feed; the fusion of microblogging features with activity streams; the "floating" of stories to the top of one's feed as new users comment on them and a real-time system of update in which one doesn't need to manually refresh the page.

on various aspects of Facebook's core infrastructure (Bosworth worked on, amongst other things, News Feed, Messages, Chat, Groups, Photos, Videos, Ads, analytics), the discussions that led to the eventual implementation of a Like button in February of 2009 began around the summer of 2007. This is of course an account told by a Facebook insider, and one should take certain details with a dose of scepticism, particularly given that Bosworth's account conveniently dates Facebook's discussions of the Like button before the release of FriendFeed's Like button – which Facebook was accused of copying at the time. Indeed, in this timeline of events, Bosworth deems it necessary to go so far as to make the following comment, "October 30, 2007 – FriendFeed adds 'like' feature. As far as I can tell from my email archives, nobody at FB noticed. =/". A perhaps doubtful statement, given that Facebook was clearly an admirer³⁵ of FriendFeed, whom they eventually acquired for an estimated \$50 million in August, 2009.

With all of this in mind then, as told by Bosworth, an email thread began for a project codenamed "Props." This thread was initially held between Bosworth, Justin Rosenstein, Leah Pearlman, Ezra Callahan, and Akhil Wable, and involved discussions in which they "boil down the discussion of symbols to"

- stars (concern that it would translate to "I give this 1 star" which is a bad review)

- plus sign (possibly accompanied with a minus sign, apropos to this discussion)

- thumbs up (concern about internationalization, this is a bad sign in some places)

We also consider lots of language and settle, temporarily, on "awesome." (Bosworth 2014)

Initial prototypes of an "awesome button" integrated into the News Feed and (now defunct) Mini-Feed are tested at an in-house hackathon, and the longer process of design and full-scale integration is then begun, with the project garnering a large amount of interest within the company:

July 31, 2007 - In a larger set of threads, the project builds a huge amount of interest:

- James Wang and platform product marketing are interested because of the potential to use awesome button to filter out bad application stories.

- Feed team interested in improving feed ranking

- Ads team interested in improving CTR

[...]

August 22, 2007 - the word “like” is proposed as a more universal term but receives a lukewarm response. We’ve become somewhat attached to awesome and, comparatively, like seems bland.

[...]

November 12, 2007 - Ready to launch and things appear to be all set but final review with Zuck surprisingly doesn’t go well. Concerns about the whether the interaction is public or private, cannibalizing from the share feature, and potential conflict with Beacon. Feature development as originally envisioned basically stops.

[...]

December 2008 - February, Jonathan Pines as lead engineer, Jared Morgenstern as product manager, and Soleio take on the project. The project was considered a cursed project because it had failed so many Zuck reviews. In order to combat that the team enlisted Itamar Rosenn to arm the team with data to prove the presence of a Like button did not take away from the number of the comments that a post received. In fact when the early tests came back it turned out that the presence of the Like button increased the number of comments due to how News Feed using Like as a signal for distribution. Roll out to 100% of users followed shortly.

February 9, 2009 - Facebook launches “like” and Leah Pearlman writes her blog post “I like this” to announce it to the world, recognizing her hard work at the inception of the project and her support throughout it. The world immediately accuses Facebook of stealing the idea from Friendfeed. (Bosworth 2014)

In this recap of Bosworth’s, several crucial features of the Like button are highlighted. These include the abstraction of affect and questions around its interpretation. But most telling is the eventually evident potential of the Like button “as a signal for distribution” to seamlessly capture and propel (as its original code-name Props hints towards) further forms of action and activity within the Facebook platform (themes that will be returned to in the next chapter). Pearlman’s (2009) “I like this” post announcing the launch of the Like button similarly focuses on these qualities of the simplicity and propulsiveness of “one easy click.” With its rollout, starting on 9 February, 2009, the Like button quickly establishes itself as one of the best recognised and most used forms of interaction on Facebook’s platform and further outwards across the Web.

COLLECTIVE PROCESSING

The Like button's productive executable function is in its ability to capture and share a certain affective response towards the content onto which the Like button is appended to. The potential reasons for a click on the Like button are variable and open-ended. Nevertheless, the triggering of the button will most usually stand for an affective response on the part of the user, an indicator of attention and recognition of one form or the other. While typically used for the sharing of positive forms of response, the clicking of the Like button can also stand for irony, cynicism or an exhausted need to move on from the content in question. The Like button then both in name and use is aimed towards the expression of emotion, but it involves further key elements of interpretation and the transformation of these responses into the clickable and countable Like. In this way, the button folds affect into imbricated human-machine modes of interpretation.

The Like button acts as a kind of highly simplified yet rather efficient and productive interface for processing affective response. As Robert Gehl characterises it, one can understand such work in the design of such buttons and their platforms as a whole as being aimed towards putting into motion a form of "affective processing" on the part of users that many of the social media enterprises of the moment aim to tap into and build upon. In models such as that of Facebook, users

are expected to process digital objects by sharing content, making connections, ranking cultural artefacts, and producing new digital content, a mode of computing I call "affective processing." In essence, this business model imagines users to be potential superprocessors. With enough users aggregated via network effects and presented with a smooth interface (preferably something simple and binary, such as a "Like," "Tweet," "+1," or "Dig" button), they become a valuable source of digital-artefact processing (Gehl 2014, 42).

Gehl links this approach, as many do, to the rise of so-called Web 2.0 models of platform infrastructures that are focused on facilitating and motivating users to easily generate various forms of potentially valuable content which the platform hosts can share with other users and also capitalise on. Indeed, Gehl goes so far as to point to the way in which one might see this development as a natural end product of divisions established at the level of the machine in the computer's early adaption of a Von Neumann architecture. Gehl points to how business models like those of Google or Facebook's draw from cognitive and affective labour on the part of users while denying them access to the valuable archives of data that they produce. Such a division can also be witnessed in the Von Neumann architecture, which divides the processor from the memory (where both data and

programs are stored and fetched from). In this way, social media companies are able to “derive power from storing the results of users’ affective processing in archives” (17), whether in terms of granting certain forms of access to these stored archives (as in the examples of Facebook’s Social Plugin APIs looked at in the next chapter) or in being able to sell its value on to other parties (e.g. advertisers looking to make the most of Facebook’s fine-grained microtargeting capabilities). One can debate the specifics or relevance of Gehl’s comparison to the Von Neumann architecture, but here, as in the Chapter 3’s discussion of Friedrich Kittler’s writing on protected mode, one sees a correlative denial of access to both technical and social areas of memory (in, amongst others, the computational form of stored databases and archives, the makeup of the all-important algorithmic instructions that process and present these memories, and also in the communal sense of socially generated memories). This restriction of access is enacted however not at the level of an individual user’s machine or operating system, but upon social web platforms used by many, many users. Such intentional engineering for and mobilising of affective processing results in a profitable archive of culture and affect, the capitalisation of whose user-generated labour and energies companies such as Facebook and others have proven very capable of developing further and expanding upon. Indeed, it feeds their business model and is thus a key factor in their ability to expand their reach.

The Like button acts as a particularly productive unit of expression *and* interpretation. It is both added content and an evaluation of content; data and metadata. In its continued appending onto any form of content produced in Facebook it continually prompts its viewers with small micro tasks of cognitive and affective labour aimed at changing the state of the button and topological sociotechnical network within which it is situated. There is of course no requirement to Like content, but such is the continuous availability and presence of the Like button in one’s interactions on Facebook that it proves rather hard to ignore. A user is continually nudged when their own content is Liked, thus reminding one of the Like button’s presence, and encouraging similarly active engagement with the button when viewing others’ content as a result of this infrastructure that, in classic discursive fashion, has the potential to create dispersed forms of coercion in the form of promoting certain normative and self-regulating forms of behaviour and interaction over others.

The Like button, like all social buttons, is also a form of production that mobilises the energies of what is referred to as crowdsourcing: the drawing on the multiplier effects of inputs from numerous users in order to achieve a certain kind of effective critical mass in both the production and sorting of information of one kind or another. Crowdsourcing can take many different

forms. If its paradigmatic and oft-paraded early example was Wikipedia, one sees now in examples such as Facebook and Amazon's Mechanical Turk the way in which this technique of drawing on the "collective intelligence" of large numbers of users has become infused with much of the earlier practices of capitalist modes of outsourcing, from which crowdsourcing partly takes its name. As evangelised by Jeff Howe in the June 2006 issue of *Wired* magazine, "The labor isn't always free, but it costs a lot less than paying traditional employees. It's not outsourcing; it's crowdsourcing" (Howe, cited in Aytes 2013, 89). Once again, as in the Chapter 4's discussion of Charles Babbage's writings on physical, mental and economic forms of division of labour, one sees just how tightly emerging modes of computational practice continue to remain deeply infused with now longstanding modes of capitalism that specifically seek at exploiting and extracting profits from the labour of others while typically withholding much of the capital profits of this labour from its labourers.

Gerlitz and Helmond (2013) characterise Facebook's model of gathering individual user responses in a free-to-use model as a "Like economy." This model can itself be seen to follow in the wake of a range of similar "service-for-profile" business models (Elmer 2004), by which the collection of interactions on the part of readily attributable and further aggregated user profiles are orientated so as to be able to generate value for the service in question by making this collected data sellable to paying advertising clients, as most notably implemented by Google in the years previous to Facebook's own launch in 2004. This commodification of users and their interactions is in one sense nothing new to the post-industrial modes of capitalism. It follows in an ongoing trajectory of certain mid-twentieth century shifts from manual worker industrial economies to those of "knowledge workers" and their participation in what Peter Drucker ([1959] 1996) described as burgeoning "knowledge economies" built upon the generation of value in comparatively more immaterial products and services. With the arrival and mainstreaming of the World Wide Web comes what Donald Tapscott, in his well-known piece of mid-1990s managerial literature, popularised as a new "digital economy," defined in its early stages by its merger of cultural economies with the emerging information industries that produce a "new economy based on the networking of human intelligence" (Tapscott 1996, xiii). In this gradual development of knowledge economies into attention economies based on computationally managed forms of capitalising on cognitive and affective forms of interaction, one can see a shared aim towards what Matteo Pasquinelli (2009) describes as the generation of "network surplus-value" that represents a further shift in the locus of value generation (specifically, things such as attentional value, cognitive value, affective value, network value). This kind

of data capture and value generation requires an infrastructure that includes high levels of storage capacity, networking bandwidth and processing power, and is thus dependent on the newly emerging tools of networked and computational media that begin to develop the ability to “capture living time and living labour and to transform the *common intellect into network value*” (Pasquinelli 2009).

In such models, affective data about human behaviour is strategically and aggressively captured via computational practices aimed at cultivating the kinds of network effects that will lead to the generation of more such data and value. As Tiziana Teranova’s (2004) early critical descriptions of such digital economies describes it, this experimenting with various techniques and technologies aimed at the capture and valuation of larger pools of social and cultural knowledge continues an ongoing trajectory and intensification of the turning into a form of labour and making monetisable forms of everyday “cultural flows” of social interaction (e.g. commenting, chatting, sharing of news items or photos, etc.) that were previously not commonly recognised as such. Such practices participate in the cultivation of what Maurizio Lazzarato (1996) has termed as affective and cognitive forms of “immaterial labour.” When so successfully commandeered as it has been by the likes of Facebook, Amazon, Google and others, these forms of immaterial labour can be seen to provide yet another example of what Italian *operaismo* and autonomist writer Mario Tronti had already in the 1960s famously characterised as a “social factory” (Tronti 1996), or what Antonio Negri would later call “firms without factories” (Negri, in Gill and Pratt 2013). Establishing in the process so-called post-industrial eras in which the factory model of an efficient system for the application of labour to the production of value lives on in this new division and distribution of micro cognitive tasks that open up the realm of the social to computationally effective forms of processing.

Part of the triumph of late twentieth and early twenty-first century forms of capitalism is their ability to suggest creative, cultural and social interactions as always already orientated and thus open to capitalisation as it occurs in capitalist models. While new in form, these models should be seen as very much aligned with classic traditions of aggressive forms of surplus accumulation and the exploiting of the labour of many for the profits and monopolistic expansion of the few, and thus are very much products of their cultivation within and close ties to twentieth century models of capitalism. The template for Web 2.0 and collective generation and processing of information arises not only as a clever strategic technical implementation of its time, but additionally as a mode of content generation that is both perfectly in line with ongoing trajectories of channelling flows of culture work into

very specifically capitalist models, just as it is a further entrenching of, experimentation with and formalising of such models into the technical makeup of platforms such as Google or Facebook. With the recurring rollout of techniques such as personalisation algorithms and data hoarding and mining in the development of one new platform to the next, we see just how thoroughly this model of engineering for the extraction and processing of affective forms of freely provided forms of digital labour has become at present. Such a successfully co-constituted fashioning and bringing together in computationally efficient fashion of the labours of bodies and machines can also be understood as another example of processing power, as it was described in Chapter 4, with the ability to capture, store and process information generated from the labour of users becoming the specific form of power in this particular relationship.

In the case of the Like button and the many of the other forms of user labour that can be effectively capitalised on by Facebook, the labour in question is an affective form of labour. As Brian Massumi speaks of it, affect can be understood as describing a sense of being brought into or participating in an experience of a relational exchange of forces, and in this sense indicates towards a sense of transition and transduction. Massumi:

When you affect something, you are at the same time opening yourself up to being affected in turn, and in a slightly different way than you might have been the moment before. You have made a transition, however slight. You have stepped over a threshold. Affect is this passing of a threshold, seen from the point of view of the change in capacity. (Massumi 2015, 4)

In its making available of the Like button as a site with which users can quickly indicate a sense of having being affected in one way or another, Facebook inscribes the particular threshold of clicking the Like button as one method for indicating such a sense of having been affected – a process of clicking that typically involves a small but meaningful aspect of additional labour on the part of the user. Facebook is in one sense then essentially a platform for the continuous generation of expressive content that can be affectively marked up in various ways. In interpreting these various bits of user produced information, Facebook is able to map relations and crucially also relational intensities (via things like the number and frequency of Likes on a particular data point). This information and labour on the part of its users can then be used so as to determine levels of demand for the supply of particular content at the same time that it can also be sold on to those who would make use of such relational data. This opening up of everyday social interactions to their stored capture and transformation into cumulative forms of information capital (as rendered in interpretive models such as Facebook's social

graph) to be sold to micro-targeting advertisers is, as Wendy Chun aptly describes it, a “structure of using while being used” (Chun 2006, 250). As with any social contract, this involves key questions of freedom and control such as Chun studies, with these questions charged and orientated at least partly by the specific compositional forces that computation brings to bear in such questions.

In the case of the Like button, the computational query of “What is executing here?” discussed in the previous section is made more readily processable via its transformation into a more sharply delimited question of “Do you like what is executing here?” A question that in the Like economy of Facebook and the particular proposition of the Like button infuses this social and technically orientated question with additional productive outputs and charge. Regardless of whether one dwells on their effects, in an age in which Facebook is a clearly dominant infrastructure for social interaction, to take the steps leading up to the potential event of Liking a piece of content—i.e. at the bare minimum, logging into the platform, agreeing to its legal terms and conditions—is already to accept and participate in these effects; just as using a product or service from a particular vendor is always an agreement at least in part to working with the executable contours as established by the vendor. One enters into Facebook and its own sociotechnically informed modes of executable communication just as one does with any form of discourse. But as much as it may often be taken for granted now, Facebook’s is a very specific and carefully structured model for the processing of social interactions, one whose sense of ubiquity and givenness has been achieved and engineered in very particular ways.

In the case of the most dominant platforms of the present, one is continually presented with a separation of users from an ability to see in what ways their forms of interaction are being processed via the technologies that they engage with. These are ongoing questions of power and control, issues that are further reflected in the question of interface. Does one accept the particular functions that are afforded within the interface and platform’s particular executable contours? Is the balance sheet of power and control sufficiently appealing? Are the costs involved worth the necessary conceding of certain forms of agency and control in the name of others? The answers to such questions are infused within a whole set of compositional gatherings of various forms of affordances and their ongoing, contestable negotiations.

At the same time, while specific knowledge of the workings of a platform like Facebook are largely denied to its users, a regular user of its services can nevertheless infer many of their contours. Just as a labourer on a factory or shop floor develops a kind of soft and intimate knowledge of the flows and circulations of which they are a part of, so too will a Facebook user likely sense—whether overtly or in more affective modes of comprehension—

the particular valuations being generated and the orientations of the value systems lying behind them. A sociotechnical relation, even in its most dominant and taken for granted discursive phases, is never a passive relation. It is a continuously presented *proposal* for interaction and as such can be problematised at any point and by all parties involved. The question and its threshold of execution must be negotiated and crossed again and again. This is the political and immanent follow-up question lying at the heart of all programmatic and thus potentially reprogrammable acts of execution. *Do you like this?*

As this chapter on the Like button as an interface for interaction has aimed to highlight, there is an ongoing and formative process of negotiation that can be seen to play out in computationally-informed practices. This process of negotiation involves the establishing of certain forms of differentiating thresholds, for which the interface and its various executable points of contact and material discursive exchange acts as one notable site of consideration. In the case of the Like button, the various compositional forces and energies involved result in this particular unit of expression that in turn affords certain forms of collective interaction while also further propagating its own now familiar compositional energies of Liking, clicking and counting into the world. As the next chapter will explore, a key feature of the Like button is not only its interfacial qualities of establishing such thresholds for interaction but also the Like button's further featuring as an implementable function in Facebook's suite of propagative Social Plugins. By looking at the Social Plugins' qualities as APIs (Application Programming Interface), it becomes possible to further consider a notion of interface in relation to that of platform, and also to begin to trace outwards from this initial site of the Like button, following the ongoing projection of Facebook's tools and models for interaction as they expand into further areas of the Web and networked interaction in general.

7 ENGINEERING RELATIONS: APIS AND THE STRUCTURING OF NETWORKED FLOWS AND CONNECTION

The term *connection* has a wide variety of meanings. It can refer to a physical or logical path between two entities, it can refer to the flow over the path, it can inferentially refer to an action associated with the setting up of a path, or it can refer to an association between two or more entities, with or without regard to any path between them. —Vint Cerf and Bob Kahn (1974), “A Protocol for Packet Network Intercommunication”

In order to further map some of the key contours of Facebook as a platform for networked and computationally-informed expression, this chapter looks into further key features of Facebook’s infrastructure for expanding its reach into various networked domains that lie outside of its core platform (e.g. facebook.com and its suite of apps). This will involve looking at a range of Facebook’s services, particularly its Social Plugin APIs (application programming interface), with a focus on the specific ways in which Facebook works to manage and engineer these services. Of particular interest in this chapter will be the way in which Facebook is able to engineer flows of connections and interactions into its platform via what can be understood as a highly sticky and projective model of making things connectable to its services. This will involve a consideration of the role of web APIs as a tool for making things interoperable, and tracking their specific role in the structuring and opening up of particular data flows to Facebook. The concept of flow itself will also be considered in relation to such networked forms of exchange and connection. Finally, the chapter will end with some examples of the kinds of unplanned for relations and effects that can emerge in parasitic and also emergent relation to Facebook’s own structuring of social interactions.

EXECUTABLE STRUCTURES FOR EXCHANGE: PROTOCOLS AND WEB APIS

Facebook’s Social Plugins are web APIs (Application Programming Interface), and as this chapter develops, the key quality of APIs as tools for organising, structuring and making connectable various forms of information flows and exchange will become of particular importance. As with network protocols, web APIs are essentially about describing the validity of networked messages that a computational entity or party can and cannot accept. Whereas a protocol specifies the valid sequence of messages that

can flow between such parties, an API describes all of the valid messages that two or more computational parties can accept. More specifically, an API is a set of functions or procedures used by computational applications whose primary aim is to allow the internal programming components of one application to interact with the components of another application in a manner that makes accessible certain aspects of their components while segregating and preventing access to other aspects of them (known as information hiding). Protocols then typically act as workable standards for transmission (e.g. the transport-layer protocol of TCP/IP), whereas web APIs work to structure the nature of what content can and cannot be accessed and exchanged between parties communicating via such network protocols. In the case of Facebook, the majority of its web APIs are currently structured according to the REST (Representational State Transfer) style of web architecture, which establishes general principles regarding the sending and receiving of certain requests (using HTTP verbs such as GET, POST, DELETE) and identifiable web resources (typically structured in XML, HTML or JSON formats) between clients and servers via the HTTP protocol.

Before moving on to discuss some of Facebook's APIs in more detail, it is just worth highlighting here the way in which—whether one is speaking of an interface, protocol, API or platform—each of these various forms of computational agents are essentially all performing the general function of acting as structuring wrappers of information, describing the executable tasks that can be carried out in the particular computational exchange in question. In this sense, all forms of software can be understood as protocols of a kind. Or alternatively, as Jussi Parikka writes, “Software can be thought of as a plug-in, as it is defined by its capacities to connect or deny contact, to enable or disable, to afford or block” (Parikka, in Hillis, Paasonen and Petit 2015, 105). The last chapter on the Like button focused on an understanding of interface and focused mostly on the abstraction layer of the general model of the universal machine commonly referred to as “user interfaces.” As with a user interface, an API is also a form of abstraction layer in software that, as with all abstraction layers, interfaces the universal machine “by behaving as a specialized machine, breaking the former down to a subset of itself”; an operation that in doing so “reformulates the totality of available machine instructions into a new control language” (Cramer and Fuller, in Fuller 2008, 150). As witnessed in regards to the compositional questions of execution discussed in the chapters in the first section, these various forms of abstraction layers and computational wrappers can themselves be understood as always being nested and inscribed by other structuring forces, highlighting both an ongoing relationality but also the specifically protological nature of such relations in execution and executability.

Alexander Galloway (2004) rightly highlights the way in which, despite the much-vaunted decentralised qualities of some of the most fundamental protocols currently used in networked communications, issues of power and control are very much at play in these protocols. As this chapter shows, Facebook makes full use of existing protocols for client server interactions via its establishing of various forms of APIs, whose programmatic terms of control they orientate in very specific directions. In making use of the increased popularity of the platform and network effects that it is able to accrue, Facebook is able to gather increasing levels of access to and control over—often in the form of APIs—various forms of networked data flows. As Benjamin Bratton highlights in his writing on platforms, a key quality in regard to questions of power within computational infrastructures is the way in which, “As infrastructure, a platform’s regularity is often guaranteed less by laws than by technical protocols” (Bratton 2015, 44). Particularly in the pushing out of certain executable structures for exchange over other potential structures, and how over time such “Artificial standardizations become naturalized as if they were always the measure of things (45). Part of the task in this chapter and also the section as a whole will be to look at the way in which Facebook’s structures for networked exchange have come into being, achieving in the process a kind of prevailing dominance that posits Facebook’s model as the seemingly most obvious and available mode for current forms of networked interaction.

MULTIPLIERS: FEEDING A SOCIAL GRAPH VIA SOCIAL PLUGINS, HTTP COOKIES AND MORE

Yet the quanta of data produced in such processes are not just metrifications of intensities, they also have intensive capacities themselves, entering various processes of multiplication.
—Carolyn Gerlitz and Anne Helmond (2013, 1358)

Facebook has always been an eager cultivator and benefiter of network effects. From its craftings of the Like button, the News Feed and Open Graph API, to its acquisitions of other popular platforms—e.g. Instagram (social photo sharing), WhatsApp (messaging and chat) and Oculus Rift (virtual reality)—and even its plans for an alternative version of the internet in the shape of internet.org, Facebook, as a still only 13-year-old business, provides a kind of paradigm of rapid development and expansion. The focus in the next few pages will be on how Facebook employs a suite of APIs and their corresponding techniques, such as Social Plugins, Facebook Login and Open Graph, to spread its influence outside of the confines of the Facebook platform and into a range of networked connections. In doing so, one can begin to see just

how Facebook is able to project its ability to collect more information on user interactions as they browse outside of Facebook itself, while in the same process opening up more data flows back into its own platform.

Social Plugins

Introduced in early 2010 (roughly a year after the introduction of the Like button), Facebook's Social Plugins represented a major next development for both the Like button and the ability of Facebook to extend its reach beyond the confines of facebook.com. Typically involving the copying of just a few lines of tailor-made JavaScript, Social Plugins allow external creators and services to embed Facebook digital objects such as Like, Follow and Share buttons, as well as comments, Posts and Videos onto the websites and networked applications of these external creators and services. Thanks to Facebook's already considerable network effects, Social Plugins, particularly the Like and Share buttons, have been widely adopted by websites both large and small. This rapid uptake of Social Plugins can be seen to represent a massive expansion of Facebook's reach and ability to collect data, as the embedding of these small snippets of code on vast numbers of websites have enacted a noticeable rewiring of much of orientation of the web. Most specifically, when loading any web page that has a Social Plugin embedded, the user's browser connects to Facebook's servers, which make a record of the URL being visited, the visitor's IP address and their Facebook ID (if logged in). Thus, these simple lines of code are able to track particular aspects of user activities, wherever and whenever they visit a site with some form of Facebook plugin or tracker employed – an increasingly likely phenomenon on the Web at present. This stickiness engineered into the Social Plugins is further enhanced by the ability on the backend of Facebook to aggregate and mine this data into further forms of targetable information for Facebook. Finally, the Social Plugins are also effective for the way in which their presence on any website acts as a form of free advertising for Facebook's services and a direct route for users to travel back to Facebook's own pages.

```

<html>
<head>
  <title>Your Website Title</title>
  <!-- You can use open graph tags to customize link previews.
  Learn more: https://developers.facebook.com/docs/sharing/webmasters -->
  <meta property="og:url"          content="http://www.your-domain.com/your-
  <meta property="og:type"         content="website" />
  <meta property="og:title"        content="Your Website Title" />
  <meta property="og:description"  content="Your description" />
  <meta property="og:image"        content="http://www.your-domain.com/path/
</head>
<body>

  <!-- Load Facebook SDK for JavaScript -->
  <div id="fb-root"></div>
  <script>(function(d, s, id) {
    var js, fjs = d.getElementsByTagName(s)[0];
    if (d.getElementById(id)) return;
    js = d.createElement(s); js.id = id;
    js.src = "//connect.facebook.net/en_US/sdk.js#xfbml=1";
    fjs.parentNode.insertBefore(js, fjs);
  }(document, 'script', 'facebook-jssdk'));</script>

  <!-- Your like button code -->
  <div class="fb-like"
    data-href="http://www.your-domain.com/your-page.html"
    data-layout="standard"
    data-action="like"
    data-show-faces="true">
  </div>

</body>
</html>

```

Figure 7.1. “Your like button code.” The snippet of code (as it was on 20 March 2017) provided by Facebook to developers for copying and pasting into the HTML of their own website. Screenshot from the “Like Button for the Web” page at <https://developers.facebook.com/docs/plugins/like-button>

As briefly discussed in the previous chapter, a key quality of the Like button is in how it provides a near instantaneous transduction of affect into quantifiable and readily interpretable data. In the case of Social Plugins, the key multiplier at play is in how these web APIs allow users to themselves further propagate the Like button and others features of Facebook (e.g. the Share button, Facebook Login) across the expanse of the web, and in doing so, further spreading Facebook’s methods and infrastructures for the capture and interpretation of socially generated and processed content. This can be understood as helping to put in place “an alternative fabric of the web,” one that, as Gerlitz and Helmond summarise it, “is not organised through hyperlinks placed by webmasters, but one that is based on data flows enabled by and to third party devices, facilitating the decentralisation of data mining and the recentralisation of data processing within platforms” (Gerlitz and Helmond 2013, 1361). In this way, Social Plugins can be seen to provide yet more buttons and methods for both capturing and further setting off various chains of interaction that Facebook’s many different moving parts and forms of information processing are able to multiply as productive factors throughout its growing network of executions.

As Facebook CEO Mark Zuckerberg famously declared at the

2010 Facebook f8 develop conference, the ostensible aim of such features is to help Facebook in its goal of “building a Web where the default is social” (Zuckerberg, cited in Schonfeld 2010). Webmasters that embed a Social Plugin can be seen in one sense to operationally subscribe to this vision. The Web and Internet itself is of course from the beginning a platform of connectivity able to initiate different potential forms of sociality, with this particular vision of the social Web representing one in which both Facebook’s orchestration of and largely asymmetric ownership over the content of this sociality is at the heart of the connectivity being engineered.

Graph API and Facebook Login

In addition to Social Plugins, 2010 was also the year in which Facebook premiered its Open Graph API, or Graph API as it is now called. The concept of APIs has been around for some time, but the advent of the Web and particularly the growth in popularity of web APIs in the early 2000s has seen a great increase in the use and importance of APIs. Facebook’s first notable foray into API development came in August of 2006, when it launched Version 1.0 of its Facebook Development Platform, which gave developers structured forms of access to details such as profile information, friends, photos, events and other information on Facebook. As discussed, APIs work to structure exchanges between software components, while also typically assigning various identifiers, priorities and restrictions in regards to the forms of exchange that can occur between these components. In an implementation like Graph API, the API aims to create a set of stable terms through which webmasters and app makers can exchange certain forms of structured data between themselves and Facebook. Web APIs have long acted as one of the primary drivers and “underlying technological glue of the social web” (Helmond 2015, 6-7), enabling as they do interoperable and structured terms for the sharing of content across and between web applications and services. One of the most common exchanges of data in this respect is webmasters being given access to various forms of analytics via Facebook Insights in exchange for the funnelling of information collected on a webmaster’s site or service back to Facebook. Facebook’s Insights API gives a webmaster details regarding things such as Like and Share button impressions, as well as basic demographic data (e.g. age, gender, location) relating to various interactions with these buttons, which Facebook is able to provide as a result of its attempts to ensure that users provide their real identities when registering with the service.

The primacy of establishing one’s real identity on Facebook was baked into the service from its very earliest days, when users of the first version of the service were required to use their Ivy League college emails to certify authenticity and membership in

this particular club – highlighting a particular hierarchical protocol of privilege and access at the very beginning of Facebook's inception. For a platform primarily monetised via advertising, this linking to a database of real-world identities would also be of great benefit to the popularity of the platform with advertisers. As many have pointed out (e.g. Grosser 2011), the seeming promise of exploring different forms of identity in the rather more anonymous days of the early web seems a rather distant afterthought in the continued preference and prominence given to the use of real world identity in many of the most dominant corners of the web as they have become at present.

In December 2008, with a growing number of single user identities in place, Facebook set into motion yet another of its multiplier effects in the form of Facebook Login (previously referred to as Facebook Connect), a single sign-on application that allows users to sign on to other websites using their Facebook user account. Because of its popularity with users as a simple solution for logging onto the many various sites and applications that currently require user logins, Facebook Login, along with Google Sign-In, has steadily become one of the go-to solutions for such login services (taking a considerable amount of precedence over earlier non-profit and open standard efforts such as OpenID). The benefits of this popularity are at least two-fold. Of most importance is the way in which, once logged in via Facebook Login, user visits on these websites outside of facebook.com can continue to be tracked by Facebook in those instances where users login to these websites or applications using Facebook Login. And secondly, as with the other Social Plugins, Facebook Login acts as yet another instance of free advertising of the service and further tributary for filtering potential users and their interactions back to Facebook's services. As a result of each of these well-engineered and popular multiplier functions, the continued growth and power of Facebook becomes such that the incentives for third party sites to integrate ever more deeply with Facebook prove difficult to resist. With the continuing spread and uptake of its services, Facebook's model of a social web does indeed begin to become something like a default starting point for a vast majority of web content creators and developers, as well as the many users who come to accept and work within the modes of interaction and subjectivity Facebook presents them with via its various APIs and other services.

HTTP cookies

Facebook's eagerness to collect and track user interactions outside of the platform itself is considerably deeper than even these initial descriptions of its services suggest. Particularly notable in this respect is Facebook's automatic issuing of its "datr cookie." The datr cookie is an example of an HTTP cookie (also referred

to as web cookie, Internet cookie, browser cookie or just cookie). Created in 1994 by engineers working with the Netscape browser, an HTTP cookie is a small piece of data that can be delivered from websites during internet browsing for storing on the user's browsing device. Each time a user loads up the details of a particular site to which they have browsed, the internet browser has the ability to read and deliver any cookies that are triggered by the launching of the particular site in question, thus sharing the variously targeted aspects of the user's browsing activities that the cookies in question aim to capture (e.g. one of the most common uses of cookies is to gather data about the referrer's URL address, i.e. the URL from which the user came to the website). HTTP cookies can be used for a variety of reasons, but from the very beginning of their creation they have largely been aimed at profiling user browsing habits for the purpose of various forms of targeted advertising. In this respect, HTTP cookies can be seen to have acted as a major facilitator in helping to set into motion this particular trajectory and development of the web as a data gathering effort carried out in the name of the accumulation of information on user browsing habits that can be made monetisable. Furthermore, cookies also participate in the creation of a form of computational "memory" that can be stored, processed and also denied access to, helping to further feed the kinds of asymmetric forms of monetisation of user labour discussed in the last chapter. As Elinor Carmi highlights, "Cookies revolutionised the web because instead of treating each time you use the web as a 'new' and importantly – *anonymous* – session, it began to remember what you did previously. Cookies gave the web a memory; it gave your actions on the web a 'past', a past which you have no idea or access to" (Carmi 2017).

The datr cookie is issued by Facebook to a user's web browsing device and makes a snapshot of the user's browsing profile which Facebook can then log for future reference. There are a variety of ways that Facebook can issue this datr cookie, but it is most typically delivered when a user (regardless of whether they have a Facebook account or not) visits a page within facebook.com. As explained on Facebook's "Cookies, Pixels & Similar Technologies" page,

When might we use cookies, device identifiers, local storage or similar technologies on your computer or device?

We may place or use these technologies when you interact with our Services, our related companies, or with an advertiser or partner (whether or not you are logged in to the particular Service) using a browser or device that permits the placement or use of the relevant technology. For example, when you visit our site or use our app, we may place or read cookies or receive information from your devices. We may also place cookies

through a pixel on an advertiser's or partner's site. —Facebook 2017, <https://www.facebook.com/help/fblite/1516132378645371>—

Once issued and stored in the user's browser for the two-year lifespan that Facebook has currently set for this cookie, whenever a user then visits any website that has at least one of Facebook's Social Plugins embedded in it (i.e. a vast amount of websites today), the datr cookie, which is specifically triggered by any network fetch requests for resources from the facebook.com domain (which will always occur in the case of a Facebook Social Plugin being included on a webpage), will in turn trigger a network request that automatically sends the already logged browser ID in the datr cookie and the URL of the currently visited page, along with further snippets of information, such as the first and most recent Facebook page visited by this user as well as browser window dimensions (which can give an indication of the device the user is browsing with). Of course, in those cases in which a user then directly interacts with a Social Plugin on the particular website browsed to, still further pieces of information will similarly be sent to Facebook.

Figure 7.2. Image from Acer et al.'s (2015, 7) report "Facebook Tracking Through Social Plug-ins," highlighting the network traffic requests generated as a result of a non-Facebook user having visited a facebook.com page, receiving in the process a datr cookie with a two-year lifetime that makes a snapshot of the user's Browser ID.

If the user has a Facebook account and is logged in with Facebook, the details gathered will be greater still. As highlighted in Acer et al.'s 2015 study, a total of 11 cookies in addition to the above mentioned datr cookie giving browser ID and URL of the page being visited are known to be sent in such instances of logged in browsing to sites with facebook.com fetch requests. These cookies include the Facebook ID (c_user cookie), the encrypted Facebook ID and browser ID (fr cookie) and the timestamp and counter of user actions (act cookie) (Acer et al. 2015, 13-4). Even

if the user were to close the Facebook tab in their browser, they will remain logged in and thus these cookies will continue to be sent to Facebook until the browser itself is closed (something that is often done with less frequency as computers get more powerful and able to cope with browsers being open while working in other programs). Finally, the same study also found that even in cases where a user deactivates their Facebook account, Facebook will not remove the uniquely identifying “fr” and “datr” cookies (as well as the “lu” and “locale” cookies), and thus, unless they are actively deleted, the browsing information of these deactivated users will still be tracked in any visits to sites with any of Facebook’s Social Plugins embedded within them (Acer et al. 2015, 17-8).

With these various kinds of HTTP cookies in place (assuming a user hasn’t disabled or blocked the use of cookies in the browser), Facebook can thus automatically trace and log a visitor’s browsing behaviour across the many parts of the web in which its Social Plugins and other embedded forms of code linking back to facebook.com happen to appear, assigning this information either directly to the user’s known profile, or, in cases where the user is not known to have a Facebook account, simply adding the browsing information as anonymously profiled information to Facebook’s data collection facilities. In this way, as Gerlitz and Helmond indicate, a Social Plug such as the Like button “turns any web user into a potential Facebook user, as each user may unknowingly contribute to the production of valuable browsing data for the platform” (Gerlitz and Helmond 2013, p.1353).

Finally, in addition to all of the above techniques, Facebook is also able to gain access to a massive amount of profiling information at the moment of the install of any of its key and massively popular mobile applications, such as the Facebook app itself, as well as other Facebook-owned services, including Messenger, Instagram and WhatsApp. As even a cursory glance at the terms of services for these apps will show, the apps are in their default permission states able to capture revealing details relating to both software and hardware profiles of the users in question. The list is long, but these details include specific identifiers relating to one’s various mobile/tablet device(s), the WiFi connections (and all of the related details that can be extracted from them) the device in question associates itself with, ongoing location logs of the device, address books and the contact names and numbers in them, call logs, the contents of one’s SMS messages, downloaded files, multimedia folders and more. Indeed, the purchases of Instagram and WhatsApp, given their massive popularity and pride of place on the home screens of many user’s mobile phones (devices that are carried about and accessed at all times of day) can now be seen to rank as one of the most effective additions to Facebook’s already impressive arsenal of data harvesting tools.

SOCIAL GRAPH

As hinted at earlier, the multiplier effect accrued through all of these techniques and tools of information capture is in how they are all capable of being directed into Facebook's models for the storing and creation of highly granular profiles of user interests and behaviour. While Facebook continues to develop a range of different techniques for the algorithmic processing of all of this data it has captured, lying at the core of its modes of interpretation is the creation and ongoing development of a "social graph" that aims to map all of the relations between the various data points that Facebook is able to capture and infer from its store of content. Taking its terminology from the mathematical field of graph theory (graphs being in this context mathematical structures used to model relations between objects), a social graph such as Facebook's is a model of its social network and the many relations that it is able to establish as existing between its various users and the many different forms of content they generate and are known to give their attention to. This is done via the gathering, creating, organising and structuring of various forms of metadata to the various delegated and structured bits of information that Facebook has gathered. In the case of Facebook's social graph, this consists most notably of the designation of its information into relational categories of "nodes" and "edges." As described by Facebook, a node (also often referred to as an "object") is "basically 'things' such as a User, a Photo, a Page, a Comment," while an edge is "the connections between those 'things', such as a Page's Photos, or a Photo's Comments" (Facebook 2017, "Graph API Overview"). Thus, in the social graph, every user, status update, video, event and so on is categorised as a unique nodal object in Facebook's database, each with its own unique ID. Similarly, every interaction, such as a Like or Share—but also the actions themselves of creating or uploading content—is categorised as an edge between these nodes. Some edges can be specifically defined by users and others can be relationally generated in the interactions users make with these designated nodes. For example, in the act of liking another user's status update, the mapable functions in the social graph becomes those of node X<userID: you> liking<edge: Like> node Y<statusID: a status update> uploaded<edge: upload> by node Z<userID: other user>. A whole range of edges of connection might further link other nodes to this particular node of the status update in question.

Having thus assigned its many bits of information as identifiable nodes and connected edges, a social graph can then map out a meta structure that assigns various forms of valuation and meaning to its databases of user profiles, user actions and the various objects of content and connections made between these many users and objects of various kinds. Because of its great popularity and these effective forms of engineering on its part, Facebook

is able to take the vast reserves of data that it has amassed on the many informational objects and relations collected both within and outside its platform and turn them into a social graph. A continuously mapped set of data that should be understood as both a digital fingerprint and footprint, in that both the relatively static individual details of identified networked nodal objects (e.g. User ID) and the dynamic interactions and movements that this particular object makes across an identifiable network of other objects and relations (e.g. clickstreams) can be tracked in great detail.

Such a combination of massive amounts of data and informative layers of granularity and meaning that can be applied to large quantities of data using computational methods is of course of great value to its owners and of high appeal to others who would gain access of one form or another to it. The multiplier effects of Facebook's data collecting efforts take on further momentum when they can open up select parts of its databases to other users in the form of its Graph API. The Graph API allows applications and users of various kinds to gain access and read and write to select portions of Facebook's social graph, obtaining in the process potentially valuable information about relevant objects and edges in Facebook's store of networked data. As with its other services, Facebook has once again set up a very particular kind of relationship here. The key detail being that in using the Graph API, the access granted is not only a one-way relation of getting data out of Facebook for querying as one wishes, but is rather a two-way one in which Facebook will make sure to use this access as a way of in turn having the ability to bring data flows back into its platform. One common example of this method being the requirement to implement Facebook Login in order for access tokens to be granted by Graph API.

This is the continual two-way pact of APIs, protocols and interfaces in general, the agreeing to give up certain potential modes of expression and their associated affordances and forms of control in order to achieve particular affordances of expression, interaction and control. As witnessed in the examples in this section, while the onus remains on Facebook to give users sufficiently appealing reasons to engage with the at times aggressive and often highly asymmetric terms of its services, with the accruing of the multiplier effects that it has achieved over time, the terms of these pacts of engagement can often seem increasingly difficult to contest or negotiate over. With so many forms of online social interaction defaulting to Facebook's platform of mediated connectivity, a certain threshold of dominance is achieved whereby the social and economic costs of opting out of the platform can be experienced as sufficiently high so as to make it less and less likely that one will do so, thus giving Facebook still further negotiating power when it comes to future updates and iterations of its services. Crucially though, even when Facebook's dominance

fades, the various norms for forms of networked practice that it has helped to establish might still continue on in one form or another.

In the examples of the Social Plugins one sees the multiple two-way data harvesting techniques and networked flows that these APIs put into play, with a particular focus on both their projective and asymmetric forms of information capture. As is clear, it is not one particular technique or another that defines the power of the platform but rather the multiplying and aggregative nature of these executing techniques as they feed into, cross breed and further amplify the powers of each. Such a notion of the effective and successful engineering of various forms of information flows is an important one in this chapter, and thus it can be helpful to consider in some further detail a notion of networked flow in relation to the example of Facebook.

FRICION-LESS FLOW: EXECUTIONS IN THE BACKGROUND

Despite its rather noisy pronouncement of what was to become a dominant paradigm of “Web 2.0” (O’Reilly 2005), the web as platform nevertheless emerges mostly in the background, beating out a quiet pulse of always on internet connections and the asynchronous, constant sending of requests between clients and servers that characterise this new model of information processing. In the replacement of dial-up connections with those of broadband connections, “The connection becomes silent (i.e., no more chirping sounds over phone lines) and invisible” (Gehl 2014, 61), particularly in the sense of a much greater reliability and more seamless rate of information transfer and network speeds that broadband provides in comparison with previous forms of connections like dial-up internet. Furthermore, such an increase in bandwidth also means an increase in the size and types of networked data and activity that can be transmitted, shared and captured as material for various modes of processing.

This silent, largely invisible form of backend transmissions and executions also emerges as a result of further developments and implementations of client-side technologies, such as Ajax and JavaScript frameworks (e.g. jQuery), that provide the ability to update selective regions of a web page without the need for the user to manually request a full page reload, thanks to the separation of the data request going to a server from the data coming back to the page. The data fetched by an Ajax request will typically be formatted into various machine-readable formats (such as XML and JSON data formats), which can in turn be fed into JavaScript routines that are able to prepare and update page content based on the quietly transmitted data on the backend, which it can use to anticipate what actions and content the user are likely to next want to engage with. Such techniques allow for the creation of an ostensibly more seamless experiences of the web

in which rapid interactive experiences are enabled by adaptive and anticipatory techniques (e.g. HTTP pipelining, JSON parsing) in which the platform in question pre-loads further prepared content while the user is engaged with a particular piece of content or action.

Mike Krieger, a co-founder of Instagram, describes this as an ability to “move bits when no-one’s watching” (Krieger 2011). Thus, in the example of Instagram, the upload of the photo to Instagram’s servers begins at the very instance of clicking to edit the photo. As Krieger explains, this is a design philosophy that works to “perform actions optimistically.” This proactive approach comes with costs, both because the user might opt to not post the photo they were editing (thus wasting network and processing bandwidth), and also because it involves the creation of extra requests between client and server as the user makes their way through the editing stages (e.g. applying filters, comments, tags) before the eventual event of clicking to post (thus opening up more opportunities for unsuccessful data transmissions). But in the end such methods are seen as worthwhile specifically because of the reduction of latency time on the user side, and the increase in the sequencing of networked interactions, all of which serve a proactive and propulsive aim to “make the user feel productive” (Krieger 2011).

In Facebook, it is common to receive several pieces of prepared data from Facebook’s servers in the very time one is taking to decide whether to Like a particular item that one happens to be viewing. Similarly, the Like button and other Social Plugins become in many ways a key manner for refreshing content in such systems, each click of a Like or Share pinging the Liked content out to the designated pages of one’s friends while also ticking the various counters involved one step forward and modifying the algorithmic likelihood that the content might possibly be further circulated and propagated via a range of intersecting topological markers (such as those of the social graph, but also related value assigning forces such as advertising valuations, variable user security settings and so on). To refresh content in such platforms then is no longer, as it once was, only to send a manual request for more up-to-date content by clicking a refresh button, but rather to contribute with various defined units of expression that act as bits of content for continuously refreshing across the network via functions such as the Like button.

Another notable function that makes use of client-server requests and preloading that will come to define much contemporary browsing experiences is the implementation of infinite scrolling and its use of dynamic loading to fetch and add new content as a user scrolls continuously through a page. This form of “infinite scrolling” has now become a de facto way for presenting the data “streams” on social media sites (again, typically involving

the use of JQuery and Ajax requests to fetch new data). This form of interaction, via its doing away of page refreshes and pagination links (i.e. not having to click “more” or “next page” buttons), allows the user to browse through content in a more continuous, seemingly never-ending fashion. Whether on Tumblr, Twitter or Facebook, the user situated in a platform environment of infinite scrolling is continuously presented with yet one more piece of content which they might potentially process via a Like, Share, heart or star – and then move on as the next piece of content dynamically suggests itself into the stream. Every action propels forward a new query and unit of content to be contributed or processed, the stream and its dynamic transmission and loading of new data from server to client (and back again) working in many ways to create a sense of “flow” within such continuous scrolling environments. In this context, the continually presented action of clicking on the Like button becomes something of a series of what artist Ed Atkins, in his video piece of a series of thumbs up gestures interspersed within the perpetual aesthetic promise of advertising slogans and glossy title sequence style imagery, characterises as an ongoing and fluid stream of “even pricks” (Atkins 2013). On those occasions where more intensive or sustained scrolling is required for the task at hand, it becomes what artist Tom Moody amusingly describes as a “scroll bar workout” (Moody, cited in Johnson 2014). This updating in the background and presentation of continuous streams of information to be viewed and interacted with creates a propulsive sense of lively circulation and activity, the user and machine-processing at play continuously refreshing and propelling content and the platform itself with a sense of forward momentum.

Also driving the algorithmic decisions of which bits of content and relations to privilege are the various forms of data analytics carried out by corporations such as Google Analytics, Quantcast, Omniture and Facebook itself. Using a whole suite of tracking devices and techniques of various kinds, these services collect still further forms of user activities, adopting techniques such as data mining and machine learning to further interpret and adapt content and data flows according to these further forms of interpretation. In the modern version of the Web as it has become today, when browsing to a specific site, the various visible forms of content that one is presented with are typically not simply sent by the creators of the site in question. Instead, many of these elements (e.g. images linked to from another external site such as an advertiser or an image hosting service, an embedded YouTube video, a Social Plugin from Facebook, etc.) come from many different places and sites outside of the particular address that one has browsed to. When browsing to a site then, each of these elements are loaded into the page and, in the act of being inserted, are themselves given various abilities to connect in the backend

with one's browser and load or gather information of different kinds.

Artist and researcher David Gauthier, in his piece *Loading... 800% Slower*, aims to capture the “timely designed assaults” of these many third-party scripts that will typically be executing in the background as one browses through the Web as it has become today. By slowing down the bitrate of an internet connection and then using a browser plugin to audibly render (in the form of purpose-build software oscillators) the composing of the many web resources, HTML DOM elements and runnings of invisible scripts that “lurk deep in the murkiness of you web browser’s script interpreter,” Gauthier aims to make at least somewhat perceptive the “ambulant and rampant code and scripts” involved in the various temporal resolutions and accelerated machine-to-machine executions that capture information at the same time as they present it in the rendering of webpages on the internet (Gauthier, in Pritchard, Snodgrass, Tyžlik-Carver 2017, 115). In this method of slowing down and amplification, Gauthier moves one from the familiar flow of user-focused representational content on the page—i.e. text, images, videos, etc.—to that of another form of flow, namely, the many micro-temporally constructed executions in the background involved in both composing this sense of user flow and also further tracking its users as they browse from one rendered piece of content and page to another.

Flow in networked and computational environments is this merging and composing of intensities between machines, networks and their users. But in such emerging forms of computational capitalism, this flow is also further inflected by the scripting of what might be understood as techno-economic specifications of various forms of information capture, whose aim and processing power is to extract still further interactions and thus value from its users (as discussed in the previous chapter). The commonly described sense of the neediness of contemporary platforms is not simply a kind of banal technophobic platitude of the uninitiated or undisposed. Platforms such as Facebook and the many forms of tracking they instantiate both within and across the Web are at the technical level unquestionably busy hives of activity, whose purposefully orientated tasks can very readily be seen to push in certain directions over others.

As Mark Zuckerberg would famously state at Facebook’s 2011 f8 developer’s conference, forms of browsing and interaction such as these aim to allow for “real-time serendipity in a friction-less experience” (Zuckerberg, cited in Shayon 2011). The newly introduced Timeline is another example of the steady roll out of infinite scrolling on social networks of the time, and Facebook was by this time itself already a fully-fledged example of the web as platform, with a host of client-server requests executing in the background so as to make the site a dynamic environment alive

with content and social interactivity. As has been discussed, in its very simplicity, the Like button is in many respects already about as “frictionless” an interface for affective processing as can be devised for human-computer interaction. In further building out a set of many purposefully structured executable connections between Facebook’s clients and its servers, Facebook is able to create a sense of not simply frictionless interaction but a lively “real-time” environment within which various explicitly defined interactions can be managed.

The sense of frictionless real-time that Zuckerberg names can on the one hand be compared to well-known media studies discussions around the notion of flow. As a concept famously brought to the fore by Raymond Williams ([1974] 2003) in his discussion on the viewing experiences of television users, flow in a media theoretical and specifically televisual context can be seen to be both the way in which television networks of the time tried to hold their audience from one segment of a program to the next, and from one scheduled program to the next, just as it is also the way in which television users further create their own journeys and temporally managed experiences from one program and viewing to another. As something that is both intentionally programmed for on the provider and content creator sides and further engaged with and navigated through on the user side, flow can be understood as the establishing of a certain rhythm of execution, whether one is speaking of channel surfing on television or traversing social network feeds. With a description that is unsurprisingly almost identical to the descriptions of interface theory given in the previous chapter, this phenomenon of “planned flow” is for Williams to be understood simultaneously “as a technology and as a cultural form” (Williams 2003, 86).

As highlighted in recent texts by writers such as Florian Sprenger (2015) and Winnie Soon (2017), the network structures involved in creating the “streams” of today’s online environments, while often experienced as direct, frictionless and in a kind of continuous flow and sharing of connections, are of course digital and computationally-informed artefacts and thus necessarily broken up into discrete and sequentially managed parts. Below any threshold of an experience of flow experienced as in any way continuous is a necessarily discontinuous “micro-temporality” of discrete-time signals, data packet transmissions, client-server responses and the many other micro-decisions determined by instructions, protocols and networked interfaces of different kinds. This carefully timed ensemble of networked and computational processes executing a comparatively vast amount of inputs and outputs must be continually managed in order to serve up any sense of perceived “frictionless” flow on a particular user’s part. The processes are enacted in time and as such are subject to the many unpredictable and dynamic variables of liveness in net-

works (e.g. internet routing, network congestion), computation (e.g. the queuing and passing of instructions through a pipelined processor) and user interaction (e.g. the rhythms and pace of a user's own lived experience during these interactions).

As described in Paul Baran's foundational 1964 article "On Distributed Communications Networks" (an abridged version of twelve longer works that Baran was contracted to write by the RAND Corporation), a key aspect of the kinds of distributed computational networks such as the World Wide Web as it currently works today is that they are time critical in nature and thus dependent on the negotiation of such micro-temporalities of the network. Given how increasingly tightly the technical aspects of the network can be seen to converge with a whole host of social and cultural interactions today, it is important to consider the technical contours of these connections, and particularly how "This relational layer of sociality is based on the technicity of microdecisions" (Sprenger 2015, 77). Galloway speaks of such a sense of perceived flow as one of a "continuity" experienced by users because of the continual agility of engineers to manage the many various discontinuous qualities of networked interaction. As he points out, the "act of 'surfing the Web,' which, phenomenologically, should be an unnerving experience of radical dislocation—passing from a server in one city to a server in another city—could not be more pleasurable for the user"; with continuity defined in this case as "the set of techniques ... that, taken as a totality, create this pleasurable, fluid experience for the user" (Galloway 2004, 64). Creating such a fluid sense of continuity and flow is no easy feat. For instance, issues of "flow control" and congestions avoidance remain paramount in the scaling up of the rate of data transmissions across networks. From early pioneering examples such as ALOHAnet (1971) and its implementation of adaptive backoff algorithms for negotiating congestion issues, to ongoing methods employed in multiplayer gaming, this engineering of flow remains a key aspect within networked connectivity and interaction, and one that Facebook has proven an expert crafter of across its various services and applications.

Circulation and the establishing and maintenance of various forms of flows has always been a central issue at the heart of projects of expansion, such as those of various forms of "globalisation" and the project of making inter-connectable and preferably *smooth* the infrastructural, economic, political and cultural protocols of different systems. Networked computing as a project comes into being in a twentieth century that was alive with such projects of making amenable to circulation the material discursive intricacies and frictions of a range of different bodies and practices (containerisation being one of the most notable of such projects, and one that came into gradual being around the same time as that of the early internet projects). Just as time-keeping

was at the heart of the expansion of imperial projects and their reach across time and space, so too does a particular management of clock cycles sit at the heart of practices of computing, an issue that takes on particular prescience in the negotiation and spread of computation across a network of computing devices. While all technologies are negotiations of one form or another of the technical and the social, this move to globally networked forms of interoperability makes the challenge of the sociotechnical all the more pressing. Many of the same questions that lie at the heart of questions of making things globally amenable can be seen to apply to those of the Internet and its current most dominant model of the World Wide Web. These questions include those of whose discourses and whose operationalisations of materialities will take precedence in these connected environments? Where and when will they do so? By which means and on whose terms? Or as Paul Dourish puts it in his helpful article on internet routing, the political nature of such questions becomes that of addressing the ongoing question of how such negotiations and contestations of competing sociotechnical wills and design that lie at the heart of practices like Internet routing result in the arrival of not just any Internet, but “*just this Internet*” (Dourish 2015, 189). Indeed, key forces in contemporary platform practices, like the establishing of individual user identity, were not necessarily given trajectories in the formation of the Internet as originally conceived. For instance, as Wendy Chun highlights, “IP addresses, even when fixed, were not viewed as permanently tethered to a computer, let alone a user” (Chun 2016b, 57). Rather, it was only with the introduction of changes to IP addressing and, even more importantly, via the introduction of techniques like those of HTTP cookies and cross-platform logins discussed earlier, that such a mode of continuous tracking of “unique identifiers” in connected environments became what is now a default and taken for granted practice that undergirds so much of the Internet as it is currently conceived.

As one sees in examples such as the Like button, Social Plugins and the other practices of Facebook considered here, the socio-technical grip and granularity of circulation is an ongoing interplay and struggle to manage the frictions of materialities, culture, discourse, institutions, economics and the technical in their multiple forms of both intersecting and co-constituted relation. At the materially-orientated level, the negotiation of temporalities comes up against material questions not only of infrastructural elements like underwater cables but also those of the materiality of flows of electrons within the digital signals that spread out over these wires. The questions of the design and deployment of such “data on the wire” are ultimately worked out in a mutually informing, material discursive fashion, with issues such as transmission capacity versus switching capacity being particu-

larly important ones in the case of Internet routing (Dourish 2015, 192). In the process of getting *just this* Internet we also end up with *just this* unit of expression, resulting in the situated effectiveness of things such as animated GIFs (Snodgrass forthcoming), MP3s (Sterne 2012) and the Like button.

An understanding and definition of circulation is necessarily dependent on a consideration of how flow is established and experienced in material discursive fashion. As Sprenger highlights (echoing the likes of McLuhan 2003 and Bolter & Grusin 2000), at the heart of most forms of mediation and the transmission of communication is the striving to create an engaging sense of immediacy. In order to achieve such an immediacy in the model of a distributed online network, this working towards a suggestive presence and continuity of transmission will have to negotiate the necessity of coordinated and time critical decision-making that information sent distributively in packets across the network must work its way through. In order to achieve what Sprenger describes as “a phantasmal” sense of immediacy, stability and flow, a network “should not capture the user’s attention that decisions are constantly being made” (88). In an example like Facebook, this involves the management of the flow of information and its structuring, via things like its web APIs, towards its algorithmic methods of processing used for deciding what content should appear next in a user’s regularly updated stream. The take up of technologies such as Ajax and JavaScript frameworks such as jQuery is unsurprising then, in that they are helpful tools in managing and masking the ongoing, often stuttering nature of technical decision-making and its time critical qualities, helping to further facilitate any sense of perceived immediacy and flow.

This micro-temporality of decision-making machine interactions executing in the background also points to the way in which technological media, dating back to technologies like film and its manufacturing of a rhythm of 24 frames per second, have a way of establishing what writers like Nigel Thrift have described as a “technological unconscious” (Thrift 2005). In attempting to challenge human-centred conceptions of media, many writers on contemporary media have focused on the particularly accelerated nature of computational processing power and how an accelerating of machine time—in which massive amounts of tasks and processes can be executed during the small instance of something like the case of a user pressing a Like button—points to a way in which computationally-informed practices can be seen to bring about a particular intensification of processes operating at speeds, scales and distributions that are beyond the realm of perceptual human consciousness. Such an intensification requires a careful consideration of newly emerging forms of “synchronization between consciousness and technical object,” and how these rapidly proliferating technical processes can be seen to establish

what might be thought of as intense “imbrications” of technical objects into modes of human experience and the different operating environments in which they are brought into being with one another (Hansen 2012). As Mark B.N. Hansen describes it, these data-intensive operations “impact experience *on a much broader basis than consciousness*. They literally seep into the texture of experience, forming a background, a peripheral ‘calculative ambience’” (Hansen 2014, 39). That Social Plugins such as the Like button have been able to establish their effective and well established little perches of interaction amidst such a tumultuous set of computational currents and variable forms of web design, is one of their most successful achievements.

In speaking of temporalities and notions of time, it is also worth highlighting that machine time is itself not some kind of uniformly straightforward entity, but rather functions in its discretely established regularity via an aggregation of different forms of computational timings. As listed by Adrian Mackenzie (2007), these timings include, amongst others, seek time, run time, read time, access time, available time, real time, polynomial time, time division, time slicing, time sharing, time complexity, write time, processor time, hold time, execution time, compilation time and cycle time. Mackenzie:

While some of these timings are related (for example, read and write time), many are unrelated or antagonistic to each other (for example, real time and polynomial time). The relations between different timings are heterogeneous. ... Machine time has many interstices, and they have implications for how we think about changes in perception, experience, movement, embodiment sociality and meaning associated with contemporary telecommunications and information networks. (Mackenzie 2007)

A recent talk by influential game designer John Carmack, currently the Chief Technical Officer for Facebook’s recently acquired virtual reality system Oculus Rift, gives an example of these complex but key issues of temporal negotiation. Speaking on the issue of latency mitigation strategies for head-mounted displays in virtual reality, Carmack describes the challenges involved in virtual reality and how they represent “one of the most demanding human-in-the-loop applications”:

Human sensory systems can detect very small relative delays in parts of the visual or, especially, audio fields, but when absolute delays are below approximately 20 milliseconds they are generally imperceptible.

... On an unloaded Windows 7 system with the compositing Aero desktop interface disabled, a gaming mouse dragging a

window displayed on a 180 hz CRT monitor can show a response on screen in the same 240 fps video frame that the mouse was seen to first move, demonstrating an end to end latency below four milliseconds. Many systems need to cooperate for this to happen: The mouse updates 500 times a second, with no filtering or buffering. The operating system immediately processes the update, and immediately performs GPU accelerated rendering directly to the framebuffer without any page flipping or buffering. The display accepts the video signal with no buffering or processing, and the screen phosphors begin emitting new photons within microseconds.

In a typical VR system, many things go far less optimally, sometimes resulting in end to end latencies of over 100 milliseconds. (Carmack 2013)³⁶

36 One could complement such a technically dramatic example of virtual reality with that of the equally pertinent example of the rhythm game genre of video games, particularly for its bringing together of these chapters' focus on clicking and temporalities.

In such processes of accumulation and resolving of different temporal perspectives and agencies into one another, as with discourse in general, the act of repetition over time becomes a key factor in the achieving of any experience of a given sense of flow and frictionless interaction. Algorithms are often orientated towards the task of repetition, even more explicitly so in their automated and computational form. Repetition takes on meaning as something that carries out a task in a way that is sufficiently identifiable by its relative similarity to a previously executed task, at the same time that it is typically carried out with a discursively identified, and thus differentiating, output in mind. The interpretive flexibility and moving parts involved in any particular algorithm and algorithmic procedure points to an ongoing potential variety and modulation at play in acts of repetition. In other words, each instance of a repetition is temporally situated, just as the inputs and outputs—as well as the different associative relations that can come into being in each instance of the execution of a particular algorithm—point towards the procedural and processual nature of execution in general.

Mackenzie's nuanced and careful readings of algorithms and the function of repetition is particularly helpful for the way in which he highlights how different algorithms can frame time and space, and as such, the ongoing and modifiable creation of different textures and senses of duration. In the first instance, through their acts of repetition,

Algorithms socialize repetition by making it imitable. The force of an algorithm in establishing repetition is dependent on the linkages it establishes, the predicates or attributes it brings into relation, and corporealises as a force with specific intensity and quality. ... Following [William] James' logic of conjunction, we could say that algorithms function as associative objects. Algorithms make the world they work in hang together in certain ways and not others today. They give weight to relations, and they treat relations as real by holding things

together, and by making some conjoined path of translation discernible. (Mackenzie 2007)

In the example of the Like button, a click of the Like button and the launching of various algorithmically defined procedures (themselves constantly being modified and tweaked by Facebook's engineers) are "frictionless" in the sense that the act is a repeated and, over time, highly familiar one to Facebook users. But, at the same time, each Like takes on a sense of friction and meaning in the overall discourse and flow of the platform in relation to the situated factors involved in the act and interpretation of this interaction – both from the user perspective and Facebook's.

Furthermore, amongst the many different variables it uses to rank levels of meaningfulness of potential content to share to users, Facebook's proprietary EdgeRank algorithm is known to include a focus on time decay, gradually devaluing older pieces of content so as to maintain a sense of continuous and up to the minute contemporaneity in users' news feeds, creating a sense of a never-ending and up to the minute conversation. The time-stamp of a particular clicking of a Like button and the many other timestamps generated in these datastreams, when passed through algorithmic meaning makers such as EdgeRank is calculated and defined so as to generate a particular kind of ebbing and flowing of frictionless and real-time serendipity. A take on real-time serendipity and timeliness that Facebook clearly wishes to privilege at the expense of other possible notions and forms of liveliness. Again, this is an engineering of the social, in this case an engineering of a networked sense of presence and liveliness. Facebook not only captures user interactions but also turns them into carefully crafted producers of further interactions.

The "real-time serendipity" and sense of "a frictionless experience" that Zuckerberg speaks of is a sense of flow that can be seen to represent the highly successful achievement of Facebook's material discursive negotiation of online social networking. At the forefront of a suite of such interfacial experiences in the Facebook platform, the Like button and other Social Plugins act as the iconic and swiftest of executable inputs for feeding the algorithms. In their easily spreadable form as seemingly simple pieces of JavaScript code that can be embedded in almost any site and service, these web APIs spreads Facebook's reach out over millions of sites on the web, drawing in more Likes and a slew of further information regarding a users' interactions online, each attempting in a carefully orchestrated micro-temporal fashion to create certain forms of participation and flow. As discussed in the last chapter's discussion of the Like economy and its particular modulation of various forms of collective processing on the parts of users and machines, some of these flows might be characterised as resulting in the kind of "tense, accelerated, environ-

ment of the knowledge economy” that Fuller and Goffey speak of, one whose establishing of a certain “continuity of flow—work, data, libido—is paramount” (Fuller and Goffey 2012, 314). While this might indeed be one of the main perceptions of the Facebook experience, the flows are not singular nor categorisable according to one perspective only. Rather, they open up variable forms of experience and syncopated encounters between different users, machines, network speeds, economic models, and so on, spreading their affective, iterative and repeated forms of relation making in both predictable and unpredictable ways.

REAL ABSTRACTIONS

You cannot think without abstractions; accordingly, it is of the utmost importance to be vigilant in critically revising your modes of abstraction. —Alfred North Whitehead ([1926] 1953, 73)

A material discursive understanding of execution is sensitive to the cuts made in the name of forms of executable agency. In the example of the Like button there is an obvious way in which the complexities and nuances of affective response are boiled down into a lightweight user interaction that can nevertheless be readily mapped into a complex network—the social graph—of many other such Likes, Shares and so on. Part of the Like button’s great efficacy is its ability to extract so much value out of this functional act of abstraction made in the name of technical and economic efficiency as well as social and user-orientated practicalities. As a well-known passage from John V. Guttag in his *Introduction to Computation and Programming Using Python* book characterises it, the essence of abstraction in computer programming is the art of finding ways of keeping the degree of relevance and usefulness of a programmed interaction as high as possible between both the user of the abstraction in question and the builder of this interaction (Guttag 2013, 45). As the cases of both interfaces and APIs point to, abstraction is an attempt at opening up forms interaction across what are designated as differentially composed entities, which in turn entails a practical managing of complexity through forms of information hiding and the structuring of operable forms of information exchange that, if well designed, enable dynamic forms of interchange. In this reading of abstraction, the Like button and other Social Plugins can be understood as highly effective forms of programmed abstraction.

Facebook is a dynamic forum for interactions and communications of many kinds. One lasting achievement of the platform to date is in how it has managed to mobilise the many multiplier effects it can build out of the sheer number of users and defined user engagements within its platform. If one were to however take away these users and the lively contributions and interac-

tions that they infuse the platform with, what one encounters is a relatively limited computational template within which the primary forms of interaction on the main area of the service are restricted to the creation and sharing of content via status updates, comments, Sharing and Liking. Unlike some social networking services (such as its notable precursor Myspace), a Facebook user is given comparatively little control over the look and feel of their profile page and News Feed. User expression is rather squarely confined within the various clearly demarcated spaces of status updates, profile pictures, user photos and so on. The strictly defined contours of these spaces, each with relatively sharply demarcated, structured and preformatted qualities, is typical of much of the Web 2.0 generation of platforms and their template-based approaches, aimed as they are at generating readily categorisable forms of content and associated metadata for the feeding of various forms of data processing.

As characterised by José van Dijck, the signature quality of Web 2.0 approaches is the way in which they instantiate systems in which content and content management become synonymous with one another (van Dijck 2013, 162). Whether one is speaking of Facebook or Wikipedia, this making operable of forms of communication is typically characterised as a practical need on the part of the system in question, one that is itself ostensibly aimed at improving the user-centred aims of the service. A dual premise of “shared processing logics” in which

Users need platforms to voice their opinions and creative expressions, while platforms need users to funnel their expressions in pre-sorted formats. Content is spontaneous yet controlled, unmediated yet manipulated. The interoperability of microsystems is dependent not only on the compatibility of algorithms and formats, but also on a shared processing logic. (van Dijck 2013, 163)

The Like button’s power is in its combining of computational and user forms of processing of content into a particularly tight and productive forms of interoperability and exchange it has proved capable of opening up between the service and its users. Similarly, a web API is effective where it can initiate a drawing of participants such as webmasters and app creators into its particular structuring of forms of interoperability and executable exchange.

The empty, inviting frames of already structured forms of content generation are one of Web 2.0’s key components, and a large majority of them are aimed, in one way or another, towards this dual function of encouraging content generation while making it readily processable by machines. Again, such a coming to prominence of this Web 2.0 approach should not in itself be particularly surprising. Citing pioneering computer scientist Niklaus Wirth’s

well-known dictum “Algorithms + Data Structures = Programs” and its advocacy for a structured approach to software design and construction (Wirth 1975), Dourish points to how in the contemporary rage for discussions of algorithms, the concomitant and equally important practices involved in preparing and effectively structuring data—the non-algorithmic material to which algorithms are applied—are often mistakenly elided or neglected. In fact, algorithms should be understood as often arising in direct compositional relation with these practices of data gathering and structuring (Dourish 2016), in addition to the many other relations that are animated in any particular algorithmic instantiation and for which these chapters on Facebook are attempting to highlight in their orbiting around the Like button and Social Plugin APIs. Web 2.0 then, orientated as it is to making things relational, is an approach that aims specifically at structuring potential incoming data streams in ways that, in cases such as Facebook’s design, more readily align with the intended algorithmic processing and relational mapping of this incoming data. As highlighted in the discussions here on collective processing and the particular informational flows initiated by Facebook’s APIs, Web 2.0 architectures, in their further integrating of the possibilities that the compositional drives of things such as relational databases already provided, can furthermore be understood as mobilising an “approach of facilitation at the front end, data-mining at the rear” (Fuller and Goffey 2012, 325).

As Robert Gehl describes it in his comparison between the web services of Myspace and Facebook, “In an ideal social media site, the user is conceived of as an *implementer*, a laborer responsible for realizing the architecture conceived of by the site owners and designers” (Gehl 2014, 81). In return for being given access to the service in question and the other users active on this service, the user-implementer is orientated as a generator of content whose labour is also directed towards the further efforts of helping to structure and process this content in tandem with the computational processing needs of the site in question. In such instances, Gehl argues that the abstractions and structures made in the name of software compatibility can be understood as “real abstractions,” capable as these abstractions are of “directing users’ concrete labor, social relations, and interactions” (81) and generally enacting actual effects via their execution in the world.

As Gehl demonstrates in a comparison of Satanism pages on Myspace versus those on Facebook, the less structured and thus less readily processable forms of content produced on Myspace’s user generated pages can be understood as an “abstraction failure.” At the level of interface, the failure of abstraction involved is in the way in which Myspace gave users what, from the perspective of contemporary platforms of content management and processing, are comparatively high levels of control over the

design of pages in the form of being able to alter things such as CSS and HTML, thus leading to a situation in which the content fields and overall structure of each user page and its identifiable web resources could be very different. From a contemporary perspective in which the true value of content for the vast majority of social media sites is understood as that which can be made into storable forms of information that can be processed and interpreted in a fashion that can lead to the selling of more effectively targeted ads to users, Myspace's architecture thus fails because of the way in which its structuring of content is a "real abstraction failure," in the sense that it is "a failure to discipline labor effectively, a failure to direct laborers' concrete actions, and thus a failure to capture the surplus value of that labor" (87).

As Gehl's telling example of Satanism web pages shows, the fundamental difference in the structuring and affordances of a Myspace page in comparison to that of a Facebook page is visually evident in the comical way in which the characteristically dark and discordant aesthetics of a typical Satanism page in Myspace are largely impossible within Facebook's information architecture for content generation, which imposes its aesthetically homogenous, unalterable and clinically clean frames in a way that flattens, or at least drastically mutes, any visual sense of subversive intention and expression on the part of the creators of such pages. That this homogeneity is done in the name of a clear intention to abstract direct value from the labour of its users only serves to further highlight the brute simplicity of Facebook's methods of abstraction that directs such expressive creations into very specific executable forms of exchange in the name of exchange-value. The hope on Facebook's part is partly that such a relatively homogenous look and feel of the design will make the space a welcoming one to users of all kinds, providing an easily navigable template within which to steadily fill out each of these spaces with the kind of readily extractable, mineable and relational information Facebook's model is built upon.

For all the advanced and complex qualities of the engineering that Facebook implements in the background, the Facebook interface itself remains a relatively simple and rigid one. Every new implementation on the platform tends to fall into this technique of categorising into a particular and clearly demarcatable section of the platform, and then, in almost every instance, appending the ability to Like, Share and comment on whatever particular content is permitted therein. The philosophy of abstraction here is one of getting as much user engagement with the service as possible, but always with the provision that these engagements are kept as amenable as possible to being categorised and processed by both users and machines.

Every abstraction, when it gathers collective hold and traction within an executable system of relations, has the effect of project-

ing the particular values that went into it. Where Gehl and others emphasise the way in which the abstractions of software become “real” because of their effects in the world, the point of the consideration of Social Plugins such as the Like button is also that one should pay attention not only of the way in which software abstractions impact “real” life, but also how software is itself an abstraction of the “real” affordances of computation. As the discussion of the computational questions of interpretation in the previous section indicated, abstraction is itself something that is practically defined and made to stand as abstraction in relation to something else that is made to stand as “real.” Each layer of abstraction is imbricated in another. Software is conjoined with hardware, which is in turn conjoined with the idealised formalisations of logic and the universal machine, just as the forms of content creation carried out on a social network like Facebook are themselves conjoined with the algorithmic forms of content management and processing that Facebook prioritises in its Like economy. The stabilised material discursive continuum achieved in this particular platform of networked and computational abstractions is that of the agreeable flow and homogeneity of the Facebook interface, with its carefully allotted forms of content generation that are all readily capable of being fed into and processed by its relational machines. These modes of abstraction on Facebook’s part have proven to be vastly popular and successful to date. But as with all hegemonic systems, further abstractions and models can in turn be built upon and leech off of Facebook’s own systems.

LEAKY ABSTRACTIONS: “FAKE NEWS,” VOTER MICROTARGETING AND THE LONG TAILS OF WEB 2.0 AND USER PROFILING

In the words of “rock star developer” Joel Spolsky, “All non-trivial abstractions, to some degree, are leaky” (Spolsky 2002). For all of the ability of any particularly effective abstraction to discursively preserve relevant pieces of information while at the same time allowing for the practical and efficient exclusion of other aspects of information, an abstraction continues to exist within a range of interchangeable variables and components, all of which at any point might lead to a failure or inability on the part of the process at hand to execute upon its designated abstractions. Spolsky is speaking here particularly of computational issues such as memory leaks and the ability of a programmer to understand how their particular abstractions might relate to and be informed by other abstractions and variables. But in the general context of this research, the point can also be understood as an ongoing one of how things can never be entirely managed, predicted or abstracted out by any particular system of abstraction. In the execution of processes of abstraction “in the world,” techniques and tools of abstraction are themselves subject to what Marc Berg

(1997) characterises as “drift,” with the inscribed entities of any formal system always in one way or another overflowing the particular definitions assigned to them in their actual substantiations and entanglements with other bodies and systems (formal and informal). Encounters that in turn often lead to further parasitic, emergent and unforeseen practices – such as practical work arounds, technical kludges and the general pragmatism of practitioners in general. These practices might in turn develop their own material discursive hold or power, and as a result of this be incorporated into or have the effect of moulding over the original formal logic that helped to instantiate them, thus putting into motion further contingent effects that often were not overtly planned for or intended by their programmers.

This leaking of unintended effects has become a particularly prescient point for Facebook recently in the rise of discussions of “fake news,” “filter bubbles” (Pariser 2011) and also the use of Facebook’s platform as one particularly rich site with which to target voters in elections. As a way of highlighting some of the key overall themes of this section on Facebook, and also in order to start to more directly bring in some of the political issues that they touch on, it is worth looking in some brief detail into some aspects of these still ongoing issues.

As has been discussed, Facebook’s intentionally homogenous interface for the display of content on its platform mutes any strong sense of unique visual identity for potential content creators, thus creating a kind of flattening effect in the visual display of content on the site. Satanists and broccoli lovers both come in similarly arranged bunches of blue and white. A similar flattening effect is also enacted on various forms of news content disseminated on Facebook. An article from *The New York Times* and one from *The Daily Stormer* or *American Patriots Daily* will arrive into the News Feed in identical presentational frames. While paying attention to specific indicators such as the visual identity of the article and the profile icon, the writing of the news bit or clicking through to read the article on its original site can bring up further differential markers as to the authority or nature of the source of the news item, the point here is that in a mode of rapidly browsing through content on an infinitely scrollable Facebook stream in which such news items are interspersed with many other forms of similarly presented items from one’s everyday life, there is a potential flattening and also internalisation of such news items in the buzz of activity that is the Facebook News Feed.

Figure 7.3. Visual flattening of news articles in Facebook

In fact, such is the prevalence of an aesthetic of cleanly formatted templates for web design and content management at present that even when clicking through to these sites of “alternative news,” a user might well be confronted with yet more bland and everyday forms of gridded and typographically clean template design common to platforms like Wordpress and many other content management systems for web design. According to recent counts, the WordPress platform, by far the most popular content management system for website creation, is currently employed by nearly 75 million websites, a figure that positions them as powering approximately 25% of existing websites (Munford 2016). In an article titled “Facebook and Google make lies as pretty as truth,” technology journalist Kyle Chayka highlights this effect of how, “In a platform world, all publishers end up looking more similar than different” (Chayka 2016).

Figure 7.4. Homogenous “WordPress style” gridded template design of web sites

In the case of news articles, this homogeneity of the look and feel of news is made even more prevalent with the pushing of proprietary publishing platforms in the form of APIs, such as those of

Facebook Instant Articles, Google AMP (Accelerated Mobile Pages) and Apple News, with each forcing publishers to cede control over the design and customisation of their content to the particular codified strictures of the platform's APIs. All of which results in what has become the now dominant post-Web 2.0 standard of "boxes of well-proportioned text in an empty white field with branding at the top and bottom" (Chayka 2016). As Chayka points out, each of these forms of platform standardisation of news content have the accumulated potential effect of normalising such content under a coat of boxed-up digital minimalism:

Over centuries, print media developed a visual language of credibility that became second nature to most readers: crisp type and clean, uninterrupted columns communicate integrity, while exaggerated images, messy layouts, and goofy text inspire doubt. On a physical newsstand, it's still easy to tell the National Enquirer from, say, The Atlantic. Online, it's becoming increasingly difficult to differentiate between the two. ... Take, for instance, a site like the Libertarian-slanted Liberty Viral and its companion site The Libertarian Republic. Whereas hyper-partisan publisher The Libertarian Republic's homepage is plastered with full-bleed images, pop-up menus, and AdSense ads, a Liberty Viral story shared on its Facebook page, delivered through IA [Facebook Instant Articles], appears on mobile as a glowing beacon of web design, with dynamic images, pleasant serif typography (reminiscent of the upmarket web product Typekit), and a Timesian byline and date, not to mention an absence of distracting social media share buttons. (Chayka 2016)

The point in highlighting these effects here is not to get into a discussion of "real" versus "fake" news, but rather to highlight the way in which Facebook's intentional homogenisation and formatting of content in the name of making it readily processable and tightly integrated into its computational practices has consequences. The medium is the message, and the messages of these individual sites of various kinds are inevitably further mediated and framed by their presentation as they appear into users' Facebook News Feeds. Similar to the ways in which various users and parties attempt to "game" Google's search algorithms using search engine optimisation techniques of various kinds, one now witnesses a similar approach on the part of news outlets of all ends of the spectrum, who work to manipulate the computational contours and propensities of Facebook's systems, particularly the highly populist and attention-focused nature of its News Feed algorithms. In the liberal bubble bursting climax of Donald Trump's US presidential victory in 2016, the seeming abstraction failure of Facebook's decisions regarding its decision-making machines came rather crashingly to the fore, with the spectre of fake news and its largely unchecked and rampant propagation

within Facebook News Feeds being held up as one contributing factor in Trump's victory.

As further elaborated upon by Gehl, an abstraction failure can be understood not simply as a technical failing but, more importantly, an ideological failure, in that in its visibility as a failure of abstraction it potentially surfaces and manifests the underlying coercive tenets that have underwritten and sustained the abstractions in question, with all abstractions requiring ideological work to support their discursive sense as given (Gehl 2014, 90). With this in mind, in the fallout of the US presidential elections of 2016, Facebook's preferred and continued ideological positioning of its platform as a "neutral" technology for communication and interaction, and specifically not as a powerful media player whose decisions actively shape and participate in the creation of discourse online, was pushed forcibly into question once more as a result of the perceived important role of filter bubbles and fake news on the election. The long, aggressive push of Facebook to establish certain forms of connections, relations and content over others did of course mean that this was always the case. But in its now dominant position as the de facto "front page" of the news for so many of its users—a position that it had always aggressively pursued—the ability to deny such a direct discursive and political role was in this particular moment no longer as easy to deflect.

At the same time that Facebook's visual flattening of content within its platform has played a role in helping to further facilitate and normalise various forms of previously less mainstream sources of content, its techniques of aggressive harvesting of user actions and data in the aim of extracting and extrapolating user interests and affinities has also seen a situation in which such methods can be further manipulated on the part of politically interested operatives. Chief amongst these examples at present is that of Cambridge Analytica. Cambridge Analytica is a company that sells its ability to employ techniques of big data and microtargeting towards the support of political campaigns. The company recently described its approach as being based on three specific methodologies: behavioural science, data analytics and addressable ad tech (personalised advertising aligned to an individual target consumer) (Nix 2016). The company combines these methods in order to enable what it describes as "psychographic profiling," a profiling based not only on traditionally available data such as demographics and general consumer habits, but also more fine-grained details regarding individual attitudes, personal habits and affiliations, thus enabling Cambridge Analytica to craft political messaging and campaigns that are ostensibly able to be more individually targeted (microtargeting is typically defined as statistical modelling to predict voter intent at the individual level, though it also operates in practice at group scales, with these

scales nevertheless being comparatively more granular than previous methods of voter targeting). As seen in the example of Facebook's own extensive model of data gathering and targeting, connected users moving across not only Facebook but other platforms and areas of the network leave increasingly extensive digital finger and footprints, and these digital traces might of course also be captured and made politically operational by organisations able to gain various forms of access to such data.

A few relatively straightforward but important points in this example are worth highlighting in order to bring to the fore some more of the kinds of "leaky abstractions" that can be seen to emerge from and around Facebook's own models of targeting and analytics. For instance, many trace the technological roots of Cambridge Analytica to research being carried out by David J. Stillwell and Michal Kosinski at Cambridge's Psychometrics Centre. In particular, their 2007 myPersonality Facebook application that allowed users to take psychometric tests whose results Stilwell and Kosinski were, with the users' consent, permitted to connect with each test taker's Facebook profile. The popularity of the test provided the researchers with over six million test results as well as details on 4 million individual Facebook profiles from a range of backgrounds. By running various algorithms that scraped details on Likes and posts in user profiles, the researchers worked to try to see if they could predict personality types based on this information. Kosinski and others then repackaged this in the form of their Apply Magic Sauce prediction engine, which they made available in the specific form of an API for exploring further avenues of research with the tool.

By 2013, the team reported being able to predict, on the basis of an average of 68 Facebook Likes, a user's skin colour (with 95% accuracy), their sexual orientation (88%), political affiliation to the Democratic or Republican party (85%), and a range of other affiliations such as religion, use of addictive substances, whether the user's parents were divorced, and more (Kosinski, Stillwell and Graepel 2013). As the models continued to be developed and iterated upon, Kosinski and colleagues claimed to be able to evaluate a person's affiliations and personality traits better than their average work colleague, now requiring only ten Likes to do so, with enough further Likes enabling them to outperform the readings of even those nearest to the person in question (Youyou, Kosinski and Stillwell 2014).

As Kosinski and his collaborators were able to see from very early on, Facebook's collection of information on its users could be accessed in various ways by outside parties, such as they originally did in the creation of the test in the myPersonality Facebook application. Via a Facebook application, such as in the case of Facebook's many quiz apps, it is possible to get access to an extensive range of details, including, amongst others, name, profile

picture, age, sex, birthday, friend list, posts, photos, education history, hometown, current city, Likes, IP address, info on the device being used to play the game and more (Bischoff 2015). Facebook's model of ubiquitous digital tracking and profiling arises in turn in an era of many other corporations (e.g. Google, Acxiom, Oracle Data Cloud) doing similar such efforts (U.S. Federal Trade Commission 2014; Christl 2017). Indeed, these companies often sell and buy data from one another, creating burgeoning economies of data brokerage that only further ramp up a drive towards amassing and selling more such data. Beyond their use of Facebook, Kosinski and his team also worked to plug into several such large-scale collections of user data, so as to further tweak and train their prediction models.

And if a small group of researchers can achieve such successful results, it is of course possible for more well-funded outfits to do so as well. Thus Cambridge Analytica, via its funding from some of the deepest pockets politics in US right-leaning politics (most notably in its funding by hedge-fund billionaire Robert Mercer), is able to take such methods and operationalise them towards very particular political aims. Formed in 2013, and having recruited several employees from the Cambridge research teams, Cambridge Analytica has been involved in the campaigns of Ted Cruz, Donald Trump and the pro-Brexit Leave.EU campaign of 2015-6, and there has been some emerging writing about their work and methods. The main point to be made in relation to the writing on Facebook here is how central Facebook has been to their operations. After purchasing and further gathering large sets of data on individual preferences and psychological leanings, Cambridge Analytica then works to fine tune its political messages according to what it determines as relevant aggregate and also individually identified leanings on the part of various voters in ways that are deemed as able to have optimal psychological impact. In the case of Facebook, these messages can be released as sponsored News Feed style ads that can, as with any ads on Facebook, be targeted to users with specific profiles. This form of "multivariate" ad targeting allows Cambridge Analytica to craft thousands of different messages, ranging across the scale from messages of muscular economic liberalism to scare-mongering, as well as ads targeted at suppressing voter enthusiasm amongst potential opposing voters via psychologically targeted negative messaging regarding their candidate. These messages enter user News Feeds, to be Liked, Shared and commented on, thus potentially furthering their sociotechnical spread and circulation amongst Facebook users.

As we have seen, given the homogenous visual flattening that Facebook's design encourages, such messages might often look like any other news item. Indeed, the messages are often additionally crafted at the level of colours and fonts used depending on

the user being targeted. Thus, there is an interesting way in which Facebook's key dual features of being both relatively homogenous in terms of surface look and feel and yet highly targeted and algorithmically profiled in terms of the content served comes up in this example as well. A steady stream of so-called "alternative" news items emerge into various identified user streams as carefully proportioned and crafted units of boxed text, image and/or video. Where a company like Cambridge Analytica is successful, this intrusion of targeted political messaging into a user's Facebook feed might not even be felt as a message with a particular political intention, given how ostensibly targeted it is to carefully register with the user in question's own sentiments and affinities.

In regard to the issue of "fake news," it is important to highlight here how the deemed veracity of the particular message is in the end not as key as it might have been in a more strictly delimited domain of a political news forum. Instead, such messages arrive in a platform filled with forms of affect and affinity sharing, and it is just as much towards such affective registers that these messages are aiming to find purchase with. If it is able to receive the relatively costless proposition of a Like, a Share or a comment, the message becomes potentially in turn imbued with further levels of not only algorithmic but also human meaning and affinity. Such a sense of information as sociotechnical affinities and circulating energies highlights what it is that is in play in the discussions around fake news and what several are describing as a coming age of a "post-truth politics" and situation of being in "the middle of a transition from a society of facts to a society of data" (Davies 2016). As witnessed in the seemingly simple example of the Like button, these affinity engines are underpinned by counters and their many mathematical functions for algorithmic processing, and thus it is unsurprising to hear Cambridge Analytica CEO Alexander Nix describing current new methods being applied in his branch of influencing through advertising as one of a transition "from mad men of old to math men of today" (Nix 2016).

In such a society of data sharing and harvesting, companies like Cambridge Analytica (and other organisations and political drivers that would carry out similar strategies) are able to, seemingly quite effectively, achieve a stated goal of "data driven behaviour change" (Nix 2016). Like Facebook, and indeed directly via Facebook, it works to engineer relations via particular executable methods for predictive data modelling aimed at analysing historical and current forms of behaviour and decision making so as to be able to attempt to make proactive predictions and interventions into particular events and their outcomes. Specifically, in this case, of finding people who can be sufficiently influenced to go out and vote for the candidate in question. That we now are witnessing a situation of what researcher and data journalist Jon-

37 Bannon, a former executive chair of the right-wing online newspaper Breitbart News, would go on to be appointed as Trump's senior counsellor and chief strategist.

athan Albright characterises as one full of “micro-propaganda machines” and “weaponized, behavioral-tracking shadow tech” (Albright 2016) based on behavioural micro-targeting and emotion manipulation is not simply some kind of pernicious effect of big right-wing donors and companies like Cambridge Analytica that have members like the far-right, white nationalist Steve Bannon on their board.³⁷ These services and potentials were baked into Facebook and other platforms like it from early on, as Kosinski and his colleagues saw and as picked up on by others. Now that they are established we are beginning to see some of the leaky, long tails of their effects.

As those strategists working together with Cambridge Analytica and as researchers like Albright (2016) highlights in his helpful data-driven analyses of the propagation of right-wing forms of online information influencing, Facebook lies very much at the centre of such targeting movements, with the Like button as one of the most noticeable propagators of such forms of information across the network, both inside and outside of facebook.com. As witnessed in Albright's early investigations on this, and as discussed in this and the previous chapter's writing on the Like button as featuring both within and beyond Facebook's services, the Like button is often front and centre on many of the increasingly influential, so-called “fringe” websites and shadow channels that have been making inroads into mainstream politics (Albright amusingly describes Facebook Likes as “social media's misinformation gateway drug”). In many cases, the Like button can be said to lend a sense of authenticity to such content providers, allowing them to put a recognisable and seemingly trustworthy brand icon on their sites, an establishing of trust and authority that can be further bolstered by highlighting large number of Likes for the particular page in question. Many, but not all of these websites are of the kind of clean Wordpress design discussed earlier. In those cases where the websites “amount to little more than a Wix, Squarespace, or an ‘index.html’ file clumsily ftp'd onto a nine-dollar-a-month GoDaddy page” (Albright 2016), Facebook's web APIs will nevertheless automatically clean them up along the way of articles from these sites being pushed—via user sharings or paid for distribution of the articles—into Facebook's own services. In this way, Social Plugins APIs such as the Like button lend a sense of veneer to such sites, while other Facebook APIs (e.g. Facebook Instant Articles) and procedures for cleaning up the news items from such sites further polish their otherwise perhaps more visibly telling signs of potential inauthenticity or misinformation. And finally, the appending of further Likes and others forms of interactions with these posts within Facebook's own platform top off this transformation of what were once often marginally attended to news items into the everyday attention and sociotechnical networked flows of much larger audiences.

When this sense of authority or plausibility given to such information is combined with the aforementioned tools of predictive data modelling and micro-targeted pushes of paid promotion of articles, it can be seen to readily enable a form of what Albright describes as a projective feedback loop and readily manipulable approach of “propaganda-lytics” (Albright).

Facebook has been struggling in the aftermath of the fallout from the visibility of such manipulations of its platform’s workings (while of course continuing to profit from the various revenue streams generated as a result of the heavy user engagement that these politically polarising news items generate). The suggestion here is that leaky abstraction failures are representative, on the one hand, of the always unpredictable contingencies of execution in the world, at the same time that they are very much outgrowths and products of Facebook’s own making. Specifically, its own practices of aggressive micro-targeting and profiling of users and also its strong flattening and setting of strict limitations over potentially more differentiating forms of expression in its service – a flattening that relates directly to its computational endeavours of microtargeting and profiling. Despite its protests otherwise, Facebook was of course always already political in its technological facilitating of certain relations and forms of expression over others. Indeed, Facebook is already known to be carrying out experiments of its own in regards to the potential manipulation of its users. Amongst those publicised examples that are known, this includes its experiment in the 2010 US midterm elections, in which a sample set of 61 million of its users were tested with two different forms of messaging, with one group shown a “go vote” message in a plainly displayed box and another group given the same message with the addition of thumbnail pictures of their Facebook friends who had voted (Bond et al. 2012). Other experiments include the now infamous emotional contagion experiment in which Facebook, together with university researchers from Cornell, secretly manipulated its newsfeed so as to study the effects on 700,000 users of showing one test group greater numbers of “happy” posts and another more “sad” posts, as determined by semantic analysis software (Kramer et al. 2014).

Similarly, the effect of so-called filter bubbles were already long detectable in the opaque but nevertheless clearly attentional and affinity-orientated workings of Facebook’s algorithms. The eventual coming more forcibly to the fore of debates around filter bubbles, fake news and political manipulation of the kind such as witnessed in Cambridge Analytica highlights Facebook’s obvious participation in and affording of these phenomena, even if it did not intend or want to do so. In their breaking down of a sense of Facebook as a neutral platform for social interaction, these pressing examples represent a very clear example of an abstraction failure and surfacing of the mechanisms and their attendant

ideologies that underpin Facebook as a platform. Equally, they serve as a forcible reminder of the need to think through questions of the compositional nature of executions as they apply to examples such as Facebook and those that would plug into Facebook's methods of information capture and exchange. Facebook, as well as a range of other networked and computational platforms, via techniques such as those of interface, API and algorithm design, encourages certain forms of relations over others, circulates certain items more readily than others, and in doing so, participates in ongoing processes of making certain worlds more likely than others. When Facebook circulates a targeted and politically-orientated message (be it a "mainstream" or "alternative" piece of content) to a very specific group of users whose profiling it has encouraged, it actively participates in the creation of particular kinds of spheres of the political. What Zeynep Tufekci, in her writing on the "engineering" of publics, describes as a form of "big data-enabled computational politics," one that in such examples can be understood as breaking down, or at least reconstituting, previous forms of civic, public and shared commons (Tufekci 2014). In such a realm of computationally-afforded forms of politics, engineers, interfaces, APIs, protocols and other agents involved act as increasingly important brokers of political discourse and its executable orientations and vectors – regardless of whether they would prefer to position themselves outside of such a sphere of influence.

PLATFORMISATION AND "SOCIAL INFRASTRUCTURE"

**Our goal is not to build a platform. It's to be across all of them.
—Mark Zuckerberg (cited in Rose 2011)**

As many have noted, the paradox of the development of platforms and their vision of "the social web" is that the streamlined forms of strictly allotted and controlled forms of user interaction that these platforms typically provide has gradually resulted in a situation in which the users are many but the number of platforms used relatively few. Martin Warnke speaks of the hoarding style of Web 2.0-style models and their data gathering efforts as leading to a situation of a limited number of highly protected "citadels" and how "In Web 2.0 everyone is allowed to take part, however only on the terms of the citadel rulers" (Warnke, in Lovink and Rasch 2013, 87). As these last two chapters have aimed to demonstrate, in the case of Facebook, its cultivation of network effects has been achieved through careful and clever feats of sociotechnical forms of engineering, having partly begun around 2006 with its implementation of APIs of various kinds and then formalising this more thoroughly in 2007 with Facebook Platforms and soon after in the specific form of the Social Plugins.

These APIs and other services of the Facebook platform, each in their own way, provide webmasters and app developers with ways of integrating functions of Facebook on their own sites and services, and in this way, establish particular kinds of data flows between such sites and services, with much attention given to the various user specific activities carried both outside of Facebook, and the feeding of these activities back into its Facebook's burgeoning social graph. According to Zuckerberg himself, over 30 million apps and websites incorporate Facebook's services; equating to what website profiler BuildWith estimated in 2015 as a situation in which 28.4% of the top 10,000 websites had implemented Facebook features (as cited in Helmond 2015, 3). As discussed, these embeddable web services of Facebook have the effect of capturing a wide range of user interests and activities as they transpire across the vast range of spaces into which Facebook has managed to lodge its services within.

In this way, the "citadel" approach—more commonly cited as the "walled garden" metaphor—though accurately capturing the protective nature of Facebook in regard to its cultivation of its multiplier effects and data accumulation, can be seen to in some senses be only a partly accurate one. Indeed, many writers on Facebook work to develop conceptual metaphors that can serve as a way of getting a hold of Facebook's large and distributed forms of networked pursuits. For instance, ex-Facebook Product Manager Antonio García Martínez, in his tell-all memoir of his time at Facebook, opts instead to describe the situation as one in which "Facebook sees you everywhere, as if it had a closed-circuit TV on all city streets" (García Martínez 2016, 6). But this also is not quite accurate, in that it implies a kind of top-down, surveilling form of power relation. With Facebook's deliberate projection into multiple areas of the web via its particular technological frameworks, and as witnessed specifically in the examples of the voluntary uptake of its Social Plugin APIs and other services, such forms of projection can also be seen to be the creation of a kind of extensive tributary system for Facebook in which it purposefully encourages the adoption and spreading of its services outside of its platform, so as to create further data flows that can then be fed back into the overall system. Such is the uptake of Facebook's various services that it has for some time become possible to speak of Facebook as a "utility" for social interaction. This particular nomenclature points to a kind of normative tipping point and achieving of critical mass in which, as with the provision of plumbing or electricity, the service in question has become both "ubiquitous" and "inescapable" (van Dijck 2013, 166). A form of privatised infrastructural plumbing for networked and computational sociality which Facebook continues to find ways of further expanding.

To such an understanding of Facebook as both walled garden

and more general infrastructure consisting of a suite of platforms for connection and surveillance, one can add yet another dimension. During one of his pitches for the Facebook IPO in 2012, Zuckerberg presented a vision of Facebook and its many integrated apps as a kind of “passport” to the Internet (Zuckerberg, cited in van Dijck 2013, 163-4). In this metaphor, we see again how the walled garden and CCTV metaphors don’t adequately capture the full situation as it currently is, in that Zuckerberg is here explicitly indicating towards a way in which Facebook—via its various apps and the primacy of singular identity that it attempts to impose—sees its service as a kind of travellers’ document with which one might access all domains of connectivity, breaking down a strict sense of being “inside” or “outside” of the Facebook platform. Of course, as witnessed in examples like the HTTP cookie, whereby even users not signed up to Facebook can still be made to feed it with data, there is no one conceptual metaphor to rule them all. Instead, each of these techniques act together, feeding off of the multiplier effects of each and projecting Facebook as a series of connective techniques for data generation and capture within a range of networked forms of interaction.

Anne Helmond’s writing on the “platformization of the web” provides one of the most extended analyses of this ongoing phenomenon, giving particular attention to the “rise of the platform as the dominant infrastructural and economic model of the social web” (Helmond 2015, 3). In the case of platforms like Facebook and its particular cultivation and structuring of its services, Helmond sees the putting into motion of what she describes as a “double logic of platformization,” a two-way process whereby the decentralising platform features such as the Social Plugin APIs are carried out with a specific aim of using these features to make data external to the platform capturable according to platform-native objects and techniques of the platform itself, thus resulting in an expansion and what, in the larger picture, is a recentralization of the platform’s infrastructural and economic models (4). In their further underpinning and wrapping within the connective terms of APIs such as the Social Plugins, an interfacial object such as the Like button is infused with a particular form of two-way projection and contagion. By allowing its small snippets of code and their clickable interfaces to be propagated by webmasters and other developers throughout online environments of various kinds, Facebook is able to create, capture and process still more user interactions, and in the process, further expand and propagate its own dominant influence as an increasingly seeming indispensable infrastructural service for online interaction. Facebook’s form of projection here should also be understood as one of naturalising its particular take on the social web, one that underpins not only its own services but also all of those who adapt them into their own pages, applications and other forms of

web services. Thus, each embed of any of its services by an outside party further promotes Facebook's models of the privileging of real user identities, its promotion of a quantified take on social interactions and the accompanying capitalist advertising models of an attention economy aimed at extracting high levels of cognitive and affective labour from its users.

As this research aims to highlight, it is important to attend to certain compositional drives in technologies of various kinds. The API, with its structuring of the executable terms and conditions for the interoperable exchanges of information between networked parties can of course be implemented in many different ways. But as it has been pursued to date by the likes of Facebook and others, the use of things like web APIs, rather than acting as open-ended forms for cross platform communication, has often instead been weighted in favour of the kind of recentralising forces that Helmond speaks of, aiming in the end to solidify rather than open up a platform's own services. A Social Plugin such as the Like button not only captures user Likes outside of Facebook's own platform, but does so according to the terms of the Like button, rather than those set by the webmaster. Furthermore, APIs such as those of the Social Plugins are typically structured and weighted towards capturing data from the third parties that employ them, while black-boxing and giving only minimal of access to the workings of Facebook's own platform. In this way, Facebook is able to establish very particular kinds of relations in which it grants forms of access to its services and collections of information that are in general defined by their methods of directing more flows of information to its service while withholding, so as to be able to broker and control, various forms of access to this collected information. Such methods have the effect of leading to significant potential situations of what Tufekci describes as "information asymmetry," situations in which "those holding the data know a lot about individuals while people don't know what the data practitioners know about them" (Tufekci 2014).

A further use of the API within a general structure of platformisation is for the way in which it can help platforms to structure the data channels that are opened up by an API so that the data captured is made "platform ready," both at the technical level but also according to other principles of the platform in question. Here again one can see how the earlier comments on interface regarding the Like button can be seen to expand to a larger scale in the case of an API and its acting as an intermediary between platforms of technologies and the particular owners and sets of users within these different platforms. As pointed out by Gerlitz et al., it is important to note the way in which websites and now apps are typically no longer only self-sufficient, standalone "single medium" style software interfaces, but rather "are embedded in, built on top of or in relation to social media platforms and

their databases” (Gerlitz et al. 2016). Social media platforms and the extensive spread of their features across the media landscape lead to a situation in which the already linked and implicitly relational nature of internet connected content is now infused with this further infrastructural layer of often privately controlled and very specifically orientated computational infrastructures and data flows. As Getlitz et al. rightly point out, there is in the open-ended potential of the API a possibility for “interpretative flexibility,” one in which the various degrees of openness or closure between platforms could be explored. However, in the case of Facebook, what one witnesses to date is a distinct incentivising of the sharing of monetisable data for Facebook with comparatively little sharing of this value creation with the adopters of APIs and particularly not the actual users themselves. So, in the case of Facebook’s structuring of the power relations at play in its own APIs, the operational syntax of the interfacing between platforms is almost always such that the power relations opened up are implicitly aligned with Facebook’s clearly engaging but also asymmetric terms of access, and thus the field of possibility opened up by Facebook APIs becomes one in which very particular sets of potentials are mobilised. As a result of such structures, the Like button and Facebook’s many other APIs prove capable devices for the capture and filtering of data flows back into Facebook’s control, further concentrating its capitalisation of a continually expanding range of platforms for different forms of content creation and user interaction.

Protocols and APIs can be more or less open, applied towards processes of decentralisation or centralisation. The practices of the present era can be seen to oscillate between such polarities, though an example such as Facebook points to this being in many respects a very centralised era. Facebook has clearly managed to build what have proven to be more effective and popular forms for social infrastructure than those working for more open and decentralised models. The ongoing battles of things like the “platform wars” also highlight an interesting form of tension for platforms, namely their often necessarily symbiotic but often potentially adversarial relationships with other platforms and services. In these relationships, the need to be able to build and construct various applications and forms of exchanges upon and between other platforms brings with it all forms of potential tensions, issues that are further compounded by the varying degrees of open and closed source components involved in such exchanges. For those starting from the bottom or attempting to promote alternatives, such existing and dominant structures and conditions for networked exchange can involve very delicate and difficult to negotiate regimes and relations of power.

With the accumulation of greater wealth and market dominance comes the ability not only to become a seemingly indis-

pensable infrastructure to the general social ecosystem of online connectivity in which Facebook would be the dominant player, but also the ability to imitate or simply takeover existing services, so as to expand and project its reach still further. As a result of this dominance, in those cases where developers come up with novel new features of interest to users, Facebook has shown itself more than ready to either blatantly copy these features, cannibalising them into its own dominant platform, or instead simply purchasing the developer in question so as to bring the feature fully in-house and gain proprietary rights over any of its patented or patentable features. Because of its continued expansion, Facebook becomes able to pay increasingly large sums of money for the acquisition of otherwise potentially competing emerging services, such as in the case of its purchases of Instagram and WhatsApp. In doing so, Facebook achieves both horizontal and vertical forms of end-to-end integrations, or what van Dijck describes as “chains” of connective platforms (van Dijck 2013, 163), in which it works to further integrate its hold over key user entry points for interaction, with a particular focus in the case of Instagram and WhatsApp on the app as a very particular form of entry point in mobile technologies of today. Furthermore, in the example of Instagram, one can now witness how the company has been aggressively pursuing Snapchat users not by a tactic of purchase, but rather in the strategic “unbundling” method of disruption, whereby Instagram, since its purchase by Facebook, can be seen to have ramped up its attempts to specifically target such users by directly imitating particularly popular features offered in the overall “bundle” of services in the platform in question (in Snapchat’s case, the copying of its Stories feature and also a copying of Snapchat’s Lenses feature of real-time special effects). This form of copying is nothing new in the industry, and in the case of Facebook can be tracked back to its own replicating of FriendFeed’s social features and then eventual purchase of the service, as discussed in the previous chapter.

In the chapters of the first section on the compositional questions of execution, some attention was given to the development of various techniques centred around the coercive structuring of labour through a method of division of tasks, and how this disciplinary method of divide and rule in the name of productivity came to being in the operational system of the factory floor, but also gradually spread and took hold in a way that informed a range of other technological but also social processes. The platform model that one witnesses in an example such as Facebook can also be understood to have a projective quality of its own, and can be seen to have spread and taken hold as a powerful new model of connectivity in contemporary networked and computational cultures. This platform model involves coding practices and the spread of coded objects that are themselves

compositionally informed by the economic models and practices that have underwritten them and further evolved in relation to their effects. In the example of Facebook, these practices continue apace, benefitting from the multiplier effects of more and more data flows becoming amenable to and entering into Facebook's services and control.

While major platforms such as Facebook and Google each have their own specific techniques and modes of projection, certain recurring ideological tenets can be witnessed. These include a rhetoric of openness and transparency that is underwritten by a mode of making actors and their data connective while generally denying any meaningful access or understanding to the algorithmic production that underwrites this connectivity. Furthermore, an ideology of a flat neutrality is often employed as a smokescreen for what are very particularly decided upon models of connectivity, a structural and programmed form of decision-making that has clear incentives for the platforms in question. Indeed, as argued by Tarleton Gillespie, the very designation of a social networking service as a "platform" can be seen as one such strategic discursive move to position the service in question as a neutral form of facilitator, thus "eliding the organizing agency of its own systemic and economic affordances" (Gillespie 2010). As writers like Tufekci (2014) or van Dijck (2013) remind one, this normalisation of their modes and terms of engagement are the results of very particular ongoing efforts on the parts of the platforms to engineer publics and sociality.

This determined effort on Facebook's part to play a central part in such an engineering of the social is evident, once again, in Mark Zuckerberg's latest manifesto-style statement, penned partly in direct response to the growing discussion of Facebook's role in the issues of fake news and filter bubbles. Titled "Building Global Community," the piece makes continued reference to Zuckerberg's overarching goal to "build social infrastructure" – in this particular version, one of a "civically-engaged community" (Zuckerberg 2017). The following passage gives a general sense of the statement:

For the past decade, Facebook has focused on connecting friends and families. With that foundation, our next focus will be developing the social infrastructure for community -- for supporting us, for keeping us safe, for informing us, for civic engagement, and for inclusion of all. (Zuckerberg 2017)

Sociality is of course a dynamic, continually engineered and negotiated thing. The fact that Zuckerberg felt pushed to write this 6,000-word statement could be seen as indicating a more overt acknowledgement on Zuckerberg's part of this constructed nature of the social which Facebook of course plays a major role

in. At the same time, in the statement's generic platitudes and continued deferral of attempting to define or share in a more up-front fashion Facebook's own particular methods of participating in this construction (because this would partly lead to certain forms of ideological "abstraction failures" spoken of earlier), we see that Facebook isn't quite ready to admit to its dominant, highly projective status and ideological role in producing certain forms of connections rather than others.

By focusing more specifically on its techniques and methods for making such a sociality amenable to its particular intentions, it becomes possible to highlight some of the specific ways in which Facebook is indeed projecting a particular kind of social infrastructure for interaction and the sharing and producing of content and expression. In the making executable of certain abstractions and their correlations rather than others, Facebook mediates experience in very real ways, just at a different and more dispersed scale than is typically understood in discussions of mediation. The seemingly radical technical indifference of computational wrappings like protocols and APIs to their content, capable of serving up everything from fascist memes to Afrofuturist performances, doesn't mean that they are being engineered and sustained in some kind of flat, universal and apolitical mode of operation. As Sara Ahmed reminds one, any discourse of "flatness" is itself 'orientated'" (Ahmed 2006, 113; discussed further in Chapter 9). Speaking of the neutrality of the technical object or Facebook as a platform for social interaction ignores the fact that these technologies come into relational being in already active energies and sets of relations. Indeed, Facebook's success is partly this very ability on its part to plug into and engineer its services in direct relation to such energies, be they burgeoning forms of "platform capitalism" (Srnicek 2016) that build off of earlier economic trajectories, or discourses of difference whose segregating yet attentionally productive populist feedback loops a model of individually targeted content can put into further motion. Via all of the examples looked at, this chapter has attempted to highlight just some of these ways in which Facebook and its networked and computational practices participate very directly in this mediation and engineering of certain relations over others, creating not just any "social infrastructure," but just this one.

At the same time, in the latter examples looking at "fake news" and strategies of voter microtargeting, one also sees examples of the way in which this necessary appeal to exchange and participation that drives platforms can be manipulated by outside actors in ways that can also engage in the engineering and configuring of relations via networked and computational methods. Where successful, these actors can also benefit from many of the same networked forms of multiplier effects, making claims on the social and political via the making executable of their own

particular intentions. In order to follow up on this question of the politics involved in platforms, the next chapter will move from what has been a focus on various forms of abstraction within the engineering of platforms to a consideration of a particular user working through a particular intersecting set of relations, of which Facebook is but one force within.

8 DIAMOND REYNOLDS WAS LIVE

This chapter features a consideration of Diamond Reynolds' Facebook livestream video recording of a police shooting of her boyfriend and partner, Philando Castile. In doing so, it aims to consider some of the complex issues that Reynolds' act of livestreaming brings so forcefully into view. Specifically, it will look at how Reynolds is able to counteract the brutally charged event unfolding before her by employing a tactic of producing a live recording of the event. Reynolds' actions are considered here within writings and frameworks from intersectionality studies, and a specific intention of this chapter is to consider how such frameworks might help to further develop an understanding of the intersecting forms of power relations as they exist and are afforded in executing technologies of the present, as well as to specifically highlight oppositional modes of engagement and resistance in response to these forms of executing power relations. As the video is specifically generated via Facebook Live's livestreaming service, some of the previous two chapters' discussion on Facebook's role as a dominant platform for the generation and dissemination of user content will be returned to and given further consideration in relation to this example. Most importantly, the chapter will focus on how particular aspects of this event of Reynolds' livestream can be seen to point towards particular structures of domination but also oppositional potentials and forms of resistance.

It should be stated up front that in writing of this event of a black woman's perspective on police violence and further framing it predominantly within feminist thinkers of colour, there is a particular question of the ethics of representation in regards to my framing, as a white male scholar, of this traumatic event. I have not been subject to the oppressive regimes and their ongoing manifestations of antiblackness discussed here, and as such the lived everyday experiences that they present are far removed from my own. There is therefore a very real risk that in presenting such an event from my privileged position of observation as a relative outsider to this experience, and in looking across the particular bodies and perspectives involved in this event, I am participating in a further privileging of a gaze that William David Hart describes as that of a "normative whiteness (panoptic whiteness)"; one that "seeds the ground and scripts the nature of perception" in its continuing of a positioning of an "observing subject who is normatively white and the observed subject who is prototypically black" (Hart, in Yancy and Jones 2013, 97). Such a form of visibility and writing on others' lived experiences always risks the colonising act of seeing and speaking for others.

In response to such a danger, one can attempt, as I partly have here, the sustained and ongoing act of dismantling one's own gaze and position in relation to these issues, in the hope of opening up the possibility of speaking not for, but rather in solidarity with those who are closest to the situation in question. While also always speaking clearly out against those forces of oppression that enact their markings of particular bodies more than others, so as to continue the project of dismantling the oppressive structures themselves. This chapter partly represents what in the second half of my PhD studies was a personal attempt to question and rework my own set of theoretical references. The powerful sets of voices, concepts and practices that were encountered in doing so have subsequently worked themselves over this research as a whole, providing as they have many of the most valuable insights on speaking of power, oppression and resistance that I have encountered as a researcher, while also highlighting potentially problematic features of my research practice that need further consideration going forward. It should also be pointed out that it was largely because of the very persistent and repeated forms of resistance and speaking against such practices on the part of both individual and collective efforts of past and present movements such as Black Lives Matter that these exclusionary, racist practices were made into more visible and urgent issues for addressing, which is another reason for the sharing and promoting of these lines of thought and action here. But the potential that the sharing and framing of such a lived appearance might still become a further occupation of a kind nevertheless still remains.

As it is considered in here, Reynolds' livestreaming of the police shooting of Castile will be framed very particularly as one telling example, amongst many others, of the ways in which technologically-afforded structures of agency and oppression intersect, counteract and concretise into complex compositional instances of encounter and lived experience. In one sense then, it aims to highlight the ways in which to exist within the networked and computationally-afforded situations of the present is to engage with and be situated within a series of sociotechnical provisions and executions of power, each with their own established and emergent executable practices and relations. Like Reynolds, we are all moving within and across these structures of technology and power. But clearly, as this chapter (and the one following it) also aims to describe, these manifestations of various executions of power are very differently applied and experienced. This chapter is thus also an interrogation of what continues to be a dominant strain of white supremacist practices, whose sustained and structural exclusions and forms of violence continue to manifest themselves throughout the US and many other nations, while also finding further compositional traction in certain domains of

contemporary technologies. The chapter specifically supports claims that race continues to be one particularly powerful lens and technology of oppression that continues to ground and orientate contemporary societies, while also working to point to some specific ways in which this sense of “race as technology” (Chun 2012) takes hold and intersects within other networks of relation.

Reynolds’ video is a document of a lived and situated encounter of one individual at the centre of one particular unfolding event in time, with the reading here being a very particular framing of this event. Both before and subsequent to Reynolds’ film there have arisen a number of different but interesting potentially complementary cases of filmed police cases for consideration. Deciding on what details to highlight in this discussion, and what not to, has been difficult and in the end these decisions have been made in the name of this research’s overall focus on developing politically-orientated ways of describing technologically-afforded forms of power and expression. The reader is encouraged not to simply accept the framing given here, but to view Reynolds’ video and others like it in order to consider those aspects that were left out here and also as further context, though it should be pointed out that these videos are disturbing and should be approached with care (see the *The New York Times* page “The Raw Videos That Have Sparked Outrage Over Police Treatment of Blacks” for a video archive of many of these incidents).

Because the details in the video are relevant to the issues raised and also because Reynolds’ commentary is so important to the video as a political artefact, I have taken the decision to describe several of the traumatic events in it as largely given by Reynolds, despite the fact that this risks both normalising and also aestheticising a sense of black suffering. In the research presented on the Mediterranean Sea in the next section, I take the explicit approach of focusing the gaze of my research on those in positions of power rather than those vulnerable to power, because of a specific worry of the way in which such accounts can end up normalising imposed suffering, when the real work at hand should be that of strategically and actively intervening into the situation so as to change the various forms of power relations and practices that participate in bringing such experiences into being. But when encountering Reynolds’ video in the midst of writing the other chapters on Facebook here, I felt moved in this instance to attempt to think through Reynolds’ particular oppositional act of mediation and speaking of truth to power. When asked why she made the livestream, Reynolds responded,

I wanted everyone in the world to know that no matter how much the police tamper with evidence, how much they stick together, no matter how they manipulate our minds to believe what they want, I wanted to put it on Facebook and go viral so

that the people could see ... I wanted the people to determine who was right and who was wrong. I want the people to be the testimonies here. (Reynolds, cited in Mott 2016)

It was this call on Reynolds' behalf for justice regarding the to the specific incident that it records that motivated me to begin gathering notes on the event. Furthermore, in her powerful example of sharing this imposed vulnerability and the experiences of violence and oppression that it points to, Reynolds also makes what can be interpreted as a call for a collective audience to interrogate and take both individual and collective forms of responsibility for, as well as direct action against the forms of oppression that the video and the incident as a whole speaks to.

"POLICE"

On July 6, 2016, Diamond Reynolds was making regular checks and updates to her Facebook account, making 18 posts and shares on this particular day. A browse through her publically accessible profile page (before Reynolds eventually deactivated it) shows an active and familiar user of the platform, with the updates giving the sense of someone who enjoys the ability to share various bits of everyday experience in Facebook's framework for social sharing in the form of text, emoji, image sharing and the like. The day begins with Reynolds declaring affection for her long-term boyfriend Philando Castile and reminding friends of her upcoming birthday. Reynolds is savvy to the vernacular and ins and out of social media (5:13 pm: "It's funny how nobody see my posts n like my pics but soon as I unfriend a mf they notice that"), and it is apparent from some of the digital artefacts and overlays on the images uploaded that she is also on other social platforms such as Snapchat. Interspersed between back and forths with friends are also signs of everyday work and struggle ("8:47 pm: "Don't get it twisted everything I have I worked hard for an it's only the beginning ain't nobody gave me shit period"; and from the day before, 5 July, 7:28 am: "Tired asf working both jobs today y'all pray for me").

With the onset of evening comes a particularly active period of posting leading to a video post listed as occurring at 9:06 pm, in Falcon Heights, Minnesota, with Reynolds giving only one word of explanation: "Police"

Figure 8.1. Content warning for Diamond Reynolds' Facebook Live video

The post is a Facebook Live video, part of a new live video streaming service that Facebook had only recently launched three months earlier in April of 2016. The new service allows Facebook's users to share live video with a click of the button from their phone or other computing devices with a camera and access to Facebook. Such videos livestream whatever the user happens to be filming from their device and appear as a piece of viewable content in the streams of those who have access to the user's content.³⁸ Upon completion of the livestream, the video remains in the posting user's profile timeline as a viewable video. Given that the service had only recently launched and was still not in wide use, this is yet another indicator of Reynolds' ready familiarity with these social platforms.

Subsequent to its being posted, the video would soon be stamped by Facebook with a content warning and a query of "Are you sure you want to see this?" Again, sensitivity is needed. The opening description here is moving quickly, but the events will be retraced again after this initial description. Before continuing, it should be pointed out just how suddenly this event of extreme violence entered into Castile and Reynolds' life. Having been pulled over, it takes only a few seconds from the police officer asking for Castile's licence and registration to the pulling of the trigger and Reynolds' split decision to record the proceedings.

"Videos that contain graphic violence can shock, offend and upset. Are you sure you want to see this?" it says. Upon clicking the video, the viewer is immediately confronted with footage of Reynolds and her heavily bloodied partner Castile, who is in a visibly critical condition in the driver's seat of their car. Recording

³⁸ Depending, as always, on Facebook's complicated and continuously mutating privacy settings and further algorithmic decisions in regards to who to push the content to.

directly beside Castile in the passenger side of the car, Reynolds is giving an on the spot commentary and explanation of what has just transpired, using the front-facing camera to record herself and the scene.

Reynolds: Stay with me. We got pulled over for a busted tail light in the back. And the police just... he's, he's, he's covered... [inaudible] they killed my boyfriend. He's licensed, he's carried so he's licensed to carry. He was trying to get out his ID and his wallet out his pocket and he let the officer know that he was that he had a firearm and he was reaching for his wallet, and the officer just shot him in his arm...

An audibly stressed police officer standing outside of Castile's window (later identified as Jeronimo Yanez), continues to point his gun at Castile while also issuing commands to Reynolds.

OFFICER: Ma'am, keep your hands where they are.

REYNOLDS: I will sir, no worries, I will.

OFFICER: Fuck!!

REYNOLDS: He just got his arm shot off. We got pulled over on Larpenteur.

OFFICER: I told him not to reach for it! I told him to get his head up!

REYNOLDS: He had, you told him to get his ID, sir, his driver's license. Oh my god please don't tell me he's dead. Please don't tell me my boyfriend just went like that.

OFFICER: Keep your hands where they are please.

REYNOLDS: Yes I will, sir. I will keep my hands where they are. Please don't tell me this Lord, please Jesus don't tell me that he's gone. Please don't tell me that he's gone. Please officer don't tell me that you just did this to him. You shot four bullets into him, sir. He was just getting his license and registration, sir.

This distressing event of the livestream continues, with Reynolds stepping out of the car with her hands and phone held in the air, moving, as requested, slowly backward towards the police, who have her kneel on the ground, at which point the phone drops to the ground, landing with the camera facing upwards. Still live, the video presents a view from the pavement of a clear blue sky across which an intersecting staff of telephone and electricity wires cut diagonally across. In this position, the untouched phone continues to stream the dialogue between an off-screen

Reynolds and the police against its blue backdrop for a full two minutes. At one point Reynolds can be heard to lose the fragile sense of composure she has maintained until this point, breaking into a plea for Castile's life. The same police officer Yanez can be heard shouting multiple aggravated cries of "Fuck!" The sirens of other cars are heard arriving onto the scene and the phone is then picked up, at which point the scene goes dark, presumably having been pocketed by an officer on the scene.

Figure 8.2. Still image from Diamond Reynolds' livestream

Still recording and with Reynolds audible in the background, the video continues in this obscured view for another two minutes until the face of Reynolds—and briefly also her four-year-old daughter (who was sitting in the back seat of the car during the shooting)—appears again, the phone returned to her possession with Reynolds now sat in the back of a police car and filming from the seat of her lap. Reynolds stops to gather her composure and give a final account of what just transpired. The livestream comes to a close with Reynolds notifying that the phone's battery is about to die and calling out with the directions of her location to family or friends that might be watching. In the closing moments of the now 10 minutes of recorded footage, Reynolds slips back into grieving for Castile, and this wilful act of sustained oppositional gazing ends with Reynolds being comforted by her four-year-old daughter, whom the footage suggests has herself remained a quiet, observant spectator of these unfolding events. "It's OK mommy... It's OK, I'm right here with you."

While the drawn-out court proceedings against Officer Yanez are still in process at the time of writing this, the general known details of the case are as follows. Philando Castile was 32-years-old and worked as a cafeteria supervisor at the local elementary school J.J. Hill Montessori, in St. Paul, Minnesota. Castile had worked at school cafeterias for over a decade and was known to

be well-liked by children and parents at the school. Castile, Reynolds and her daughter were returning from grocery shopping on a route that took them through Falcon Heights when they were stopped by Yanez, who questioned them about an alleged broken tail light. Later police radio recordings revealed that Yanez apparently used the broken tail light as an excuse to pull Castile over, with Yanez claiming over the radio that Castile looked similar to a recent robbery suspect. “The driver looks more like one of our suspects just ‘cause of the wide-set nose” (a physical description that could encompass any number of African American men). Castile was more than familiar with these instances of profiling, this being at least the 49th minor traffic stop in his 13 years as a driver (LaFraniere and Smith 2016).

As Yanez and a second police officer approached him, Reynolds claims that Castile notified them that he was carrying a gun, that he had a permit to carry it and that he was reaching to pull out his ID. In the space of a few short breaths, Yanez, for reasons that continue to be debated, suddenly panicked—ostensibly because he thought Castile was reaching for the gun rather than his licence—discharging his weapon seven times into the car, with five of the shots striking Castile. Castile was confirmed as dying from the gun wounds approximately half an hour later at Hennepin County Medical Center. Yanez was charged with second-degree manslaughter and two counts of intentional discharge of a dangerous weapon. Conviction would lead to a sentence of ten years, though the experience of such trials of police in relation to shootings of black individuals to date suggest that Yanez will more than likely evade conviction.

In the aftermath of its being posted, the video was temporarily removed by Facebook from Reynolds’ page but was then reinstated with the aforementioned content warning and was quickly shared and viewed by millions. In a statement to BuzzFeed News, Facebook stated, “We’re very sorry that the video was temporarily inaccessible. It was down due to a technical glitch and restored as soon as we were able to investigate” (BuzzFeed 2016a). As dictated in Facebook’s community guidelines, graphic content of this nature can be removed, though they will permit certain instances of such content, such as in the case of documenting human rights abuses or acts of terrorism (Sperry and Biddle 2016; and also discussed later in this chapter).

The shooting of Castile came a day after police officers in Baton Rouge were seen on camera rapidly escalating an encounter with 37-year-old Alton Sterling, presenting yet another of a series of videos of the deaths of black civilians at the hands of the police captured and disseminated via social media networks. Reynolds’ video thus came at a time of particular visibility of police violence.

For many, the most remarkable aspect of Reynolds’ livestream

is the composed manner of Reynolds' running commentary of the scene. As characterised in a Washington Post profile of Reynolds in the weeks following the shooting, "Whether it was instinct or shock that had taken over inside the car, she was the one whom millions of viewers remembered as dignified, as unafraid, as somehow calm at the center of an American crisis" (Saslow 2016).

OPPOSITIONAL GAZING

Reynolds' act of livestreaming is many things. As such, it opens onto different potential understandings and experiences of its content. Amongst others, it is the initiating of a gaze. It is a situated gaze. A gaze that is specifically positioned in relation to Reynolds' physical position in the passenger side of a car in which a powerful event is unfolding. In the context of a police shooting, it is a further charged and situated gaze of a black, female participant in this tragically common American scene. An emergent but also fully aware gaze that, as Reynolds later stated in interviews, knows "that people would choose sides and I knew that they wouldn't see me as the person that would be telling the truth. And because of that I chose to in that moment record the media aftermath. ... I knew that by recording I would be able to have my side brought to the table" (Reynolds, cited in ABC News 2016). As a livestream carried out on Facebook's now massively popular platform for social sharing, it is also a knowing sociotechnical and networked gaze of a heavy user of the tools that contemporary social media provide. Reynolds: "I wanted it to go viral so that people could determine themselves as to what was right and what was wrong" (Reynolds, cited in Mott 2016). Understood from this perspective, the video can be seen as a situated gaze aiming, at least partly, to speak a certain form of truth to power, a possibility whose amplification of this imposed precarity is partly afforded to Reynolds as a result of her ability and willingness to use Facebook Live to immediately stream footage shot from her phone that will be immediately archived and disseminated further on Facebook.

In her book *Black Looks: Race and Representation* (1992), bell hooks speaks of the "oppositional gaze" of oppressed subjects. In her description of such an oppositional gaze, hooks describes the particular acquaintance with the power of the gaze that those in marginal positions of power carry. In the case of this lived experience as it relates to the history of the United States, this knowledge of the power of the gaze can be traced back to a politics of slavery and racialised power relations in which slaves were strictly denied of a right to gaze (hooks 1992, 115), as well as further onwards into traditions of the Jim Crow era, in which still segregated black citizens could be arrested and violently punished for cases of "reckless eyeballing" – any deemed threatening look on the part of a black man at a white woman (Mirzoeff 2015).

Each of these lived histories of being denied the power to gaze have the effect of directly highlighting the rebellious and oppositional power lying within the act of gazing; the agency and ability of a gaze of someone who is oppressed to threaten, confront and interrogate the acts of those in power. hooks:

Spaces of agency exist for black people, wherein we can both interrogate the gaze of the Other but also look back, and at one another, naming what we see. The “gaze” has been and is a site of resistance for colonized black people globally. Subordinates in relations of power learn experientially that there is a critical gaze, one the “looks” to document, one that is oppositional. (hooks 1991, 116)

This learning to look a certain way has an oppositional quality in its potential enactment of a resistance to accepting the received ideological wisdom of what is observable and what one has the right to look at, at the same time that it opens up a new space of recognition and appearance for those who would learn and empower themselves via these ways of looking otherwise.

Coming only a day after filmed footage showing the police shooting of Alton Sterling outside of a Baton Rouge convenience store, Reynolds’ video arrives in a notably escalating timeline of individually documented and nationally reported uses of deadly force against black citizens that includes, amongst others, the killings of Trayvon Martin, Eric Garner, Tamir Rice, Tanisha Anderson, Michael Brown, Walter Scott, Samuel Debose, Keith Lamont Scott, Alton Sterling, Terence Crutcher, as well as the subsequent death in jail of Sandra Bland. This heightened visibility for an age-old issue in American culture and politics had already partly contributed to the emergence of newly forming social movements such as #BlackLivesMatter and #SayHerName, whose use of metadata hashtags in their names signifies a specific intention to gather shared collections of awareness and recognition for the issue of violence against black communities. Thus, a general mode of oppositional forms of witnessing, empowering and resisting forms of power was in the air at the time.

What singles out Reynolds’ video from many of the other shooting videos is Reynolds’ particularly forceful and overt decision to apply a mode of oppositional gazing to the situation in which she found herself in. It is not simply that Reynolds records what is unfolding in front of her and in very direct and intimate proximity to police power, but that she further makes repeated and conscious efforts in her narration to critically situate both the viewers and also the audibly shaken police officer in relation to her critical gaze on these events, while also occasionally breaking off into moments of personal grief.

Reynolds is of course fully aware of the racist stereotype that Castile is subject to as a black man, and works to shut down this

particular narrative, stating to the officers on the scene, “He’s a good man. He works for St. Paul Public Schools. He doesn’t have no records of anything. He’s never been to jail, anything. He’s not a gang member, anything.” As if being part of a gang would justify being killed for reaching for his ID. Despite Yanez’s act of violence, Reynolds continues to address him with the deferent term of “sir.” “Yes I will, sir. I will keep my hands where they are. ... Please officer don’t tell me that you just did this to him. You shot four bullets into him, sir. He was just getting his license and registration, sir.” The power dynamics that Reynolds is being forced to negotiate in this unfolding situation are multiple and vividly present throughout the video.

But in addition to this, there is the specific aim on Reynolds’ part of interrogating the dominant position of police power as it is applying itself in this particular unfolding event, with her ongoing narration continually attempting to act as a form of testimony and veridiction as to the particular details of the event. As an acknowledged heavy user of the abilities social media provide, Reynolds can also be seen to be using the sense of communicative networked power and interpretive agency that the ability to livestream and comment on the scene provides her. This is not then simply a form of on-the-spot citizen reporting and truth telling. Reynolds is also using the stream to openly question and interrogate the police actions, while wrestling with what is unfolding before her and most likely specifically drawing on her familiarity with the ability of social media to potentially help one form a particular sense of interpretive agency and understanding of what one is seeing. In some senses then, Reynolds’ livestream might be compared to the interwoven mode of truth telling that Michel Foucault gives the name of *parrhêsia* to, in that it shares this concept’s notion of a particular kind of candid and “fearless” speech that simultaneously acts as a veridiction of events, interrogation of power and an interpretive practice of self-positioning (Foucault 1984, 9). The livestream can also be seen to take its place in the ongoing efforts on the parts of citizens in many countries who are wrestling with the powers of social media and the potentials it affords of enabling the kind of art of critiques of forms of oppression via forms of self and collective governance that writers like hooks and Foucault speak of. The oppositional gaze of Reynolds’ becomes partly that of a refusal of the expected role of passive observer and thus an exercise of individual resistance in the face of an openly violent manifestation of violence and oppression.

As in the discussion in earlier chapters of the way in which execution partly involves an interpretive and compositional question of “What is executing here?” it is also worth considering how this oppositional and truth telling gaze of Reynolds’ participates in what are the further demonstrative and declaratory functions of

execution in the world: e.g. *This* is what is deemed to be executing here and it serves as evidence as to what is executable in this particular network of (power) relations. In the case of an oppressed and subordinated subject view and its particularly informed relation to an executing system of oppression, an example like Reynolds' is both a questioning and answering, but also an opposition to the ongoing question of domination. As Frantz Fanon so distinctly characterises it: "Because it is a systematic negation of the other person and a furious determination to deny the other person all attributes of humanity, colonialism forces the people it dominates to ask themselves the question constantly: 'In reality, who am I?'" (Fanon 2001, 200). Reynolds, in her mode of oppositional gazing, speaks to, on and against this question of power and its execution, providing an individual mode of expression—*this* is what I see and *this* is how I interpret it—that also points to collective forms of resistance that might be similarly enacted, coming into being amidst other such instances of individual and collective resistance on the part of movements like #BlackLives-Matter and #SayHerName.

A further specific quality at play in this oppositional gazing is the way in which it can be seen as a direct refusal of a "necropolitical" (Achille Mbembe 2003) contract that would continue to position black death at the hands of the police as a seemingly everyday and inevitable part of America life. In the powerful collection of essays in the book *Pursuing Trayvon Martin* (Yancy and Jones 2013) that was purposefully brought to print in a much more rapid fashion than is common for an academic collection, there are several essays dealing with just this issue of resisting a sense of being already marked for death within a dominant system of oppression. As William David Hart writes in his essay in the volume, "How do these marks appear? How is it that the black male body 'presents itself' as an object to be killed? According to what semiotic is the black male body marked for death" (Hart, in Yancy and Jones 2013, 91). To which Hart answers (in relation to the case of the Trayvon Martin shooting): "It was Martin's *marked* body that made the *unremarkable* behaviour of just walking remarkable." What Hart also describes as the imposing of a "virtual identity" on Martin by those who would see his 17-year-old black body as always indicating towards some imagined form of inherent, latent threat (99). Given the particular sustained and marked history—from slave codes to segregation codes and further into emerging modes of predictive policing—of finding excuses for attacking and imprisoning black-skinned bodies, Hart describes this imposing of virtual identity upon Martin as that of an "incarcerating-and-carceral gaze," what he also alternately describes as a "criminogenic gaze" (94). This imposition of a virtual identity in the form of a carceral gaze has the ultimate effect of imposing a kind of "virtual probation" on its always-already incriminated

subjects, and ultimately, in its most persistent form, indicates to a manner in which, “Civically speaking, you are virtually dead” (96). The continual threat of imprisonment by carceral US states acts as one such example of a form of world-making, in this case for black and other citizens most subject and at risk of forms of police discrimination, violence and incrimination. Think of all the traffic stops Castile was subjected to. The perpetual threat to his body and subjecthood that such incidents continually confronted him with.

In another essay from the same collection, Devonya Havis similarly highlights Jennifer Eberhard and colleagues’ notion of “seeing black,” and how such forms of criminalising gazes act as “a visual tuning device” that directs people’s attention and interpretation of black bodies in certain ways rather than others (Havis, in Yancy and Jones 2013, 120). Discourse, whether that of reinforced and dominant white gazes of various kinds and/or those of algorithmic production, is this continual participation in the act of making certain things more visible and sayable than others, and further inscribing them into the lifeworlds of those whom it would gain purchase upon. By attempting to show another picture and perspective via her own act of livestreaming, Reynolds is attempting an oppositional pushing back against such dominant discursive forces. Her video, shared as it is on Facebook, is further distributed via both other users and Facebook’s own algorithms that decide how visible such content might further be made to be.

But as discussed at various points so far in this research, even in its most oppressive modes of domination, discourse is always open to the interstices of emergence and problematisation that the unpredictable qualities of execution in the world continuously open onto. Where the previous chapter’s discussion of Facebook might have made for a suggestion of Facebook as a largely hegemonic force of dominance, we see here an example of how, while controlling and excluding certain possibilities for online interaction, Facebook and other platforms like Twitter also open up their own particular spaces for potential agency and political manoeuvring, ranging from Donald Trump’s Twitter account and the kind of voter targeting discussed in the last chapter to examples like #BlackLivesMatter and Reynolds’ livestream.

As reported in a story following up on the difficult aftermath of Reynolds’ life subsequent to the killing of Castile, Reynolds, even after closing down her social media accounts on the recommendation of her lawyer, continued to occasionally resort to self-broadcasting as a particular mode of meaning making. At one point, she took over the Snapchat account of a friend, and, as described in the interview, can be seen to be broadcasting her depressing situation in the wake of Castile’s death:

Diamond had gone to New York a few days later to appear on “Good Morning America,” leaving behind an apartment that was ransacked and robbed while she was away, and so far, the main consequence she noticed in her own life was how one crisis spiraled immediately into the next. No more boyfriend to watch her daughter while she worked nights at the dollar store. No more pay check to help cover her rent. No more roommate with a pistol to make her feel secure in St. Paul’s most dangerous neighborhood. No more car to go searching for a new apartment, because the car was Castile’s and had been seized as part of the investigation. No one left to help her move except for a social worker who said the only place available for a single mother with limited income and a previous eviction on her record was a dingy two-bedroom across town in a neighborhood that was almost as bad.

... “Sorry. We’ll get this all fixed up before you move in,” the agent said, shielding her nose with her sleeve as they walked from the living room toward the back bedroom. The agent handed Diamond a checklist of things to inspect in the apartment and asked her to mark whatever items needed to be fixed. Diamond walked off by herself with the clipboard.

“Floor: Mop dog crap,” she wrote.

“Ceiling: Clean spider webs.”

“Refrigerator: Broken.” “Windows: Need all new.” “Lights: missing.” “Painting: Bad.” “Woodwork: Horrible.”

She took out her phone, clicked on the camera and began streaming a video. Her lawyer had recommended that she avoid posting on social media after the shooting to protect her privacy, so she had closed her Instagram account and dismantled her Facebook page when the original video surpassed 3 million views. But she had always found it cathartic to broadcast her life, so she had taken over a friend’s Snapchat account for a few weeks while he was in jail, since he wouldn’t be using it.

“Hey, everybody,” she said, livestreaming the dark crust on the bathroom sink to an audience of a few dozen strangers. “Anybody got bleach?”

“They said this place would be ready,” she said, turning the camera back on herself. “Don’t think I’m sleeping here tonight.” (Saslow 2016)

The truth-telling gaze is here one of a more mundane and con-signed nature, of telling a truth well known and lived, but speaks to Reynolds’ situation and her attempts to claim even such seemingly minor forms of oppositional agency over a difficult present by sharing them with others.³⁹ With the growing examples and spread of modes of oppositional gazing such as Reynolds’, and the

39 The fact that in the aftermath of the shooting Reynolds was largely cut off by her lawyers from this kind of productive mode of engaging with the world that she had become used to prior to Castile’s shooting points to an important issue: that of the potentially damaging way in which engaged users of social media who become the target of a particular issue relating to their media use are often cut off from the technologies and modes of engagement that are such important presences in their everyday life. Well-meaning lawyers, family members and advisors should treat seriously what it can mean for a user who is empowered from such modes of engagement to be cut off and withdrawn from them.

further familiarity that users develop with technological modes of recording, comes a greater awareness and readiness on the part of others to adopt similar modes of gazing and looking back on power. Consider the following example recorded by Rakeyia Scott, wife of Keith Lamont Scott, who was shot and killed two months after the Castile incident and under similarly unclear and still hotly debated circumstances.

Figure 8.3. Captioned presentation of Rakeyia Scott's comments during her recording of the shooting of her husband Keith Lamont Scott, as produced by *The New York Times* (<https://www.nytimes.com/2016/09/24/us/charlotte-keith-scott-shooting-video.html>)

In this recording the viewer is able to also follow events leading up to the shooting itself, and in it Rakeyia Scott shows an even greater oppositional willingness to call out the police, suggesting a gathering of mutually developed and shared sense of resistance amongst a growing public whom would turn an oppositional gaze more sharply upon these sadly predictable aspects of public life in America. Both as a form of collective truth telling but also in the hopes of instigating new relations to power and its configuration.

The Scott shooting is also notable in that it features the further recorded perspectives of police body worn cameras (bodycams) and also dashboard cameras from the police cars, giving further embodied and disembodied forms of institutional gazing that can be further complemented by things like CCTV footage, aerial views from police helicopters (e.g. the Terence Crutcher shooting) and so on. Indeed, in the aftermath of the Castile shooting, it has emerged that there is a dashcam video of the incident from Yanez's police cruiser. But, predictably, this footage is being kept from the public in advance of the trial. These are emerging new forms of gazing that will continue to open up various predictable and unpredictable vectors of power and opposition. The coming section on migration in the Mediterranean Sea will consider further forms of gazing, including those of a forensic and archival

activist gaze. But before doing so, this chapter will look at what are seen as particularly relevant and useful methods that can be of help for addressing the many intersections of power and technology that an example like Reynolds' points to, as well as some consideration on further oppositional tactics that might be adopted in response to such forms of power and oppression.

INTERSECTING, INTERACTIVE RELATIONS OF POWER

The recurring theme in this research is to follow various manifestations of technologically-informed structures and executions of power. Much of the trajectory of this tracking of power has up until now focused particularly on the technique of dividing so as to “conquer,” the making operational of particularly incisive forms of material discursive cuts for making things executable, with some consideration also given to how any such cut exists within a range of other compositional affordances, each with their own connections and divisions of various kinds. This coming together of multiple compositional affordances of the executable was often characterised as being *intersecting* in nature. And here it is worth considering more specifically what exactly such an expression can be understood to mean and entail in relation to questions of power, agency and expression. In order to do so, it is helpful to turn from discussions of media theory and software studies towards those of intersectionality studies, as writers in this tradition provide particularly powerful and considered descriptions and frameworks for thinking through just the kind of intersecting modes of power and its practices that are of interest to this research.

Following in a long tradition of black feminist writing, writers such as Kimberlé Crenshaw and Patricia Hill Collins, together with other writers of the 1980s, 90s and into the present day, have worked to bring the concept and eventual field and practice of intersectionality studies to the fore. In a chapter in her book *Black Feminist Thought* (1990), Collins pushes forward an approach of thinking of systems of oppression as being multiple and interlocking in nature. In this approach, issues relating to oppression—such as race, class and gender—are treated as co-constitutive, rather than having a hierarchical value (e.g. privileging one as more crucial and paradigmatic than the other), working to describe how these forms of oppression can be seen to “interconnect” with and inform one another (Collins 1990, 222). Oppression in such an intersectional mode of understanding is not to be reduced to one fundamental type (e.g. class), but rather to be understood as always being composed of multiple and intersecting forces that work together to produce forms of unequal relations and injustice. For Collins, one particularly important aspect of this approach is that it allows subordinated groups more scope to speak of and define the individual textures and realities

of their particular lived experiences and oppressions. Thus, in contrast to additive models and their inherently more categorical imperatives and either/or modes of description, this interlocking understanding of systems of oppression can be understood as a more inclusive, both/and mode of thinking and understanding.

Regardless of which dimensions one chooses to focus on, a primary aim of an intersectional approach such as that of Collins' is to develop an understanding of the particular structures of domination as well as the situated forms of agency and activism that would effectively resist and potentially reconstitute such structures. In a general context of the intersectional approach and its understanding of intersecting oppressions, Collins has spoken on several occasions on what she characterises as "the matrix of domination," which is intended to refer "to how these intersecting oppressions are actually organized" (Collins 2000, 18). As Collins describes it, in addition to being structured along axes such as social class, race and gender, the matrix of domination is also structured along further levels, including those of personal biography, the group or community level of the cultural context created by the axes of determination, and a systemic level of institutions. Each of these levels can act "as sites of domination and as potential sites of resistance" (Collins 1990, 227). Collins's model opens directly up onto the many individual, interpersonal and systemic complexities of domination, and the way in which "a matrix of domination contains few pure victims or oppressors," and how "Each individual derives varying amounts of penalty and privilege from the multiple systems of oppression which frame everyone's lives" (226). The inclusiveness of this conceptual model is such that an individual will find that they can be a member of both multiple dominant groups and also multiple subordinated groups, and, crucially, that each perspective should be understood as representing a partial perspective such that "No one group has a clear angle of vision" (234-5). Such an epistemological and also political stance has the potential of allowing space for unique positions and expressions of experience, and in doing so, provides the potential for dynamic and ongoing perspectives on oppression and agency that might employ particular tactical and also sensitive approaches for change in such systems of dominance.

As with hooks' formulation of the oppositional gaze, Collins views this project of developing modes of thinking able to further describe and thus better understand the matrix of domination as one of an ongoing activist dialogue and cause that "presents the matrix of domination as responsive to human agency":

Such thought views the world as a dynamic place where the goal is not merely to survive or to fit in or to cope; rather, it becomes a place where we feel ownership and accountability.

The existence of Afrocentric feminist thought suggests that there is always choice, and power to act, no matter how bleak the situation may appear to be. Viewing the world as one in the making raises the issue of individual responsibility for bringing about change. It also shows that while individual empowerment is key, only collective action can effectively generate lasting social transformation of political and economic institutions. (Collins 1990, 237)

As has been looked at in the work of this research, structures and practices of power not only intersect but often draw multiplier effects from one another, highlighting what Kimberlé Crenshaw (the originator of the term intersectionality) characterises as the “*interactive effects of discrimination*” and the “*compound*” ways in which intersecting forms of oppression and the relations they instantiate can bring about further dynamic and often oppressive vectors of domination (Crenshaw 2003, 46). The point of this bringing in of intersectionality research into the discussions here is to use it to help further consider practices of technology and power, particularly the very clearly compound, interactive and also intersectional effects that can be seen to be at play in the application and execution of certain forms of technologically-afforded power relations over others.

As Lisa Nakamura was able to show very early on in her writing on emerging forms of networked media, such was the ongoing utopian hype and potential that so many discourses, both mainstream and academic, invested into the development of the World Wide Web in the mid-1990s and early 2000s, that a sensitivity and awareness towards issues of race and the potentials of discrimination in online environments was continually deferred as something that was of less relevance in these seemingly post-identitarian spaces of “fluid” subjectivity that many ascribed to this “new” medium. Nakamura’s research aimed to resist such seeming givens of the early internet, and also to show the way in which discussions of how “everyone in cyberspace is disoriented” almost always tended to turn to prevalent discussions of post-modernity, while neglecting to learn from longer traditions and discussions in fields like critical race studies of what exactly the experience of being disorientated, “marginalized, fragmented, and imbricated within systems of signification that frame [subjects] in multiple and often contradictory ways” might involve (Nakamura 2002, xv-xvi).

This situation in so-called new media studies of often neglecting to turn to existing and highly relevant strands of existing research continues into the present. One example would be that of early discussions around the “new aesthetic” (Bridle 2011)⁴⁰ and its discussion of the potentially disorientating quality of being seen and surveilled by things like machine vision, and how such discussions initially tended to overlook highly relevant and

⁴⁰ Bridle has since been notably sensitive to these oversights and is involved in a range of artistic and also political practices aimed at direct intervention into situations of oppression.

existing writings from fields such as gender and race studies on what it means to be the object of an objectifying or othering gaze. As pithily summed up by Madeline Ashby, “Apparently, it took the preponderance of closed-circuit television cameras for some men to feel the intensity of the gaze that women have almost always been under” (Ashby 2012).

While continuing to pay close attention to the specificity and actual new aspects of “new media,” it is equally important to not let such a focus on the new bracket out the traditions from which every new technology emerges, its interactive genealogies of descent, emergence and domination. As Nakamura writes, “identity online is still *typed*, still mired in oppressive roles even if the body has been left behind or bracketed. ... Supposedly ‘fluid’ selves are no less subject to cultural hegemonies, rules of conduct, and regulating cultural norms than are ‘solid’” (Nakamura 2002, 4). Or, as Kalí Tal was describing it already in 1996,

The irony of this invisibility is that African American critical theory provides very sophisticated tools for the analysis of cyberculture, since African American critics have been discussing the problem of multiple identities, fragmented personae, and liminality for over a hundred years ... The “culture of simulation” is no different from “the culture” for people of color in this country, who have been “inventing” themselves, their multiple selves” as they go along, and “constructing the world, too” (Tal 1996)

In contrast to such approaches in media and technology studies that would elide issues of race, more recent descriptions such as Wendy Hui Kyong Chun’s (2012) of “race as technology” provide a contrasting view and formulation of how a consideration of the various actualised markers of race can be seen to provide a method into addressing the ways in which technology has been used to support various forms of discrimination and oppression, with one particularly notable example being the technique that makes race the difference that makes a difference. Chun highlights practices of segregation and its method of making “race dependent on space” as one such important racially orientated technique within the US (Chun 2012, 46). Other notable examples of racially orientated techniques and technologies that can be seen to feed into present day situations include those of the spatial and economically segregating effects of what is called “redlining” – the historical and long employed practice of the selective granting of loans by various federal and private trade associations within the US that included racially orientated clauses, such as those that explicitly forbid the sale of property to non-whites. Such practices further resulted in specifically directed flows of money (including tax dollars) into the segregated white neighbourhoods that they participated in producing (see Ta-Nehisi Coates 2014 for an

overview of this, as well as sites like *Mapping Inequality*—<https://dsl.richmond.edu/panorama/redlining/>—for more on this). The longer-term effects of such forms of technologically-aided modes of “slow violence” (Nixon 2011) sediment and seep into the present. One sees it in important examples such as that of gerrymandering (the political redrawing of voting districts), which in recent years has begun using redistricting software that, amongst a range of categories, specifically includes that of race, allowing for even more calculated and thus potentially further entrenched control of the electoral map for those able to first get their hands on such software (Daley 2016). In examples such as these, one witnesses how race, along with other key intersectional identifiers, “is not merely an effect of capitalism’s objectifying systems; rather, race is itself a co-constituting technology that made such forms of accounting possible in the first place” (McGlotten 2014). As identifier and differentiator, race in these examples can be seen in many instances to act as a co-constituting tool in an ongoing matrix of domination that now finds still further executable expression via difference making computing machines that are long acquainted with various techniques of division and control, only further emphasising the explicit need for intersectionally attenuated readings of particular aspects of technology.

As the first section in this research aimed to show, standard forms of computation build on the practical cut of making things discrete for the effective processing of data on executable machines. The question that arises in examples such as these then is what happens when the executable functions of machines are combined and infused with those of what Foucault (1982, 777-8) describes as “dividing practices” that continually work to make forms of distinctions between inside and outside via different distributions of such practices of distinction. Practices that participate in making individuals and groups subject to the various forms of knowledge/power relations and potential subjectivities installed via such practices. As Oscar Gandy Jr. (1993) was describing already in the early 1990s, such dividing practices should be understood as participating in societal practices of othering at the same time that they have specific and identifiable technical makeups that inform their practices of distribution and othering.

Gandy identifies the technique of sorting as being perhaps the most crucial and foundational force in such practices. Practices of sorting are those technologically-informed practices that use methods of identification, classification and evaluation in order to process information gathered on individuals and groups in a variety of ways. Such information is typically “generated through their daily lives as citizens, employees, and consumers and is used to coordinate and control their access to the goods and services that define life in the modern capitalist economy” (Gandy Jr. 1993, 15). In this sense of allocating options and opportunities,

sorting is thus an inherently “discriminatory technology” (15), just as it is also an active attempt at an ongoing “sensing of personhood” (3), or at least the particular ghost of personhood as it arises according to such methods.

Machines have been made from their earliest beginnings to excel at sorting. Conditional statements—the branching constructs of programming language that are used to make decisions as to the next step to be taken in a program (e.g IF [this] THEN [that] ELSE [that] control statements)—can be seen as one example of this sorting nature inherent to computational operations. The first program written for a working stored program computer is typically cited as being John von Neumann’s merge sort program, composed in 1945 and featuring an elegant divide and conquer algorithm for quick sorting of data. But, as looked at in Chapter 4, the intimate history of sorting, computation and politics goes back further, with Herman Hollerith’s electrical tabulating machines for statistical analysis of census data being one of the most notable examples (see Knuth 1998 for a comprehensive overview of computational sorting methods). The most common application of algorithms today is typically towards various tasks of sorting, as witnessed in key examples such as search engines and personalisation algorithms. In a sense, when speaking of mediation in relation to computationally-afforded practices, one might partly suggest mediation here as that of an ongoing practice of sorting and the making of decisions in regards to what content to output or action to make in regards to the particular inputs received.

Facebook is also in many ways first and foremost a sorting machine. It works to sort users according to connections and affiliations. When registering a profile with the service for the first time, it asks for various forms of personal data (first name, family name, email, gender, date of birth) and then quickly sets to work on identifying further personal details and interests, browsing behaviours within and outside of Facebook, strengths of social relations, and so on. Quickly the user becomes part of its ongoing processes of sorting, with all of its users and their content being continuously classified according to various clusters of both intersecting and differentiated relations.

FIG. 1

FIG. 4

Figure 8.4. Images from Facebook patent US 20140089400 A1: “Inferring target clusters based on social connections.” A method for inferring target clusters of users and their affiliations based on social connections in a social networking system. Patent publication date: Mar 27, 2014. Images from <https://www.google.com/patents/US20140089400>

Again, these are decision making and difference machines and thus necessarily require some sense of difference and distinction in order to be executable. The cut of making things distinct and executable also highlights a range of forms of “obligatory passage point,” such as Michel Callon has described it. Particular concretised sociotechnical spaces in a system through which actors and their defined actions must “pass” in order that the system functions according to the dominant logic and will at play (Callon 1986, as discussed in Graham 2005, 564). These important passage points and thresholds of execution might be a logic gate, a web portal or a user login, but also something like the gates of the gated community that Trayvon Martin entered into or the clicking of the record button on Facebook Live and the particular entering into an act of mediation that such an action on Reynolds’ part puts into motion.

As they are manifested within contemporary software-sorting systems for things like machine learning, such obligatory passage points and their principal points of convergence orbit around and further concretise what is a central act of classification. As described by Adrian Mackenzie, these categories for classification may be numerous and the data run through them and methods applied to processing them varied, but when working towards such goals of classification, as sorting does, these methods are essentially predicated on a conditional logical in which categories of classes, however they might be defined, are made to be recognisable as stable and in some way distinct from other categories (Mackenzie 2015).

The question then partly becomes that of what distinctions are

such processes of sorting and classification making in the computational and networked practices of the present? What inclusions and exclusions do they participate in bringing into being? What forms of relations do they end up suggesting and potentially instantiating based on such inclusions and exclusions – and how do these distinctions and relations manifest themselves in everyday practice? Furthermore, and crucially, how might they be seen to gather various forms of multiplier effects by interacting and combining with other forms of classification and difference making, both within other systems of software-sorting but also more generally in the norms and practices of society as they are in any particular situated moment?

Driving on a summer's evening through the streets of Falcon Heights, Minneapolis, Reynolds, her daughter and Castile were moving across intersecting and interactive relations of power, each with their own compound and compositional forms of inclusion and exclusion, oppression and agency. At the technological layer, they would have been partly subject to Minneapolis's predictive policing analytics and the city's specific adoption of a "future-oriented analysis" of geospatially mapped "crime hot spots" trained on existing data sets and from which extrapolated one- to three-block "micro-hot spots" of predicted high risk areas can be plotted, and then used in directing the attention of police patrols to these calculated areas of interest (see Egge 2011 for a report on the Minneapolis Police Department's use of predictive policing; note that it specifically includes Larpenteur—the street where Castile was shot—within its radius of coverage). This might partly explain the obscene number of traffic stops Castile had already been subject to. A look into Castile's criminal record shows that he had been stopped for vehicle and traffic related incidents at least 49 times (LaFraniere and Smith 2016), with him being found guilty in 31 of these instances of misdemeanours or petty misdemeanours (such as driving on suspended licence, no proof of insurance, driving without a muffler, seatbelt and parking violations). As is well known, such traffic stops and the so-called "crime of driving while Black and Latino" are common features of American civic life, though a 2003 report on racial profiling undertaken by the Minnesota Legislature revealed that Minnesota had even higher than usual numbers nationally (The Council on Crime and Justice & Institute on Race & Poverty 2003). The following table gives the stark and damning figures for Minneapolis, and further maps in the report show that the Falcon Heights neighbourhood in which Castile was driving was one of the worst affected by such racial profiling.

Minneapolis, Comparison of Stops to Driving Age Population

	White	Black	American Indian	Asian	Latino
Population percentage	69.8%	15.8%	2.3%	5.6%	6.6%
Traffic stop percentage	44.7%	39.7%	1.5%	3.4%	10.7%
Statistical significance	Yes	Yes	Yes	Yes	Yes

Figure 8.5. Table from a Minnesota Legislature report on racial profiling (The Council on Crime and Justice & Institute on Race & Poverty 2003, 13)

While taking on many different forms, predictive policing models, because of the very specific way in which almost all such systems are built upon training sets of existing data, are thus already from the beginning subject to long held structural biases, with the data sets themselves involving long and scarred layers of oppression and self-amplification (see Sonja B. Starr’s 2014 report “Evidence-Based Sentencing and the Scientific Rationalization of Discrimination” for some helpful discussion on this; also Ferguson 2016 and Perry et al. 2013). That these predictive computational systems can themselves feed forward their own self-amplifying effects is one particularly noteworthy indicator of the importance of taking into account the longstanding ways in which issues of discrimination and technology have long, intersecting histories of feeding off of one another.

At a seemingly more mundane technological level, one can also consider the fact that Castile was ostensibly pulled over by Yanez for a broken brake light on his near 20-year old white 1997 Oldsmobile sedan. Bought for \$275, such affordable means of transport in a St. Paul area that has limited means of public transport available adds an immediate layer of police targetability to all less affluent members of the public who do not have financial access to vehicles that are less likely to suffer from identifiable faults in their workings. To compound matters, an issue like a faulty brake light not only leads to the situation in which one is more likely to be pulled over by police, but also increases the likelihood of traffic fines, with such fines making it all the harder to address the continuous breakdown of one part of the car or another. Castile spent more than \$6,000 paying off the diverse assortment of minor traffic violations he was subject to. Like so many low-income drivers subject to this particular burden of continuous fines and fees, Castile’s interactions with law enforcement was an ongoing cycle of stopping, searching and fining. Indeed, Officer Yanez’s typical daily work life can be described as the rhythmic counterpoint to Castile’s, with Yanez, like so many other police, spending much of his time routinely pulling over one driver after another for such minor infringements. In a *New York Times* article on Castile’s history of minor traffic infractions,

Maria Mitchell, an assistant public defender in the county that includes Minneapolis, describes the way in which low-income drivers can become overwhelmed by this continuous cycle of fines and fees. “Clients just start to feel hopeless. Kind of like when your credit gets out of control” (Mitchell, in La Franier and Smith 2016; see also Graeber 2015 on these financially-orientated feedback loops of fines, criminalisation and policing). Such fines can lead to the suspension of a driver’s license, which can in turn quickly lead to the threat of not being able to hold down a job that requires ready transport to get to work. Over time, yet another intimate and unwanted connection between certain drivers and police can open up and expand along these faulty interstices of cheaper but aging technologies.

Figure 8.6. Philando Castile’s 1997 Oldsmobile at the scene of the shooting.

Image by Tony Webster,

<https://www.flickr.com/photos/diversey/27537803563/in/photostream/>

In addition to such compositional sets of techniques and technologies, the presence of the technology of the gun, both in the hands of the police officer and on Castile’s person is one more key technological agent in this particular event. This chapter won’t pretend to be able to go into the profoundly layered and complex issue that is America’s ongoing relationship with guns, but suffice to say that in the US there is a long-held orientation of resorting to the gun as a mediating element for police interactions. In a gloss on rapper Nas’s lyrics on the subjectivity of a gun in the track “I Gave You Power,” Matthew Fuller describes the very particular thresholds that this technology brings into sharp contrast when enclosed within triggering human hands. Fuller: “there is a compositional drive within a gun that establishes certain forms of relations, relations that are unilinear and fatal, as being more likely. It is a machine for crossing thresholds of potentiality and closing them down” (Fuller 2005, 87).

As the record of the events of Castile’s shooting highlights, it took a mere 74 seconds from the moment of Yanez flashing the lights of his squad car to that of him pulling the trigger of his gun. While the footage from the dashcam of Yanez’s squad car

has yet to be publicly released, prosecutors who have seen the video describe Yanez as approaching the car, informing Castile in a seemingly calm fashion of the brake light problem and then asking to see his license and registration. Castile informs Yanez that he has a gun on his person and is licensed to carry this gun. “Officer, I have a firearm on me.” Yanez: “OK, don’t reach for it then. Don’t pull it out.” Castile: “I’m not pulling it out.” Reynolds: “He’s not pulling it out.” Yanez: “Don’t pull it out.” And in the space of just a few breaths, the scene escalates from a traffic stop to a police shooting, with Yanez most likely panicking in the face of what he felt as seeming uncertainty, opting to fire off seven shots. The final words of Castile are said to be, “I wasn’t reaching for it” (MPR News 2017).

As further investigations are now revealing (e.g. MPR 2017), in 344 hours of police training, Yanez had only been supplied with two hours of de-escalation training, a method of training that seeks to teach officers to create space and slow down in tense situations, so as to be able to use communication techniques aimed at defusing situations that might otherwise escalate into more dangerous situations. At the same time, Yanez’s training record reveals more sustained forms of other modes of training, such as the 20-hour “Bullet Proof Mind” course, which, according to one recording of such a session, warns officers that they are “dealing with individuals who are motivated to kill in a way that we have never seen before” (Gilbert 2017). Courses like this and others like “Street Survival,” which Yanez spent 16 hours on, commonly include the watching of videos showing officers being shot in a variety of situations. Such videos and the framing that is added to them can easily have the effect of escalating a sense of heightened risk and danger. With the arrival and spread of bodycam and dashcam recording, such videos of what are still relatively unique situations in the life of a police officer will of course only become more available and plentiful, opening up still further feedback loops of fear and division.

This phenomenon of amplification is of course prevalent in many other areas of contemporary life, in which the continual circulation of footage of individual and situated acts of violence has the effect of suggesting such violence as a dominant paradigm of the present, even in those many situations in which this is often not at all the case. In the case of Yanez, even without public access to the squad car dashcam video, one hears clearly in the audio of Reynolds’ filming of the aftermath of the shooting just how on edge a frayed Yanez is. It was also later revealed that despite there clearly being no danger to his person following his shooting of Castile, and also despite Castile being in need of urgent medical attention, Yanez continued to stand paralysed and in a shaken state with his gun pointed into the car for three minutes until officers eventually helped him to stand down. Subsequent

investigations into Yanez's career as an officer (MPR 2017) indicate towards an individual for whom confrontations could create a quite natural but perhaps more than usual sense of nervousness in, and for which more de-escalation training would thus clearly have been of particular help.

This general situation of increasing militarisation in many areas of US policing is also further visible at the point in Reynolds's recording when she is asked to get out of the vehicle, with one of the officers on the scene armed with and pointing an AR-15 semi-automatic rifle at her. Yet another sign of so many forms of intersecting and interactive forms of amplification. These cocked sociotechnical devices of execution that help to compose and charge an already tense scene with still further deadly orientations.

Figure 8.7. Screenshot still from Diamond Reynolds' livestream in which Officer Yanez can be seen continuing to stand with his gun pointed at the shot and now dying Castile

The trigger of a gun in this particular case triggers in turn the pressing of a "Live" button inscribed in software which might further trigger clicks to share this content, the video ricocheting this scene of violence across the internet. Reynolds films the incident from Facebook Live, and thus the scene is further subjected to the sociotechnical affordances and terms of service of this particular platform and the many other platforms that can be connected to it. Initially, it simply appears onto the News Feeds of anyone that Facebook's algorithms dictate Reynolds' content as worthy of displaying for. As noted, in the near aftermath of Reynolds' livestream, the video was temporarily removed by Facebook, which Facebook claimed was due to a "technical glitch" – only to be reinstated later. This has been the case with several subsequent takedowns of videos of incidents involving filming of confrontations with the police, such as in the case of Korryn Gaines, when Facebook granted an emergency request from the Baltimore County police department to take her Facebook and Instagram accounts offline during a five-hour standoff that ended in Gaines's death. After the standoff, Facebook restored her accounts, while continuing to block two specific videos for violation of its community standards (see Speri and Biddle 2016

for a summary of this incident).

While these removed videos are often screen recorded and posted onto other sites, one witnesses again here, as in the last chapter, Facebook's position of authority and influence over the social and political sphere. Furthermore, in the particular way in which Facebook Live disrupts the sense in which Facebook would have us continue to see it as a mere facilitator of social interactions rather than an explicitly discursive mediator and direct arbiter of sociality, takedowns such as these can also be understood as another example of a form of potential "abstraction failure" for Facebook, as discussed in the previous chapter. Facebook's ideological worldview becomes further visible in things like the recently revealed leaks of its internal policies for content moderation (Hopkins 2017). In the moderation policies, one discovers that the core of Facebook's approach to moderation lies in its notion of "protected" and "non-protected" categories of user generated content. In establishing each of the inclusions and exclusions of each of these categories, Facebook can be seen in such instances to be faced with what can be understood as a variety of classic intersectional questions of definition and perspective and the continuously intersecting questions of relation, power and control that these questions involve. Such questions of execution are further infused with the continuous question of processing power that Facebook works within, its desire to develop efficient and scalable moderation policies for its human moderators (representing yet another example of the continued role of human "computers" in computational economies and their efficiently allocated micro tasks of decision making), and preferably ones that continue its naïve but practical and seemingly more profit-friendly modes of universalism.

In response to the controversy that followed Facebook's temporary removal of Reynolds' video, CEO Mark Zuckerberg would post the following, no doubt heartfelt, but tellingly bland and arguably self-promoting update:

Mark Zuckerberg ✓

July 8, 2016 · 🌐

Yesterday, a Minnesota woman named Diamond Reynolds went live on Facebook immediately after her fiancé, Philando Castile, had been shot by police in his car. Philando later died from his wounds. In the video, Diamond's 4-year-old daughter is watching from the back seat.

My heart goes out to the Castile family and all the other families who have experienced this kind of tragedy. My thoughts are also with all members of the Facebook community who are deeply troubled by these events.

The images we've seen this week are graphic and heartbreaking, and they shine a light on the fear that millions of members of our community live with every day. While I hope we never have to see another video like Diamond's, it reminds us why coming together to build a more open and connected world is so important -- and how far we still have to go.

Figure 8.8. Screenshot of a Facebook status update from Mark Zuckerberg on July 8, 2016

Again, one sees here how, while wanting to participate in and share a sense of concern in regard to Castile's killing, in his continued couching of his statements and his platform in universal style platitudes, Zuckerberg, both at the ideological level and in some cases at technical level, risks some of the same kinds of "erasure of difference" that older forms of "mass media" used to similarly be accused of (Chun 2016a, 366). While platforms like Facebook continue to sell themselves under a rhetoric of universal empowerment, we need to, as Chun advocates, specifically interrogate the various "gaps" and erasures of certain forms of difference that can be seen between such rhetoric and the actual practices that uphold certain networked and computationally-afforded forms of participation and democracy, speech and empowerment (363). While also remembering that exclusions and erasures of difference of one kind or another will always be a part of executable practices, emphasising again the need for care and responsibility in the act of making things executable.

As Chun in her writing on "habitual new media" and also writers like Shaka McGlotten emphasise, it is not simply the extraordinary events of mediation that we should pay attention to, but also what McGlotten has described as the "ordinary affective intersections" of everyday arts of experience and living that one can find everywhere in the various online platforms and forums of interaction. Building on Kathleen Stewart's (2007) writing on "ordinary affects," McGlotten, while sharing in the political ambitions of intersectionality studies, also critiques its tendency towards shaping much of everyday life "as a world of violence, unequal access, and limited or nonexistent resources punctuated by a range of minor resistances" (McGlotten 2012, 50). The risk in such readings is for how they can have the effect of situating actions and ways of living as always ultimately being the products

of “systemic effects of large scale structures,” while not attending to “the ways feelings erupt and circulate in and through the most intimate and the most public social, economic, and political worlds” (49). For McGlotten, such characterisations risk subsuming “the ‘something else-ness’ of life—the ephemeral, intangible, or incoherent modes of awareness, attunement, stillness, wanting, wandering (or wondering), habits, and dreaming” (50); what he describes as “this ordinary art of making do” (59). Just as important in an understanding of Reynolds’ video of the shooting then is an understanding of Reynolds during other moments of more ordinary, everyday interactions – as witnessed in the examples of her Facebook status updates earlier in the day and also in her telling Snapchat commentaries when she was apartment hunting. Many of these “ordinary” instances do indeed also partly point to structural issues of class and inequality, but they also show a kind of everyday liveliness that overflows, outpaces and even at times openly contradicts or explodes any straightforward or taken for granted readings on power and oppression.

In what is a careful critique of certain forms of intersectional approaches, McGlotten points to Tavia Nyong’o’s call for an intersectionality that opens up categorical certainties rather than risking an eventual reification of them in the very making of claims for difference and justice within and thus potentially according to such categorical logics and also the structural logics such as those of the law and nation states that can be seen to further reproduce and undergird certain notions of fixity and subject formation. As Nyong’o writes, “It is not enough, in other words, to take up the simultaneity of race, class, gender, and sexuality ... Rather, we must investigate the subject transformed by law that nevertheless exists nowhere within it, the figure of absolute abjection that is, paradoxically, part of our everyday experience” (Nyong’o, cited in McGlotten, 49). This is an important point, and in McGlotten’s own sharing of powerful personal examples of seemingly more ordinary yet unpredictable and unruly forms of affect engagements and encounters, one finds just such examples that are situated simultaneously within but also beyond specific frameworks of technology and race, bearing witness to such a potential transformativity that is constantly in play. Networks open us all onto other perspectives, our perspectives potentially taking on in turn a sense of otherness as experienced by someone or something else in the network but also potentially opening onto certain intersecting and collective points of overlap.

In describing a sense of moving across and through various intersecting sets of executing relations, it is important to also think through how the perceived crossing of a certain threshold of execution is also one of affective gatherings and intensifications of energies, bodies and matter as they are continually composed within various relational encounters. Because of certain ongoing

histories and orientations, one might expect certain actions and interpretations as being more likely than others in such encounters, but these must also be understood as open to unpredictable outcomes. To this end, Jasbir Puar (2011), whom McGlotten cites, has attempted to bring approaches of affect and assemblage theory into critical discussion with those of intersectionality, highlighting some of the potential limits in each approach while also pointing towards ways in which aspects of each might point towards future avenues for enquiry. As Puar highlights, Crenshaw's analogy of a traffic intersection as a site where discrimination can flow in certain ways more than others, while potentially suggesting a sense of only certain roads upon which to travel and even a sense of gridlock and stasis, still includes within it a crucial element of motion. "As Crenshaw indicates in this description, identification is a process; identity is an encounter, an event, an accident, in fact. Identities are multi-causal, multi-directional, liminal; traces aren't always self-evident" (Puar 2011). Similarly, in speaking of a dominant entity like Facebook, one should not lose sight of this potential of becomings inherent to networks of different kinds, and which Facebook, for all of its particular orientations as presently conceived, can still be seen to afford certain such forms of encounter, with Facebook Live being the most recent and powerful example of such unpredictability and potential emergence.

There are many potential risks here then in trying to invoke certain approaches of intersectionality in relation to that of execution and the approach adopted here. But these approaches have been very helpful in thinking further through the some of the specificities and complexities in relation to the questions difference and relation that are central to this research. As invoked here, execution is partly used as a concept aimed at reminding one that while everyday life and living is of course processual, always mattering and open to continual configuration, there are nevertheless certain rather harder coded layers and passageways that intersect and inform certain aspects of living. The drawing of lines on a map such as one sees in the examples of redlining or redistricting is of course not simply a binary act of inclusion and exclusion, but these do nevertheless have the effect of making executable certain fairly sharp distinctions in certain areas of life. Indeed, it is not surprising that a concept like intersectionality emerges from a thinker like Kimberlé Crenshaw. Given her background and experience as a lawyer working on issues of anti-discrimination, Crenshaw is very attuned to the ways in which practices like the law do enact certain decisive forms of judgments. The point of using the term execution in this research partly aims to investigate and describe just such decisive qualities of actualisation, particularly as it exists in computational practices as they are currently conceived – while nevertheless

also acknowledging the open-ended qualities of computational processes as they always might be. I would also point out that there is a specifically tactical quality to this shared interest in studying and bringing to the fore of these often harder-coded qualities of the application of differences of various kinds. Specifically, that in doing so one might be able to highlight active and operational points for direct intervention (as someone like Crenshaw has continued to do throughout her career). The writing on technical practices in these pages then is not just for the sake of understanding them better, but understanding them specifically so as to consider in what ways their existing affordances might be made use of in the political processes of working for certain forms of difference and relation rather than others, while also continuing to think in what ways they might be conceived anew or differently. As Puar writes, “one of the big payoffs for thinking through the intertwined relations of intersectionality and assemblages is that it can help us produce more roadmaps of precisely these not quite fully understood relations between discipline and control” (Puar 2011).

Reynolds’ video points to clear intersectional and intersecting orientations of determination and oppression at the same time that it also plugs into and further mobilises oppositional energies of potential. It points to issues of complexity that resist a straightforward reading. Yanez is not a white police officer but Latino. In fact, in the heat of the moment, Reynolds reports in her livestream that he is Chinese: “It was a Chinese police officer that shot him. He’s Chinese, he’s about five-five, five-six-and-a-half, heavy-set guy.” Similarly, while the last chapter presented a picture of Facebook as representing a certain brand of cognitive capitalism, the indications here are that Reynolds is very engaged and empowered by the affordances that Facebook’s platform provides. In a world of unequal distributions of wealth and the continual imposition of various daily costs and technologies that are continually breaking down, here is a technology that costs nothing in direct monetary terms and yet is perhaps the most reliable software of its kind to have been produced to date, with one new feature after another being rolled out to its many active users. Meanwhile, a number of Facebook Live videos have continued to emerge from one day to the next since the original release of the feature, opening up difficult and unruly forms and questions of execution that point to the kind of generative and vital “bleed” of affect and expression whose potential McGlotten brings so vividly to the fore in his discussion of his own movements across such intersecting and emergent relations. Indeed, the example of livestreaming in general points to a particularly vital form of media expression that we can expect to see much further forms of both predictable and unpredictable fallout from. This chapter will finish by focusing on some tentative thoughts in relation to a

move towards forms of what are described as oppositional coding – networked and computationally-afforded practices that might participate in bringing about other relations of the executable while continuing to be sensitive to the cuts made in such pursuits.

OPPOSITIONAL CODING

In our world, divide and conquer must become define and empower. —Audre Lorde (1984, 112)

As Reynolds so forcibly demonstrates and as Wendy Chun describes, as characters in this “drama” that is the networked and computationally-informed experiences of the present, “we are not—nor do we have to be—marionettes ... we do not have to accept the current terms of our deployment” (Chun 2016a, 363). By helping to habituate a sense of oppositional agency and possibility, acts such as those of Reynolds’ participate in calls for new modes and realms of the executable, pushing platforms like Facebook, the police and members of the public to consider where they stand in relation to such challenging and emergent forms of execution. Like the theories of networks that underpin many of them, these technologically-afforded practices do not simply differentiate for the sake of differentiation, but rather so as to potentially seek out both predictable but also potentially emergent forms of correlation that are deemed as significant in one way or another. These categorisations, distinctions and correlations can be unfair and discriminative, leading to further forms of inequalities and oppression. But their forms of distinction and relation making can also be otherwise. Reynolds takes Facebook Live and turns it into a platform for exposure, documentation and reflection on police violence. Yanez is now the first officer in Minnesota to go on trial for a police shooting of this nature. Without the video and Reynolds’ wilful act, as well as the ongoing protests and expressions of solidarity following the video, this is unlikely to have been the case.

As Chun highlights, exposure and, crucially, repetition are explicit features of computer networks, and one might work to think of the kinds of politics and engagement that might be engaged in such modalities of exposure and repetition. Chun suggest that one such approach might involve an attempt “to produce a ‘we’ that does not flatten or align identity, but rather that exposes that singularity is fundamentally plural” (Chun 2016a, 378). Reynolds and others enact such acts of exposure. Acts that are partly structurally imposed upon them but nevertheless within which they attempt to shift the alignments and impositions that these structures attempt. In their intentional dissemination and further sharing by others across the network these actions might further create connections and alliances that might take hold in the very

act of such repetitions. Emerging from these latest expositions of police violence, one witnesses not only emerging forms of oppositional gazing but also what could be described as forms of *oppositional coding*, tactical approaches that make explicit use of the functions of computation and the network to push their causes. In the example of #BlackLivesMatter, the simple technical function of a metadata tag in the form of a hashtag brings into being just this kind of singular-plural that Chun speaks of, allowing users to both speak out with individual and situated voices while purposefully aligning with collective energies of support and opposition.

Stuart Hall (whom both hooks and Chun draw from), in his well-known model of communication as an ongoing practice and negotiation of processes of encoding and decoding, speaks of the inherent possibility for a user to not only reject outright the dominant discursive message being delivered to them but to begin the process of “detotalizing the message in the preferred code in order to retotalize the message within some alternative framework or reference” (Hall 1993, 517). Hall describes such a mode of recoding as that of “operating with what we must call an *oppositional code*” (Hall 1993, 517). The messages we send and receive are always partially coded in one way or another. We negotiate within and across these codes, in some cases accepting their executable terms of address and the affordance and forms of connection and potential empowerment they allow for, while in other instances pushing back and positioning against them.

Twitter is a thing in the world, another platform eagerly awaiting, as all platforms do, for users to come along and make use of its coded affordances. As time progresses, users frustrated by the limitations of the platform for linking conversations and posts in searchable ways develop their own further coding techniques on top of it, as in the case of the hashtag. Twitter responds by implementing this as an overt function. Activist causes see in this function a further method for bringing together individual and collective forms of actions and the experiences that they involve.

Facebook Live is launched. Users like Diamond Reynolds are given another tool of expression for experimentation with in the coded and social platform environment of Facebook. As a service made by Facebook, it is most likely more very reliable, computationally efficient and situated within a network of relations that Reynolds is seemingly relatively comfortable and familiar with. When it comes down to situations of great danger, a tool like this often presents itself more readily than others. Reynolds not only films Yanez and the aftermath of the shooting as a piece of content for her followers and audience to decode, she purposefully adds a further oppositional layer of verbal encoding to go along with the oppositional gaze of the video recording. The video is shared via Facebook’s well-greased gears for circulation. It is momentarily taken down by Facebook due to a “glitch” and then

reinstated again, becoming an item of national and international attention. Depending on one's view of Facebook, this might be seen to produce, for example, a great potential in its ability to reach a large and potentially diverse ranges of audiences, even subversively so in its showing up in and cutting into a News Feed that contains all manner of forms of content. At the same time, one might also experience the message and evidence that Reynolds attempts to share in the video, for all of its power, as potentially overwhelmed or diffused by its surroundings, situated as it ultimately is within Facebook's particular and currently dominant medium of expression, with all of the various forms of asymmetries that it puts into place, along with further issues like its particular economic model.

With its further dissemination across the network, Reynolds' video might appear as a clickable link or even as an autoplaying video that starts automatically from the moment it pops into view. Such was the case for writer and researcher Nehal El-Hadi, who was browsing her Twitter stream at her desk in Toronto on the same day as the shooting, when the Reynolds video suddenly autoplayed (as was the case for video on Twitter at this time) its broadcast of Castile's death for an unprepared El-Hadi. As El-Hadi describes it,

There was a temporal proximity to Castile's death that was absent in other recorded deaths such as those of Alton Sterling and Eric Garner. Those deaths were uploaded after the events, the videos managed in conjunction with mainstream media coverage. Castile's death was broadcast live and immediately available. Months later, the video haunts me in peculiar ways, especially because I would not have watched had it not started playing automatically. Autoplay made me do it, implicating me in Castile's death. I am uncomfortable in my role as witness. ... What differentiated Castile's death was the fact that the choice of whether or not to watch had been removed from me. (El-Hadi 2017)

In response to this lack of control over the representations and variously curated and controlled nature of content such as these images of death and dying, El-Hadi asks for more "thanatosensitive" forms of human-computer interaction whose sensitivity towards death (thanatos) would be at least threefold in cases such as these: "first, to acknowledge Black life, second, to contend with the spectacle of Black death, and third, to consider the afterlives of Black users whose deaths become events and haunt our timelines, turning our archives into cemeteries" (El-Hadi 2017). Another example pointing to the way in which intersectional issues of culture and politics are now further infused by questions of the intersection of these issues with those of the technical affordances and properties of networks and computation, point-

ing to further interactive and compound qualities of race, politics and technology.

A demand for such a sensitivity towards black and other perspectives on the part of technologies that participate in key issues of the social and political begins to highlight how, in addition to the kinds of oppositional gazing that we see in an example like Reynolds' video, one might also want to establish oppositional platforms and infrastructures for the mobilisations of such sensitive and empowering forms of practice. Platforms and infrastructures that aren't beholden to the terms of service and models of many of the most dominant platforms of the present, as in the example of a company like Facebook or the example of the encrypted police-managed cloud storage services on which the still unreleased footage of Yanez's squad car dashcam is currently held. As is becoming clear in the example of police bodycam and dashcam footage, given that this footage is controlled by the police, it's potential as a tool for accountability can readily become a tool for the police rather than the public. As in the last chapter on Facebook, this points again to question of asymmetric access to the archive. Bodycams and dashcams do not necessarily equal greater forms of visibility and justice if the guardians of said archives are the police. Indeed, where not available to all parties equally, such footage can be selectively applied, with those in power revealing footage when it suits them and finding ways of withholding it when it doesn't. This is already evident in the common practice by which US district attorneys tasked with defending police are at an advantage as they receive evidence directly from the police and are thus able to make their determinations about whether a particular piece of footage is relevant to a case, and if so, when to give such footage to a defence counsel. As described in Alex S. Vitale's writing on this in relation to cases in New York, such evidence often only materialises the day before or even on the day of a trial, forcing many to take plea deals or be unprepared for trial (Vitale 2017). And when they are allowed into the courtroom, videos like these act as items of evidence to be further encoded and decoded by the lawyers and members of the jury.

Placing such footage under the control of an independent civilian agency might help to ensure greater levels of access to such footage, though the greater question of privacy protections for all (citizens and police) who come under the sweep of such a technological gaze would continue to remain. The history to date of surveilling gazes is of them being aimed more at certain bodies and communities than others. That these modes of surveillance can increasingly be plugged into forms of "big data" that readily enact forms of biopolitical accounting via the assigning of numerical or financial value to various forms of living only further raises the need for a vigilance and consideration of the long tails of such

forms of monitoring, no matter how well intentioned they might be.

One sees similar issues at play in the example of the difficult to negotiate, often hate-filled minefield that is Twitter, which, while providing a simple and effective infrastructure of Tweets and hashtags for political movements such as #BlackLivesMatter, also opens these movements to ongoing trolling and threats of violence, with Twitter continuing to provide relatively little tools or methods for dealing with such threats. In a networked and computational present, along with the power of the oppositional gaze that opens up with the arrival of video sharing comes a similar need for further oppositional forms of (computationally-informed) coding and (networked) infrastructures that might further support such forms of resistance. With the suggestion here that these would inevitably partly involve a working through of intersectional questions in relation to those of execution, and in doing so, might bring about new understandings and practices of the executable.

In its politically charged call to black and female forms of excellence, Beyoncé's anthem "Formation"—coming as it did in the midst of the heightened wake of these police videos—highlights just such a disseminating power and need for further claims on the means of production and the formative power that would come with such new arrangements of oppositional coding. "I might get your song played on the radio station, 'cause I slay / You just might be a black Bill Gates in the making / 'cause I slay / I just might be a black Bill Gates in the making" (Beyoncé 2016).

The importance of the technical level of coding in forms of opposition is increasingly being understood as a potentially important element in political organisation. The many executions that one isn't privy to in the dominant, privately owned network platforms of the present and their continually changing terms of service means one is continually vulnerable to the positions and politics of these platforms. Not to mention the further vulnerability to outside parties capable of surveilling and manipulating the publicly available archives or data that these companies might also prove willing to share. Similarly, if forms of what were called "tactical media" approaches that often involved oppositional forms of coding (often built from the ground up) were often the most well thought through early examples of such oppositional coding at the technical level, many are now seeing the need for larger scale, platform-style tools of resistance, speaking to ongoing questions around infrastructure and capacity within political and social movements (Zeynep 2017, 191-2).

As one simple example of this, the American Civil Liberties Union have recently been attempting to provide technical infrastructures for the recording and reporting of various forms of police misconduct. Released for various states, the app aims to

send footage directly to the nearest ACLU affiliates and lawyers, thus helping with issues such as that of retaining the privacy of the recorder of the video and also circumventing the aforementioned issue of video takedown notices. Having perhaps understood that some might want to in fact mobilise the distribution power of mainstream platforms, the more recent ACLU Blue app allows users to post directly to ACLU Blue YouTube pages, after a process of review by ACLU, thus potentially gathering quicker and greater forms of visibility for these recordings. Such a making use of dominant media platforms for tactical forms of visibility can be compared to what Hall describes as a “negotiated version” of coding that contains “a mixture of adaptive and oppositional elements” (Hall 1993, 516). It can also be compared to the third of Chela Sandoval’s five “oppositional technologies of power” that she lists in her methodology of the oppressed, what she calls “meta-ideologizing,” “the operation of appropriating dominant ideological forms and using them whole in order to transform their meanings into a new, imposed, and revolutionary concept” (Sandoval 1995, 376). What Sandoval also describes as an “oppositional consciousness” that permits “the networks themselves to be appropriated as ideological weaponry” (384).

These are the ongoing questions of freedom and control that networks but also questions of execution and executability pose, particularly when situated within further questions of power and politics. They point to questions of tactics and infrastructure. Of how to plug into existing platforms and their valences for effective political action, while also working to develop other possible approaches through further acts of oppositional coding that might also work to building forms of networked and computational capacities that aren’t available at present. In thinking through the questions of what form such oppositional codings and infrastructures might involve, one might consider some of the suggestions made here in relation to thinking through the various compositional affordances and questions of power that arise in relation to networked and computationally-informed practices of execution. One should strategically learn from the dominant practices of the present, appropriating where it might be effective, while also continually working to rethink and recode them in ways that work to more directly sustain Audre Lorde’s call for approaches that work towards a goal of dismantling approaches of “divide and conquer” in the name of those that “define and empower” (Lorde 1984, 112). Working towards, not a vaguely universal model that would claim a sense of flatness and openness to all while continuing to actualise very particular forms of distribution and relations, but rather a mode of engagement that is sensitive to “mutual (nondominant) differences” and seeks to empower via explicitly opening itself up to the possibility for reconstitutions and redistributions of power and agency in accor-

dance with the always active movements of being as they play out in their situated but also “interdependent” relations (111).

The intersecting forms of relations that are made visible in oppositional acts like that of Reynolds’ video and other emerging networked movements point towards both promising and unpromising elements at play in media as they are at present. They highlight the extensive potential of networked communications to change existing relations and structures of domination. At the same time, in the fallout from movements such as the Arab Spring and the election of “Twitter President” Donald Trump, one sees just how resilient and equally capable those already in power are of making these same technologies work in their interests. Centuries of white supremacy and oppression work themselves into many of the data sets and practices of these emerging forms of computational processing, participating in and generating further forms of segregation and violence, risking further positive feedback loops and escalations of the kind of violence one sees in Reynolds’ video. On the day after Castile’s shooting, a black Army Reserve veteran of the Afghan War took to the streets with a legally purchased AK-74 semi-automatic rifle on the same day as a protest against police killings in Dallas, declaring his intention to kill white police officers and proceeding shoot dead five police officers. In the eventual standoff, the Dallas Police Department utilised a bomb detonation robot to blow up Johnson, an event now being cited as the first known time that a robot has been employed by police officers in the US to execute a person. Opening up, in the process, yet another potential vector of computationally-informed enforcement.

“We”—as individually sensitive and collectively interacting beings—live and die in these intersecting relations of culture, gender, race, economy, the law, technology, and so on. These relations are decidedly not flat, and each applies in different ways to different bodies, with discriminations and oppressions occurring across an intersecting range of differentiations and their correlative relations of power and agency. In a world in which computational and networked forms of technology are becoming not just ubiquitous but aggressively attached to and imbricated within so many aspects of living, one needs to treat seriously the intersectional call to “think inclusively” about the interactive and compound effects of these multi-layered systems of both active oppression and potential agency as they work themselves across bodies, technologies, cultures, environments, and more. This discussion and its particular framing of Reynolds’ livestream was used because of its ability to bring what it sees as powerful theories and practices that help in speaking of such a notion of intersecting and interactive relations of power. In moving towards the final chapters, this notion of intersecting and interactive layers of technology will be developed further still, including a look at

further examples of successful infrastructures of emerging forms of oppositional coding that involve various forms of mediated gazing, archiving and direct intervention.

For all of the oppressions and particular forms of relations that Reynolds' video of Castile's death gives witness to, it continues to live a generative life of its own in the continued discussions of its content and the calls to change that it participates within and further helps to mobilise. In the ongoing spread of networked social video platforms of various kinds around the world, it is not only these extreme instances of violence that one is potentially exposed to but also the ordinary, everyday affective energies and experiences of users engaging with the world. With the spread of various forms of video capturing and sharing, from mobile phones to dashcams to bodycams, and Facebook's own explicit intention to prioritise video—"the camera is the new keyboard" (Facebook Messenger product manager Tony Leach, in Constine 2017)—we can expect to see video as one important participant in such energies of participation, circulation and engagement. These acts of sharing and exposure highlight potential forms of both affinity and difference, and in their repetition and extended exposure open the possibility for new forms of connection and affinity that might come with them. As Chun puts it, the ongoing power and potential of the network, for all of its possible abuses, is in its very "leakiness" and promiscuous opening up of its users onto a question of what to do with this collective "we" that it so forcibly brings forth. "We repeat—we write, we read, we expose ourselves—to communicate this sense of community, to insist that this 'we' is possible" (Chun 2016a, 379).

These networks and platforms represent both new forms for relation making at the same time that they participate in ongoing questions of the social and the political. This chapter is one sketch towards further thinking through the possibilities and forms of distribution, recognition and agency that examples like Reynolds' potentially speak to. It has worked specifically to find ways of addressing several key and co-constituted questions of difference and relation as they can be seen to be further composed in networked and computationally-afforded practices of the present. Philando Castile was shot and killed. And Diamond Reynolds was live. What comes next? Where will "we" aim to position ourselves and also these many practices of execution, and in what ways are we already positioned in regards to them and their claims on the executable? These questions are not final, nor fully resolvable. But they continue to make claims that project their effects in the world, calling into being forms of difference and relation, and in doing so, highlighting ongoing, intersecting and emerging lines of engagement that one might follow, share or oppose.

SECTION SUMMARY

This section on Facebook continues the general attempt in this research to explore the establishing of relations and expressions of power through considerations of particular technologically-informed examples and their executing trajectories in the world. As the specific approach adopted continually aims to acknowledge, the establishing of certain relations and productive executable practices of connectivity will always involve the exclusions of others relations and forms of connectivity. From such interstices arise the important questions of ethics, politics and the need to continually address the many asymmetric relations and positions of power that can be seen to be in play in any particular set of practices.

Facebook featured in this section as an example of one of the most dominant platforms of networked and computational media today. Installed on the front screens of so many phones; always open as a tab in web browsers; casually checked and pinging its users throughout the day – it has for many become one of the most active and ever-present technologies in many connected lives of the present. The Like button was shown to be one particularly active site of execution within the Facebook platform. As a result of its effective negotiation of material discursive differences between its users and the sociotechnically programmed machines and processes that would make sense of their clicking on such a button, it was described as a particularly notable and productive networked entity that pointed to further aspects of Facebook's overall project. Where "Facebook's enclosure of sociality" (Gerlitz & Helmond 2013, 1362) and its generation of a "Like economy" was described in some detail, part of the point of this section was to describe the way in which the Like button, and other similarly engineered features of Facebook, such as its Social Plugin APIs, involve what can be understood as explicitly projective elements to them, both within Facebook's particular networks of relations and further into other aspects of living.

As discussed in the previous section but looked at in more concrete detail here, this form of projection involves the creation of very particularly engineered sites of execution in the name of particular executable modes of processing and interpretation. These processes emerge themselves not out of thin air but in relation to other existing compositional forces, such as those of post-industrial modes of capitalising upon "knowledge economies" and various emerging affective forms of labour. The Like button in this case was particularly notable for its efficient position as a site for collective forms of human-machine processing and the Social Plugin APIs shown to be an effective way of projecting and also structuring further forms of information flows both to and from Facebook's own pages.

The section also highlighted the way in which Facebook's eco-

systems for user engagement involve both “frictionless” forms of relatively seamlessly experienced executions, just as the abstractions and correlations involved in such flows could at times be seen to express certain frictions in them – what were described as “abstraction failures” that occasionally put more clearly on display certain identifiable ideologies and practices that inform Facebook’s various pursuits, highlighting in turn the unpredictable leakages and forms of emergence that any computationally-informed endeavours can potentially open onto. Facebook becomes more than the sum of its coercive parts, sometimes willingly so in the generation of multiplier effects that benefit its standing and at other times unwillingly so, such as in the controversies that have recently surrounded it in the fallout of things like the fake news and voter targeting controversies.

These questions of execution point in turn to questions of ethics, politics and the nature of computation and networks as they are currently being conceived. Artist and media scholar Zach Blas, in conversation with Simone Browne, poses the question of “Why is it so difficult to conceive of an alternative or outside to the Internet today?” (Blas, in Browne and Blas 2017). Similarly, Paul Dourish asks “Precisely which Internet do we talk about when we celebrate openness, diversity, and decentralization as characteristics of the Internet when compared to mass media as forms of communication?” (Dourish 2015, 199-200). In describing and pinpointing some of the particular techniques and terms of Facebook’s modes of operation, the point here has been to try to keep such questions to the fore so that one might better address what is the always complicated question of making certain relations more likely and more executable than others. In an example like Facebook, a particular method for connecting one computationally-afforded ensemble of relations to another can be further supplemented or repositioned within a network of other relations so as to result in specific forms of connection, each of which involve their own particular forms and energies of centralisation and decentralisation, inclusion and exclusion.

As especially dominant relation forming forces of the present, these networked and computational entities that we currently give the name of “platform” to aim to put into executable practice their particular forms of connectivity. In the affording of certain connections and simultaneous denial of other forms of connection, and as specifically computational infrastructures, they have the effect of coercively attempting to standardise certain particular executable conditions for communication. Such forms of relation making highlight their participation in questions of the social and the political.

At the same time, in its opening up to the contingent qualities of execution in the world, a platform like Facebook remains subject to the many unruly forces that such a process inevitably entails.

Just as it is able to leech itself into a host of forms of connectivity, so too can other forces leech onto Facebook's system and further restructure relations according to their own particular aims. The Like button and its ensemble of computationally-informed relations comes into being in interstices of engagement in which the variously composed forces deemed relevant (technical, social, economic, political, etc.) must work through one another in an ongoing material discursive process of negotiation. In such endeavours, various sites of execution, interfaces and thresholds for the exchanging of forms of information across such competing energies come into being and take hold, resulting in a spectrum of executable configurations.

As the example of Diamond Reynolds' livestream aimed to show, these emergent configurations of the executable can be oppositional in nature, aiming to recode or challenge those existent and oppressive forms of categorisation and profiling that computational and networked forms of interaction might also potentially plug into via their own propensities for division and correlation. They point to complex intersections of executable forces that must be continually negotiated. A platform is always asking what we would use it for. *What's on your mind?... What's happening?... Do you like this?...* As a platform, it is specifically orientated towards gathering responses to such questions and projecting them across its particular network of relations, not untouched, but according to its particular forms of calculation and presentation and the further encounters it must itself negotiate. As this section aimed to highlight, such questions and their answers are personal, collective and political, just as they are also technical and subject to particular operational affordances, parameters of control and relations that inform any such projection. It is this ongoing negotiation of the executable and its many dominant and emergent practices of projection that this section aimed to bring further to the fore and which the coming chapters will attempt to provide some final examples and thoughts on.

ECOLOGIES OF THE EXECUTABLE

9 EUROPEAN ORIENTATIONS AND INFRASTRUCTURES OF VIOLENCE AT SEA

This section is a study of how a variety of intersecting practices (of enforcement, law, economics and technology) and affordances of matter (of water, boats, the electromagnetic spectrum) participate in giving executable shape to the ongoing migration situation taking place within the Mediterranean Sea. As the closing section in this book, it aims to bring to bear the various concepts and approaches developed across the previous chapters in order to give a final example of how such approaches can be used to describe, question and also potentially act as politically-orientated tools within contemporary practices of intervention.

To this end both chapters in the section will look to pinpoint certain important material discursive forces and relations that participate in and situate the creation and use of the technologically-informed practices and manifestations of power involved. This will involve describing certain key intersecting and contentious forces at play and how these participate in the asymmetrically enacted markings of certain bodies over others, creating in the process certain forms of flow and their often unpredictable, contingent effects. The section will also look at what will here be characterised as uneven geographies of control, focusing particularly on the material discursive ways in which intersecting sets of affordances and relations both overlap in certain instances but also open up certain gaps in their being put into particular executable shape in the case enforcement regimes that aim to employ them, creating ongoing and shifting situations of control and resistance. In putting forward a final concept of *orientations*, as described by Sara Ahmed, the section will also look at some of the genealogies and lineages of these material discursive forces and their coming into executable form. Finally, the section will conclude by pointing to further examples of the kind of oppositional coding discussed in the last chapter, looking at activist practices aimed at creating effective infrastructures for communication, archiving and intervention. This results in what is presented as an *ecology* of contested vectors of executions in the Mediterranean Sea, with various European forces aiming to control and firmly orientate these vectors in certain directions over others, at the same time that such attempts are themselves shaped by practices of movement that continue to resist and reshape such orientations.

In the case of the Mediterranean Sea and specifically in relation to migration politics, there has arisen over recent years a

41 Frontex, a European Union regulatory agency, is tasked with the integrated border security and fortification of the European Union's external border. Frontex manages operational cooperation at the external borders of the European Union's member states. Established in 2004 and located in Warsaw with financial, administrative and legal autonomy, Frontex works to promote a "pan-European model of Integrated Border Security" (<http://frontex.europa.eu/>).

particularly purposeful configuring of this body of water and the vessels that travel in its space. What in this initial chapter will be described as an orientating of the sea. This is an orientation that Europe has a powerful and direct role in shaping. Whether one is speaking of the policing forces of Frontex,⁴¹ European politicians or commentators and news agencies of all ends of the political spectrum, each can be seen to participate in such orientations, giving further ideological and material shape to this particular body of water. These orientations involve a variety of "coercive infrastructures" (Ruben Andersson 2016) and materialised markers intended to make the Mediterranean Sea a hospitable space of mobility for certain bodies and vessels but inhospitable and unwelcome towards others.

Despite ranging across a set of different sites and topics, there is a very particular political as well as tactical point to this examining of the particular expressions of power within this space. To begin with, the chapter aims to highlight the particular techniques of violence that are being enacted in this enforcement of European political will, working, as many are currently doing, to find effective ways of describing and understanding these present manifestations of power that should also be understood as participating in longer and ongoing historical trajectories of violence. In addition to such an attempt at description, the strategic bent of this chapter is to show that a material discursive method such as it is carried out here can also help in highlighting many particular points of entry into which these oppressive and violent orientations might be intervened upon and changed. Thus, where this chapter shows the many oppressive and different technologically-informed practices applied by EU policing forces in this space, the next chapter looks at the way in which activist collectives put together their own ensembles of technological methods to intervene and work to counteract the forces at play. In this way, this chapter, beyond its attempt at describing the structural forms of violence as they are, is also partly an attempt to break the situation down into certain constituent material discursive parts, considering how each informs the other and eventually highlighting where they have been effectively intervened upon in the examples of activist approaches. This entire final section thus aims to look at how the methods of analysis developed in this research as a whole help in the approach of describing executing practices and expressions of power with the specific aim of thinking how such practices might be intervened upon or constituted otherwise.

Much of the work and thinking in this chapter has developed directly out of joint research and ongoing conversations on the topic with my colleague Mahmoud Keshavarz. One result of this is our jointly-authored paper, entitled "Orientations of Europe: Boats, the Mediterranean Sea and the Materialities of Contem-

porary Mobility Regimes” (forthcoming). Suffice to say, the debt owed in this chapter to Mahmoud’s considerable knowledge of issues of migration and continual sharpening of our thoughts on the issues discussed in that paper—many of which are touched on here—are great and many. It was also thanks to Mahmoud bringing Marion Bayer and Hagen Kopp of the WatchTheMed Alarm Phone team to speak at an event in Malmö that I was able to first learn more about the work of WatchTheMed Alarm Phone network discussed in the next chapter. This work has also taken very active inspiration from the work of pioneering researchers in this field, whose combined empirical and theoretical work show powerful models for academic intervention into situations such as these. The incisive work of Charles Heller and Lorenzo Pezzani and other members of the Forensic Architecture team was particularly inspiring in this respect. Above everything else, this research draws continual energy and inspiration from the ongoing efforts of those, past and present, who continue to work for and actively claim a right to move.

VIOLENCE IN THE ELECTROMAGNETIC FRONTIER

The deaths and violations of the rights of people migrating to Europe through the particular space of the Mediterranean Sea is a now several decades long phenomenon, but one that has been intensified as a result of the many forms of fallout in recent geopolitical events, many of which Europe has directly participated in. While the factors and forces involved in such ongoing impositions of violence and precarity in the name of restricting entry to Europe are deep and complex, the execution of such a preventative will can be traced and mapped onto a range of policies and practices. Prime amongst these is the progressive introduction of a common European visa policy that denies variously defined nationalities and people entry to Europe. In order to implement and maintain the practical effect of such policies aimed at the restriction of entry by those whom these policies designate as illegal, a range of technologies have been mobilised in support of their cause. These include the introduction of biometric passports, the setting up of border enforcement agencies equipped with various technologies of direct and remote surveillance, mapping technologies, databases for the recording, tracking and sharing of information, anomaly detection algorithms, internment camps, vehicles for policing by land, sea and air, and so on. Each of these technologically-informed practices participate in ongoing impositions of various forms of both immediate and more long-term forms of violence and precarity against those whose actions are defined as illegal within these systems.

There are many different entry points into developing some understanding of the migration situation as it is at present, and much of the work of this chapter will be to specifically describe

the ways in which a range of different technologies and other networks of relations are brought together to support EU efforts to restrict movements into Europe within the space of the Mediterranean Sea. Having in previous chapters treated computation and then computer networking as essential components of contemporary technological interactions and active tools through which various forms of power can be enacted, this chapter partly highlights affordances of the electromagnetic spectrum and how this sometimes easily overlooked, but equally fundamental element in technologies of the present directly informs a situation like that being looked at here. In particular, it will show how in the bringing together of a relational ensemble of technologies accessing various bands of the spectrum, “an electromagnetic frontier” of surveillance and control (WatchTheMed 2013) can be seen to be manifested in ways that point to very particular ways in which Europe attempts to exert control over this space of water.

As is both well-known but often overlooked, the electromagnetic spectrum supplies the conditions for, amongst other things, wired and wireless internet, mobile phone communication, radio transmission, satellite observation, x-ray scans, microwave dinners and the act of seeing itself (i.e. the visible light spectrum). Where the act of making things discrete provides a foundation upon which digital forms of logic and communication can be put into motion, this provision of electromagnetic radiation in the form of waves of varying lengths should also itself be understood as another fundamental building block for both the transmission and reception of information along such waves and also the identifying of entities of different kinds using its various bands for such acts of identification. In the particular case of the monitoring of the Mediterranean Sea, this involves accessing various bands of the electromagnetic spectrum via particular arrangements of technology—such as those of mobile phone and radio transmission frequencies, GPS, synthetic-aperture radar (SAR), RADAR, vessel-tracking transponders and more. If Lev Manovich (2013), in his book *Software Takes Command*, asks us to consider the key implications of the way in which in contemporary times all media become a subset of software, one might also want to think through what it means that the vast majority of current forms of reception, transmission and identification involve the accessing and manipulating of waves of differing lengths.⁴² Each of these affordances and their manifestations in particular technological arrangements produce very specific kinds of capacities when it comes to something like the will to surveil a large body of water such as the Mediterranean Sea.

In her piece “Atmospheres of Communication,” Jennifer Gabrys discusses the way in which, in designating the devices (e.g. radio) used to access the electromagnetic spectrum as the “medium” in question, one risks displacing an ability to think through how the

42 In thinking through such a notion of the affordances of the electromagnetic spectrum, it should be noted that soundwaves, which are not a part of the electromagnetic spectrum, are also key further elements involved in this particular case, such as in practices of oceanography which rely on sonar, not to mention the act of speaking and listening that also relies on sound waves. In both cases, the phenomenon of waves of various kinds remains a critical function of each.

electromagnetic spectrum itself acts as “this space in between ... the intervening medium of the air” (Gabrys 2009, 46-7). As in the discussions in previous chapters on the productive cut that is making things discrete and also the examples of computational functions such as interfaces, protocols and APIs, one sees in the example of the electromagnetic spectrum again an important quality of affordances here as both establishing and therefore also mediating certain productive forms of *betweenness*. A notion of betweenness points towards the way in which things are mediated and the specific affordances and relations that such a betweenness opens onto. And just as such an act of bordering always requires close scrutiny, so too might one try to consider the effects of the particular forms of betweenness that mediums like the electromagnetic spectrum and further the material qualities of the sea afford, with these affordances and their potential relations often intersecting in particular instances, but also opening onto certain gaps in their uneven overlap as they are materialised in European enforcement practices.

As fields like media ecologies have been working to highlight, designating something as a “medium” of communication is a particular kind of agential cut and privileging of one object of study over others. Such cuts, while certainly productive, have a way of taking discursive hold in the field and eventually prescribing these media objects as given, when they are in fact simply one way of attempting to develop an understanding of the way in which relations are formed and informed.⁴³ As Gabrys describes it: “Every formation of ‘the medium’ gives rise to a shifting media landscape, and delineates a dynamic space in and through which we forge our understanding of communication and its apparatuses. How these atmospheric landscapes are traversed, inhabited, and extended becomes the very basis for understanding the medium” (54). By opening up an idea of medium to a scale like the electromagnetic spectrum, or as Gabrys does in other work in which she turns to the issue of technological waste (Gabrys 2013), one useful quality of such a shift in the focus and understanding of medium can be that of highlighting the way in which “the medium does not begin and end with the screen, cable, box, or receiver” (53). Such a move can be particularly useful in that it allows one to more readily take into account the way in which technologies are themselves wrapped up in a range of intersecting relations and forces, with examples provided here of how the technological practices employed in this particular arena can be seen to be formed in intimate and direct relation to properties of things like boats, the sea and the affordances of the various bands of the electromagnetic spectrum, pointing to an ecology of relations that are continually informing and further modulating one practice or another. As an example, consider the simple fact that a phone is not a phone without a sim card, just as its

43 As highlighted by Gabrys, this rather sharp relief into which media objects are so often cast can be contrasted with the rather more “fuzzy” fashion that the act of attempting to distinguish between certain “bands” of the spectrum indicates (Gabrys 2009, 51-2)

history and modes of usage are changed in profound ways by the introduction of new abilities to access and communicate via different bands of the spectrum. The introduction of Bluetooth in phones leads to new modes of local interaction between both humans and devices. The introduction of 2G, 3G, 4G, Wi-Fi and GPS introduce further often radical changes in the capacities of this particular technology that we now call a “smartphone,” with each new band of transmission and their accompanying forms of information transfer providing further incentives for pushing the development of other aspects of the phone, such as its ranges and powers of connectivity and computation.

In the examples looked at in this chapter, this quality of mutually effecting and compositional affordances will be crucial, and the chapter will highlight how the ensemble of different technologies accessing different frequencies of the electromagnetic spectrum point to a way in which the phenomenon and affordances of the electromagnetic spectrum is itself one of a number of agential forces that directly informs the particular forms of movement, restriction of movement and politics enacted in this space. Where Gabrys says in relation to smart cities that, “These wireless frequencies mobilize more than just media and technologies – they mobilize orders of energy in the city” (Gabrys 2009, 49), one can consider the same way in which such a statement applies to the situation of the Mediterranean Sea. Certain connections and relations are made more possible than others in this space. For instance, mobile phone connectivity, so important to land-based situations and interactions of people on the move, quickly disappears in a body of water as large as the Mediterranean Sea, and thus all of the many powers of mobile phones in terms of the forms of connectivity they typically provide become drastically reduced in this particular environment. At the same time, with dedicated GPS receivers now common in contemporary mobile phones, GPS signals remain accessible at sea. While considerably less common and more expensive, satellite phones are also able to stay connected⁴⁴ at sea and for this reason many of the organisers of clandestine journeys will often carry a satellite phone with them. This means that a boat equipped with a satellite phone still has the ability to report its position with some accuracy. As discussed in the next chapter, these two technological practices that the spectrum affords will prove to be crucial elements to the work of activist networks aiming to coordinate rescue efforts at sea. As will also be discussed, such affordances of the spectrum are also crucial to European policing of the sea, with the issue of things like resolution and swath of satellite coverage of the sea in relation to the particular size of the boats used to cross it coming up against very particular material and economically-informed limits. Each of the affordances of these “ecologies of transmission” (47) play a role in the mobilising of certain forms of move-

44 Connecting from the water’s surface to a satellite in geostationary orbit using the L band (1-2 GHz) of the electromagnetic spectrum.

ment, and the attempted restriction of movement, over others, and in the case of the policing of the Mediterranean Sea it is in this sense that one can speak very concretely of a notion of an electromagnetic frontier.

Figure 9.1. Satellites involved in maritime surveillance. Image from European Space Research Institute (2011)

This example of different notions and treatments of medium brings to a head again the general question of where one is to enact the agential cut of a particular perspective. Fernand Braudel, the famous historian of the Mediterranean region, highlights the particular difficulty of establishing where precisely a researcher of the Mediterranean is to enact the cut-off point of the geographic boundary of a study of this entity known as the “Mediterranean.” In aiming to describe the historical influence of an expansive zone that he gives the name of “the Greater Mediterranean” to, Braudel explains that rather than paying strict attention to the conventional boundaries of geography, one might instead “compare it to an electric or magnetic field, or more simply to a radiant centre whose light grows less as one moves away from it, without one’s being able to define the exact boundary between light and shade” (Braudel [1966] 1972, 168). The suggestion here is that it is the relevant affordances and intensities of the technologies and other factors that present themselves in any particular study that are of importance, just as it is also helpful describe how these compositional affordances can be seen to work themselves through certain notable sites and practices of execution, such as the particular site of the boats used to make such journeys and the particular practices of European policing forces involved in this issue. Each of these affordances, sites and practices have the effect of helping to enact certain vectors of movement over others, and in doing so, highlight certain existing and emerging orientations as more likely than others. As Charles Heller and Lorenzo Pezzanni describe it, “These technologies do not simply create a new representation of the sea, but rather constitute a

new sea altogether, one which is simultaneously composed by matter and media.” (Heller and Pezzani 2014b, 666-7).

Figure 9.2. “Dal VTS al VT-MIS.” Slide in the presentation the “Vessel Traffic Management and Information System” (2007), as featured in Heller and Pezzani (2014b, 664)

The point in thinking through technologically-informed practices with this focus on affordances and what will be described further below as orientations, is not primarily because it might enable to one to rethink discussions in media theory, but rather because it is in and along the interstices of these intersecting of affordances and their “thresholds of detectability” (Weizman 2015) that the politics of movement and also various situations of violence are enacted. As Adrian Lahoud writes, “Today, the colonial frontier between the known and the unknown no longer marks the difference between black ink and white page that so enticed colonial expansion and plunder. It marks a threshold between high and low resolution” (Lahoud 2015). These perceived thresholds of execution afford and produce certain expressions and relations of power over others, resulting in the production of both local conditions for particular sets of individuals at the same time that they similarly radiate out into greater domains of lived experience.

The methods of description given here in relation to such intersecting and asymmetric executions of power are also intended as potential models for descriptions of the execution of power in other situations, as was done in the last chapter’s description of Diamond Reynolds’ livestream of the police shooting. With a wider point that many of the important relations highlighted (e.g. of economics, of the applications of technology, etc.) point to more general issues of the application of practices of power

and oppression. The Mediterranean Sea is just one space of contested movement amongst many others in the world. In many of these cases, the role of things such as technology and economics highlighted in this chapter can also be seen to participate in often similar ways within other situations of movement, though the particular manifestations of such forces will always be locally situated and conditioned. The asymmetric relations and manifestations of power that this chapter explores are enacted most directly and forcibly on those travelling by boat, but their effects radiate throughout both Europe and elsewhere. They point to the dynamic and always potentially transformative notion of “Relation” that French-Caribbean philosopher Édouard Glissant ([1990] 2010) writes on. The once seemingly relatively stable relations that constituted the powerful entity known as the European Union have come into serious question in recent years, partly as a direct result of this forceful new set of questions and relations emerging in this space of the Mediterranean Sea and beyond. The many emerging connections and disconnections that these movements generate demand a way of staying with their transformative qualities, just as the violence being enacted demands a description and holding to account of its particular practices carried out in the name of European political will.

ORIENTATIONS AND VECTORS

Figure 9.3. Live view of marine traffic in the Mediterranean Sea at 13:51 on 2 May, 2017, as displayed on MarineTraffic.com. These positions are sent by on board transponders via the VHF frequency and captured either by coastal or satellite receivers, providing a live view of all registered and transmitting vessels

When looking at the map of the Mediterranean Sea provided by live vessel tracking websites, what is encountered at first glance is a relatively flat, light blue surface occupied by dozens of oblong triangular shapes, each triangle indicating a ship and its motion in a particular direction. This includes a wide range of vessels moving through these waters: passenger, cargo and fishing vessels, tankers, yachts, tugs, etc. However, two main types of vessels are hidden from view: military vessels and the so-called “unseaworthy” fishing boats and rubber dinghies used for illegalised

migration. Different in their design, functions and the visualities they produce, these hidden boats both configure and reconfigure what Europe means today.

In order to speak of the geopolitical and material significance of boats and the sea in relation to technologically-informed practices of control and an ongoing politics of migration, two relevant concepts will be used in addition to those already discussed in earlier chapters, those of *orientations* and *vectors*. Orientations is intended to signal the various frames (ideological, economic, technological, material, and so on) whose sedimented material discursive hold in a particular set of relations make certain connections more apparent and likely than others. The term and concept of orientations is drawn directly from Sara Ahmed's (2006) book-length exposition of the concept as she works it through issues of queerness and phenomenology. Ahmed's writing on orientations is of particular help for its material and politically sensitive grounding of the concept. In speaking of orientations in relation to the example of the situated spaces of migration, like Ahmed, the intention here is to highlight how "bodies as well as objects take shape through being orientated toward each other" (Ahmed 2006, 54).

As Ahmed's genealogical tracing of a particular *Orientalism* at play in many orientations makes clear, orientations arise as part of an ongoing history of things being specifically directed more in certain directions than others. "To orientate oneself by facing a direction is to participate in a longer history in which certain 'directions' are 'given to' certain places: they become the *East*, the *West*, and so on" (112-3). In this way, by its further drawing attention to specific (imperialist) histories carried within its very name, the term is able to highlight certain "imagined geographies" (Said 1978) and the way in which these have had an important, often violent, historical role in producing certain directions and movements as given and normal, and thus "orientated" and in firmly in place, while simultaneously producing others as "disorientated" and out of place. Such processual, historical and materially influenced specificities all act so as to feed into and orientate the decisive matter of what issues, objects and subject positions appear as more or less present and within reach within any particular context.

As Ahmed's writing makes clear and as will be explored throughout this chapter, *orientations require work*. They are processual in that they materialise and take hold through acts of repetition, repetitions whose orientations are constructed and endowed with energy by repeating certain practices more regularly than others. Orientations create what Ahmed describes as collectively recognisable lines to follow, and in this sense, one can think of such lines "as an effect of how energy, time, and resources are 'directed' toward an object" (119). In order to fur-

ther adapt Ahmed's concept of orientation to the examples looked at here, this execution and actualising of such potential lines of direction that are suggested within any particular orientation will be given the name of *vectors*. A vector, like its common etymology and Latin root would indicate, is a "carrier" that "conveys." It has direction and magnitude, relative properties that it takes on in its articulating of relations in a material discursive space. In the specific context of the work of this chapter, a vector should be understood as a material discursive actualisation, an execution, whose direction and magnitude is, to one degree or another, determined by the existing orientations through which this actualisation in question moves and furthermore adds its own direction and active (or counter-active) force to.

In writing on issues of mobility, Tim Cresswell makes a critical distinction between "movement" and "mobility." Where movement for Cresswell indicates a general quality of motion between locations, the term mobility stands for the particular socially produced forms of embodied meaning and inflections of power that are presented in any particular act of movement (Cresswell 2006, 2-3). A vector is in such a context the enactment of a movement that has the effect of either further solidifying, or counter-acting, the existent connections and mobilities that any set of orientations hope to put into motion. They test and give further specific shape to the influence of any particular orientation in a situated instance. Movement along and through various imposed and implied grids of mobility and control is the revealing and enacting of the potentials and possibilities inherent in any set of orientations.

To borrow from a notable term in legal and political EU parlance, vectors point to a "variable geometry" (Tassinari 2006) in which orientations are not smooth but rather varied, with certain vectors being afforded greater traction and momentum than others. In other words, vectors perform and solidify—or alternatively attempt to counter-act—the intersecting political, economic, technological and other productive motilities that any orientations work to sustain. They have the effect of further determining the influence of any particular orientation in what is a meshwork of more or less rigid and flexible forces. Finally, the term is employed here because of how something like a boat becomes both an actual material vector of movement, but also for how a mathematical term like vectors also hints at the way in which boats and the bodies upon them often become different forms of abstractions in these geographies of control. For example, as vectors of flow in a migration map in a news article or as oblong triangles on a screen in a Frontex Situation Centre Dashboard interface for surveillance and enforcement.

The point of such a conceptual framework of orientations and vectors is that it can be used to serve the important task of

attempting to trace out orientations as they are instigated and made visible in the various vectors of material articulation that they give rise to, so as to bring to the fore the nature of each orientation and the transformations and occupations involved within any particularly orientated situation. These shapings involve a variety of “coercive infrastructures” (Andersson 2016), materialised markers and underlying dispositions of “unfolding potentials or inherent agency” (Easterling 2014, 19) intended to make the Mediterranean Sea a habitable space for certain bodies and vessels but uninhabitable and unwelcome towards others. Each vector of material actualisation, repetition and performance has the effect of solidifying certain habits and potentials within a particular set of orientations over others, with this paper focusing particularly on the boat as one important vector that is orientated by and in turn can further orientate, or re-orientate, a politics of mobility as it is being played out in the Mediterranean Sea today.

As Ahmed points out, this work of following and describing the orientations at play in any particular situation also involves a consideration of certain key historical practices and trajectories. She speaks of the importance of not simply looking at objects—be it a writer’s table or an image of bodies precariously gathered in boats—and taking them at face value. Rather, one needs to consider the framings that might be at work in the given “arrival” of any such object. Ahmed:

If we were simply to “look at” the object we face, then we would be erasing the “signs” of history. We would apprehend the object as simply there, as given in its sensuous certainty, rather than as “having got here,” an arrival which is how objects are binding and how they assume a social form. (Ahmed 2006, 241)

In the particular attentiveness that Ahmed has for questions of matter and materiality, such a consideration is one that takes seriously the ways in which the materials involved also play a role in such arrivals and histories of material affordances being activated and circulated in very particular ways. Ahmed: “What a Marxist approach could allow us to do if we extend his critique of the commodity to the very matter of wood, as well as to the form of the table, is to consider the history of ‘what appears’ as a dynamic history of things being moved around” (243).

In their being given shape according to certain aims, the particular affordances in the materials brought into active being in the object in question means “that objects not only are shaped by work, but they also take the shape of the work they do” (244). A boat is a very particular object, one which, as will be discussed, has a very specific relation to its operating space of the sea and European efforts to track migrant boats in this particular body of water. A rubber dinghy has different material capacities to that

of a wooden fishing boat. The availabilities of these materials are furthermore subject to the political economies that inform the costs and availabilities of the materials involved just as they involve different amounts of labour in order to bring them into being in the form of a seaworthy boat. The same holds true for the devices of remote sensing. Each band of the electromagnetic spectrum affords certain forms of visibility and connectivity while closing off others. The launching of a satellite into space and the many further systems and parties involved in accessing its signals involve different costs and material arrangements to that of a patrol using RADAR and other closer to sea forms of surveillance. As the material discursive approach of this research has continually emphasised, such collections of factors involve a number of intersecting forces whose concretisation and expression in a particular executable practice participate in turn in the ongoing process of making certain expressions of power more or less given. This is an always ongoing and mutually constituted process of relation forming, with orientations and their different vectors of actualisation having a particular effect as to the surfacing of such forces.

To Ahmed's terminology of orientations, we can also add similar concepts and terms such as Keller Easterling's notion of "disposition," which Easterling invokes in her writing on the politics and powers involved in various forms of "infrastructure space." In the particular context here of boats and water, the following passage of Easterling's provides what might be seen as a useful conceptual image for thinking through these issues of material discursive orientations and dispositions:

Mark Twain, once a steamboat captain on the Mississippi, developed techniques for navigating the river. While the passengers saw "pretty pictures" of landscape scenes, he was extracting information from the changing "face of the water." A little ripple, eddy or "faint dimple" signaled turbulence or obstacles in a complex and potentially dangerous organization below the surface. These were markers of unfolding potentials or inherent agency in the river—what can only be called its disposition. Disposition is the character or propensity of an organization that results from all its activity. It is the medium, not the message. It is not the pattern printed on the fabric but the way the fabric floats. It is not the shape of the game piece but the way the game piece plays. It is not the text but the constantly updating software that manages the text. Not the object form, but the active form. For each technology in infrastructure space, to distinguish between what the organization is saying and what it is doing—the pretty landscape versus the fluid dynamics of the river—is to read the difference between a declared intent and an underlying disposition. (Easterling 2014, 19)

Such a poetic image of disposition will of course in practice

need to be filled out with the more concrete details of the situation under consideration (as Easterling does in her work), and part of the work carried out here will be to consider some of the specifics of the infrastructures involved that help to support the various operations at work in the examples considered. Borrowing from Martina Löw, Paolo Cuttitta describes this coming together of existing and emergent forces as one in which practices of bordering are generated within a “relational disposition” in which the placing and interacting of bodies and goods in space is an already active one, a disposition of relations into which the move to control the movement of specific bodies will have to work with and at times against in various ways (Cuttitta 2014, 203). Most importantly, in the context of the ongoing forms of both structural and more scattered forms of violence and racism being enacted in the name of European protectionism and self-interest, it is particularly important to address the way in which such violent orientations and dispositions can become naturalised. A situation in which a network of very particular relations and its contingent “flood of convergences”—in its relayed performances and sustained repetitions—has the dangerous potential of “publishing itself in the guise of the commonplace” (Glissant 2010, 45).

In writing about the orientations and actualising vectors at play in the ongoing operations within the Mediterranean Sea, this chapter aims to describe how a particular set of executable practices comes into being amongst already active orientations and relational dispositions. In a specific context in which the dynamic of movement is key, these orientations are described as taking specific shape in their material discursive expression in the form of various vectors of actualisation, whether this be the directing of the gaze of surveillance satellites towards certain corridors of the sea rather than others, or the movements of people and boats along certain routes and in certain manners as opposed to others. Each of these vectors of actualisation serve to give further executable shape and force to the orientations of this space and the political wills that they represent, both as they are and as they might be.

BOATS AS MATERIAL DISCURSIVE AGENTS OF MOVEMENT

Having introduced some of the key qualities of the electromagnetic spectrum and how its particular affordances will act as mediating and agential factors in the technologically-informed configuration of an “electromagnetic frontier” in the Mediterranean Sea (issues that will be returned to later in this chapter), it is now important to also introduce another key material agent in this issue: the artefact of the boat.⁴⁵ In eventually moving to discuss their visual and material discursive politics, this initial discussion of boats will first look at some of the relational and material discursive qualities at play in the specific design of these

⁴⁵ Please note that the majority of content discussed in this particular section on the material and design politics of boats and the next one on the visual politics of boat migration, while occasionally employing different terms and concepts and also looking at some different examples, is derived very directly from a paper written together with Mahmoud Keshavarz (Keshavarz and Snodgrass forthcoming).

vehicles of movement, highlighting how these in turn partly effect the possibilities of access, movement and inhabitation of boats within an operating space of water.

Boats have played an important role in movement and migration historically. European refugees fleeing the Second World War were often only able to escape from the southern coasts of Europe by boat, as the shores along the Atlantic Ocean were typically not as heavily controlled as other routes of escape on land (Weber 2011). Without recourse to boats, seeking asylum in North and South America would have been considerably more challenging for many of these refugees. At the same time, boats have served as an important technology of deep sea faring, proving to be key enablers of colonial and imperial projects. John Law gives the example of how Portuguese colonialism was made partly possible by the durable design of their carrack boats, whose broad and sturdy hulls made them particularly capable of long distance travel and transport by sea. When combined with other technologies and techniques of their naval project, particularly those of “documents” (records of travel and written instruction/observation), “devices” (astrolabes) and “drilled people” (navigators, experts), the Portuguese fleet could be seen to be equipped with a particularly effective material and operational arsenal for executing political projects of expansion (Law 1986). Marcus Rediker similarly points to the employment of the newly dominant “round ships” in deep-sea sailing and their particular prominence as transport ships for the slave trade (Rediker 2007). With their larger hulls, such ship designs could be said to afford a material capacity that, as a result of being able to facilitate larger loads, had the effect of accelerating the rate of the slave trade, and in turn the genocide of enslaved subjects.⁴⁶

Each form of boat provides particular possibilities of transport, migration and moving. Today, the denial of the ability of taking safer vehicles and routes of travel are the result of specific mobility regimes, regimes shaped themselves by the global mobilisation of capital and simultaneous immobilisation of major poor populations of the world inhabiting the so-called Global South. These include the introduction of strong visa regimes and security measures as a consequence of the formation of the Schengen region; various policies relating to the ongoing “war on terror”; the introduction of bans on airline companies that would take travellers without the right papers; the rise of lucrative markets of militarised security technologies to secure borders, fences and walls; guaranteed exploitation of cheap labour by globalised capitalist economies, and so on. As a result of such practices, boats as artefacts and vessels of mobility are still able to provide a small possibility of movement for those whose access to mobility have otherwise been drastically reduced within such regimes.

In the case of boats employed by refugees for crossing seas such

46 See Glissant (1997, 5-9) for one powerful and moving evocation of what would have been the experience of the “belly of the boat” for those confined within such hulls.

as the Mediterranean Sea, wooden and fibreglass fishing boats, rubber dinghies and other small motorboats have been the most common vessels used for crossing to date. These boats are often given a specific and politically-orientated characterisation as “unseaworthy” boats. This is because many, though not all, of the boats used in these cases are not designed with deep sailing (travelling far through the sea) in mind. Furthermore, they certainly aren’t designed with such large numbers of passengers in mind. Despite these limitations, such boats, while highly lethal, remain the most accessible means of travel of the illegalised travellers. At the same time, the attribution of unseaworthiness applied to such vessels is often used by authorities as a discursive manoeuvre that shifts blame onto both the travellers and brokers of the journeys, and in doing so further enables practices used to stop such vehicles from moving and entering into high seas or territorial waters, where passengers may be able to apply for rescue and asylum.

Beyond being ill-fitted to the task at hand, the reduced scale of these boats’ material structures in relation to the boats of patrolling authorities also makes them vulnerable to a strategy of “push-back” operations. A push-back is a law enforcement tactic in which the coast guards or border patrols of sovereign nations engage in a series of enforcement operations to intercept and force illegalised boats to change their routes by forcibly pushing or tugging them into international waters (assuming the boats are in stable enough conditions to do so). This is possible because of the particular design and size of fishing boats, that, in encounters with military and equipped coastguard boats, become particularly vulnerable to such operations. The disproportionalities of scale and their vulnerability for push back creates an increased possibility for interception and employments of force. However, these possibilities of push-back vary from one boat to another, dependent on their particular design, their functions and the legal contexts of the particular space of water in which the boat happens to be navigating within.

Such differences and material discrepancies in the designs of boats can also be seen to have important consequences in the case of search and rescue operations. In the current moment, in which search and rescue operations are unreliably applied and in some instances wilfully disregarded, the situation continues to arise whereby massive commercial shipping vessels are regularly asked to cooperate with rescues at sea. These boats are not only woefully inexperienced and unequipped to deal with such search and rescue operations, but furthermore, due to their typically very large relative sizes, take on particularly dangerous characteristics in relation to the much smaller boats they are attempting to rescue. This has led to situations with unintentionally deadly effects on those much smaller vessels they are aiming to help out,

as has proven to be the case in several recent examples, such as the *King Jacob* incident.⁴⁷ As examples such as these show, a critical task of enquiries into the material affordances of geopolitical power and its executing practices becomes partly that of taking into account the ways in which power is defined and enacted through a series of dynamic vectors of actualised material shape and form, reach and potential, extension and push-back, rescue and deterrence.

47 See Heller and Pezzani's (2016) damning exposition of this incident.

While the design of boats used for migration often makes them vulnerable to certain forms of law enforcement, their design can at the same time be used to enact other laws that can be made to work in favour of migrants. For example, such smaller scale boats can break more easily and can thus be tactically destroyed, something that is not as easily achieved with boats made of other materials and sizes. A broken boat in the sea has to be saved according to conventions of rescue at sea (these legal conventions are discussed in more specific detail later in this chapter). As the possibilities of asylum only become available on humanitarian grounds or through discourses of crisis, some crossing the Mediterranean into Europe intentionally damage the boats they are travelling with in order to show how deadly their situation is and to show that they deserve rescue (Papadopoulos and Tsianos 2013). In these cases, the on-board passengers are not rescued from the water because they are asylum seekers fleeing war, violence and persecution, but rather because they are made specifically legible within the legal system as at grave risk of drowning at sea and in need of rescue. However, the infamous case of the "Left-to-Die Boat" (Heller and Pezzani 2014a), and countless others like it, bear witness to the fact that there is no guarantee that such conventions will be followed.

Given the numerous forms of social struggles and modes of governmentality that arise in direct relation to the specific material forms and relations that vehicles and passageways for transport (such as trucks, roads, bridges, tunnels, ships, etc.) help to put into concrete motion, William Walters has spoken recently of a need for a critical form of "viapolitics" that aims to work through the "representational strategies and encounters which work through the media and the materials, affects, symbols and space of movement, transport, roads, vehicles" (Walters 2011b, 9-10). It is both this specificity of vehicles and also the specific relations that they put into further motion that make them particularly important sites and material artefacts for developing an understanding of the material discursive politics of the objects and infrastructures of movement and transportation.

A boat that is designed and made to carry a maximum of a dozen or so persons with a hull that is designed to harvest small fishes close to the shore can eventually be made to turn into a long distance travelling vehicle for many times this number

48 Note that in several cases, the pilots of these boats are those for whom the fishing business that many of these boats were originally intended is no longer available to them as a result of the sustained and intensive fishing of large international corporations.

of persons. When a variety of factors, of which the EU plays a decisive role in structuring, creates a situation in which the sea becomes a hostile space towards such bodies and boats, hulls and structures that were previously used for the storage of fish⁴⁸ are transformed into a potential graveyard that might readily seal the fate of those within it in the event of capsizement on their way to Europe crossing the sea. The same goes for the now ubiquitous rubber dinghy, a clearly dangerous vessel of transport that EU policy has nevertheless helped turn into the default mode of travel. The design of any boat, the form, size and direction of its possibilities, orientates the possibilities of such a floating site of mobility in interactions with the many other forces and relations established by contemporary mobility regimes.

As Allan Sekula narrates in his film essay on the effects and experience of the global supply chain of the maritime shipping industry: “a ship is not an isolated thing, but a unit in a make-shift ensemble” (Sekula, in Sekula and Burch 2010). In this study, Sekula presents the ship as a particularly important site and locus within an expansive capitalist industry whose ensemble of workers, goods, dockyards and labour practices spreads from sea to land, coercing and moulding over the many bodies, entities and socio-political practices with which it achieves its particular efficacy. In a similar fashion, this research aims to bring to the fore the particular material discursive way in which the boats of people on the move in the Mediterranean similarly act as an important artefact around which a dynamic ensemble of make-shift and coercive artefacts and technologies of control aimed at preventing movement by boat take executable shape.

By looking at the complexities of migration as they relate to the artefact of the boat, their specific design, their politics and the politics they produce, new potential understandings, challenges and openings arise (Keshavarz and Snodgrass forthcoming). Boats perform, in a material discursive fashion, what is legalised and what is illegalised in the mobility regimes operating within the Mediterranean Sea. They act as vectors to enforce or resist the orientations of particular politics and expressions of power. As units within an ensemble of other entities and relations, they are also more than seafaring vehicles. They act as mobile sites of law enforcement and oppression, as well as sites of resistance and vessels for the claim to freedom of movement. In this sense, a boat is an “orientation device” (Ahmed 2006, 4), orientating the sea and its regulatory policies in materialising certain practices of enforcement in relation to its particular material discursive properties, while continuing to work around or wilfully through such orientations via its particular and forceful movements.

VISUAL POLITICS OF BOAT MIGRATION

Boats can be seen to play a key role in migration politics, not

simply for affording possibilities of movement by sea but also in their affording of certain forms of imagery that can be seen to further charge the politics of the situation. While boat migration is the result of specific border politics and material discursive practices involved in limiting the possibilities to move by air and on land, boat migration and related arrivals to shore are often framed and presented in more spectacular ways than other migratory vehicles, routes and events. In recent years, a large amount of attention has been given to boats, seas, islands and shores, both at the level of policy-making, media discussion and humanitarian action, with recent tragedies on the Mediterranean Sea providing telling examples of such attentions (Jeandesboz & Pallister-Wilkins 2016; Pallister-Wilkins 2015; Cuttitta 2014). Governments, such as those of Europe, Australia, Canada and the United States, often shape and persuade their migration policies around the artefact, image and discourse of the boat and its passengers (Mannik 2013; Perera 2009), who have often been discriminatively labelled as “boatpeople” (Pugh 2004; Mountz 2004). It is important therefore to consider what can be understood as the visual politics of such images and their discriminatory discourses, and the way in which their arrival as particular kinds of images for circulation have been naturalised, with less focus given to structural and material discursive forces that allow for such discourses.

The regularly circulated images of cramped migrant bodies on boats at sea, the imposed precariousness that they present and the attention and orientations that such images acquire in their continued circulation within media networks participate in the production of certain discourses and politics. Indeed, it continues to be the case that almost any article involving migration in the Mediterranean Sea must necessarily be accompanied by this seemingly default image to be produced over and again by media outlets of all ends of the political spectrum. But these images are of course not the only images that could be used in representing the situation of boat migration. There are number of other bodies, boats and visualities available for representation (such as those in positions of power, or indeed, the flocks of photographers that line up along the shorelines to capture the latest image of non-European suffering). Furthermore, their “arrival” onto the pages, screens and news feeds of readers (as well as in many EU political reports and documents), while now naturalised as a result of their continued presentation and circulation, is the result of a very particular form of politics and practices. It is important then to understand how the compositional affordances involved in the arrival and appearance of such images intersect with very particular political practices as well other forces in migration politics, such as those of media spectacle and racism.

Such imagery has a history of often working against those on

the move. Most commonly, the visual presentation of precarity and sense of desperation that illegalised migration often (though not always) involves, while in some cases intended to perhaps induce a sense of empathy to the clear sense of precarity on display, often risks in its continued presentation the effect of naturalising this sense of precarity and spectacle in relation to the people caught within its gaze, readily generating in turn and/or playing into presuppositions and stereotypes in regards to certain “categories” of migrant. Such a sense of discursive normalisation of spectacle is however not autonomous. Things come together and become a spectacle specifically when they are looked upon in a way that can be appropriated, exchanged and consumed within certain patterns of representation. In this sense, as Guy Debord makes clear, such a sense of spectacle is generated in the ways in which such images perform and repeat their presence, shaping social relations via mediation through particular images and visualities rather than others (Debord [1967] 1995, 19).⁴⁹ They are made into a spectacular form of imagery whose largely unproblematised modes of visibility can be seen to be produced across pretty much the entire political spectrum of news outlets.

But what is it that makes boats such a strong spectacular instrument, a well-understood thing for mobilising policies against migration, restricting borders or even advocating humanitarian actions? Why don’t the airplanes, trucks, containers and travels by foot that are also involved in certain parts of an illegalised journey play an equally central role in imagery and discourses against or in favour of migrants? Clearly the answer partly involves this spectacular quality of boat imagery as it is currently perceived, but further factors are worth highlighting using the approaches developed in this research.

In considering the materially-informed and compositional orientations involved in such a question, one can first point out the easily overlooked point that the visual politics of boats and their specific design arise in direct relation to their operating environment – in this case, the sea. The material discursive quality of the design and visibility of boats and the sea itself participate in the affording of specific forms of imagery. For instance, other vehicles of mobility, such as trains, trucks and cars, with their typically roofed interiors and the many other further surrounding foreground and background details of land, clearly don’t afford the extreme visibility and vulnerability of bodies to cameras that something like a rubber dinghy or fishing boat on an otherwise “blank” canvas of the sea does.

This extreme visibility can be witnessed in almost any image taken of migrant boats in the Mediterranean. One sees it in what has become one of the most reproduced images for articles on migration at sea, Massimo Sestini’s 2014 aerial image of an open topped boat packed to overcapacity and moving across the sea

49 See also Prem Kumar Rajaram’s (2003) article for an application of Debord in regards to what Rajaram describes as “the spectacle of detention” as it is manifested in Australian asylum politics and practices.

(the image typically goes by the title “Italian navy rescues asylum seekers traveling by boat off the coast of Africa on the Mediterranean, June 7, 2014”). Sestini won an award for this image in the 2015 World Press Photo contest, and it continues to appear as one of the most regular images used for news items on the issue, as well as regularly appearing in various EU strategy and policy documents on migration.

As can be seen in Sestini’s description of how he was able to capture the photo while hanging out from the side of an Italian navy helicopter, there was a predictable regularity in this particular imagery as it afforded itself to the privileged aerial perspectives that Sestini was able to position himself and his photographic gaze within. As recounted in the BBC article “10 moving photos of Europe’s migrant crisis,”

Massimo Sestini took this photograph from an Italian navy helicopter in 2014, but it was in fact a repeat of a shot he had taken in identical circumstances the year before. The new photograph, taken between Libya and Italy, showed that nothing had changed – but was also more striking because of the behaviour of the passengers. “I thought if I could get the right angle straightaway, directly above 500 people who have spent five days and nights on a boat, they would probably all look up, ask for help, wave – so this year I thought I’d try again and it worked.” (BBC Magazine 2015)

In other words, the arrival of this image was predictable and Sestini merely needed to time the position and execution of his shot so as to coincide with the predictable vectors and orientations of the situation as they continue to be sustained at present. All of these factors lead to the generation of an image that is framed by Sestini in just such a way that the precarity of the situation, while visible, is transformed into an image in which the directly top down perspective charges the shape of the boat with a hard to miss sense of the boat as an arrow, with the implicit narrative context in which the image typically situates itself suggesting that this arrow is aimed towards Europe. That the image can take on such a charge and particular reading is the direct result of the many orientations and affordances—material, political, visual and so on—that come into play in the composition and further circulation of this image.

In an example such as this one witnesses the way in which the visual politics of boat migration are informed by very particular material discursive components and their executable relations. The ongoing ability for such images to be circulated and politicised means that they play into the potential of acting as essentialising images in various European imaginaries for migration as a whole. An imaginary which, as Edward Said (1979) and others have made clear, points to orientations and an Orientalism of oth-

ering that one should continually be weary of and work to dispel, via, for instance, a strategy of turning such dominant forms of gaze back on themselves, as much of this chapter aims to do.

In the case of the images under consideration here, one important register that they can be seen to participate in is in different forms and trajectories of racism that partly lead to both the possibility and production of such imagery. For instance, there is the racism embedded in specific practices of mobility regimes (e.g. visa policies and passport validity) that regularly make certain bodies on the move subject to more inspection, checks and control and thus subject to the European gaze. As discussed, such imagery also has the effect of producing a dominant associative notion of irregular migration upon non-whites bodies. Consequently, a white body on the move within the space of Europe is almost always assumed to be a legal traveler, while any non-white body on the move is more readily subject to being read as that of a potential ‘illegal’ traveler. Such orientations and their accompanying forms of specifically orientated representations have the effect of framing their subjects within often largely negative discursive narratives, neglecting to consider other forms of possible representation of the situation nor working to interrogate the effects of the use of such images or the particular circumstances that lead to the ability to capture such imagery. As Nicholas De Genova writes, in this way “the border spectacle works its magic trick of displacing ‘illegality’ from its point of production (in the law) to the proverbial ‘scene of the crime’, which is of course also the scene of ostensible crime-fighting” (De Genova 2013, 1189). The boat then, with its history as an artefact that has shaped various violent practices of colonialism and imperialism, serves in these recent cases as a vessel that participates in the mediation of particular policies and images of migration—and particularly illegalised migration—as an often racialised phenomenon.

As also discussed in regards to the Diamond Reynolds video in the last chapter, images such as these and the imposed precariousness that they highlight, together with other regularly circulated images, can help to both produce and reify certain discourses and beliefs, gaining interactive traction in their production of such uncritical spectacles. As my colleague Temi Odu-muso highlighted in a course lecture titled “Crooked room: media, blackness and representation,”⁵⁰ the ongoing spectacle of black bodies in popular media representation can be seen to participate in an ongoing orientation that relates to long histories of dominant white, Western gazes and their production of certain forms of representation of blackness over others. “Crooked representations” such as these, in each of their various manifestations in different situations of unequal access to the means and discourses of production, point again to orientations that need to be continually contested. It is also worth recalling again here

50 Odu-muso is drawing this terminology of crookedness from Melissa Harris-Perry book, *Sister Citizen: Shame, Stereotypes, and Black Women in America* (2011).

the call by Nehal El-Hadi discussed in the last chapter for more “thanatosensitive” images of any such situations or precarity (El-Hadi 2017) and what it means to simply plaster such images onto the front pages of newspapers, to circulate them within social networks, include them in academic articles, and so on.

Orientations require work. Inducing material discursive and political erasures requires work. The shipwrecks and drownings at sea that EU policy and European political will has a direct and daily role in producing requires a fair amount of political framing in order to avert the gaze or allow such acts of violence to be interpreted in a palatable way on the part of its citizens. That the infamous and widely circulated picture of a drowned Syrian child washed up onto the shores of Turkey in September of 2015 had the effect of bringing a sudden sense of shock to much of Europe’s citizenry, despite years of such deaths from migrant crossings, all of this is indicative of the work and representational choices that have participated in the orientating of the gaze towards certain representations and away from others. Images such as these are noticeable for the way in which they are experienced by many as surfacing as if from nowhere, arriving into the social network streams and consciousness of an apparently largely unsuspecting or wilfully blind public. And when such violent orientations become suddenly visible to some they can thus often be experienced as powerfully disorientating. At the same time, in their continued and uncritical circulation, they risk becoming yet another given, thus further sedimenting the very forms violence that help to bring about their continued appearance.

In addition to this circulation of particular forms of images of bodies on boats, it is also worth returning to the already mentioned deliberate framing by European authorities of such boats as “unseaworthy.” “Unseaworthy” acts specifically here as a way of framing and strategically disqualifying these boats. While affirming the desperate situation and risk people are ready to take in fleeing war and persecution (as well as the harsh and violent European border regime), these boats are at the same time used to frame these movements as a form of organised crime by “smugglers and traffickers,” brokers of mobility and boat owners who “do not care” about the safety of their passengers. By pointing to the not-safe-enough look and design of such boats, these acts of naming participate in disqualifying their passengers as asylum seekers, thus qualifying them in the same move as “illegal” migrants. And yet, as historical examples such as that of the MS St. Louis make clear,⁵¹ the visual politics produced by boats of many different kinds can always be mobilised in one way or another against those whom nation-states would find acceptable ways of keeping out.

Finally, in regards to the particular example of rubber dinghies and the ways in which the particular visibility and obviously

51 The MS St. Louis was a German cruise ship carrying 937 refugees seeking asylum from Nazi persecution. After being denied entry to Cuba, the United States and Canada, the ship returned to Europe. See Keshavarz and Snodgrass (forthcoming) for more discussion of this example.

unsuited quality of these boats are used against their travellers, it is worth briefly highlighting some details on the particular political situation that has led to their increased usage for such journeys. As highlighted in a WikiLeaks release, on 17 February 2016, of the restricted six month report delivered by the European Union Naval Force Mediterranean's (EUNAVFOR Med, commonly referred to as Operation Sophia) report on the part of the European External Action Service (EEAS) to the European Union Military Committee and the Political and Security Committee of the EU, operations such as this one, with their explicit mandate to capture and confiscate the boats used for clandestine travel, have had the direct effect of making rubber dinghies the only affordable mode of transport across the Mediterranean. Covering the period of 22 June to 31 December 2015, the report gives refugee flow statistics, details on numbers of smugglers and vessels captured, and updates on its operations to date, as well as recommendations for future strategies. Initiated in May 2015, Operation Sophia's stated mission is to "conduct a military crisis management operation contributing to the disruption of the business model of human smuggling and trafficking networks in the Southern Central Mediterranean (EUNAVFOR MED), achieved by undertaking systematic efforts to identify, capture and dispose of vessels and assets used or suspected of being used by smugglers or traffickers, in accordance with applicable international law" (The Council of the European Union 2015). In its first year of service, the operation carried out numerous search and rescue operations, detecting, rescuing and transporting around 14,000 rescued passengers to European ports. During the same period, Operation Sophia also seized 114 "smuggler" boats and arrested 69 suspected "smugglers and traffickers," with the latest tally in the recent report on Operation Sophia in May 2017 putting the current number of boat confiscations at 422 (EEAS 2017).

Given Operation Sophia's focus on disrupting the activities of migration brokers, a large part of the document is given to highlighting information gleaned on their "business model." This includes details regarding the boats used for migrations in this region:

Wooden boats are mainly used for migrant smuggling to the west of Tripoli, and rubber boats are more common to the east of Tripoli. Wooden boats are more valuable than rubber dinghies because they can carry more people, hence more profit for smugglers and are more resilient to bad weather and can be re-used if recovered by smugglers. However, following Operation SOPHIA entering into Phase 2A (High Seas), smugglers can no longer recover smuggling vessels on the High Seas, effectively rendering them a less economic option for the smuggling business and thereby hampering it. (EEAS 2016, 7)

Unsurprisingly, with the launch of this Phase 2A into the High Seas of the Central Mediterranean region and the expensive impact that having to replace such boats has had on those arranging these journeys, migration brokers have adapted their tactics accordingly:

Analysis has shown that the fuel supply provided has been halved, from a level that already before the reduction was far insufficient to reach anywhere farther than some 30-50 nautical miles from the coast. Reaching European mainland, Malta or even Lampedusa is very difficult for these boats. Effectively, with the limited supply and the degree of overloading, the migrant vessels are SOLAS [Safety of Life at Sea] cases from the moment they launch. (EEAS 2016, 7)

Thus, while Operation Sophia introduces a greater number of potential vehicles for rescue in the region, it simultaneously introduces a level of greater precarity in the form of migrant boats operating with far less supplies. Furthermore, as a direct result of the mission's efforts at capturing and scrapping or destroying (after rescue) all boats used for these journeys, the use of wooden or fibre-glass boats for travel has been drastically reduced, with almost all journeys in the region now involving cheaper and more disposable rubber dinghies. As all are well aware, and as described in a EU committee in the UK House of Lords, rubber dinghies "have less carrying capacity and are more limited by sea conditions" (European Union Committee 2016, 16), and as such "dinghies are so much more unsafe" (19). Here then, one is made privy to how the use of so-called unseaworthy boats, while continuing to be referenced by EU powers as a damning indictment of the practices of smugglers, are in this case a direct result of EU policy and active enforcement in the region. As a consequence of Operation Sophia's explicit efforts at capturing and scrapping or destroying (after rescue) all boats used for these journeys, the use of wooden or fibre-glass fishing boats for travel has been drastically reduced, with almost all journeys in the region now involving cheaper and more disposable rubber dinghies. Nevertheless, after a year's service, EUNAVFOR MED/Operation Sophia's mandate was extended by the European Council for another year of service (European Council 2016), with no mention of modifying the above-mentioned procedures that have made the journeys by sea more dangerous for those involved. Thus, Europe and the EU, even in an operation that has the effect of increasing vehicles at sea that can be used for search and rescue, still at the same time orientates the situation in ways that make the conditions for movement markedly more dangerous.

By focusing on the material discursive affordances of boats and the various orientations that participate in the eventual arrival

and presentation of certain images and practices of boat migration over others, the intention is to address such important political questions and issues in modes of description that aim to open in turn the possibility of considering other potential understandings and points of intervention into such important political issues. As will be described throughout this chapter, boats materially perform what is legalised and what is illegalised within border crossing. They are more than moving seafaring vehicles. They act as mobile sites of law enforcement and oppression, as well as affording acts of freedom of movement. A boat is an artefact as well as a site of practicing the right to move. It is an extended vector in migration politics, acting as an interface of water as well as those laws, techniques, economies, and politics for which boats play an important role in affording visual, performative and material practices over the right to move.

ORIENTATING THE SEA

The Mediterranean Sea is a very particular kind of space for the migrant boats that would traverse it. As has been indicated, by entering into such a highly-orientated space such as the Mediterranean Sea, a boat enters into a relational matrix of power relations within which material discursive and political designations such as “regular” or “irregular,” “legal” or “illegal,” “seaworthy” or “unseaworthy” can arise, as well as the more directly experienced situation that continues to be highly dangerous and often deadly for those on-board these boats. This uneven but dominant matrix of power relations is made up of a multitude of forces, all of which inform what can be understood as a situated political ecology that Europe aims to orientate in very particular ways. In these coming pages, many of the orientations and vectors of enforcement involved in this space of water will be shown as informing one another, with each set of relations often able to align with and highlight certain qualities of the others, while also often suggesting challenges, inconsistencies and points of potential traversal (and reversal) in their intersecting logics. Having spoken of the boat as one site of execution within a dynamic ecology of material discursive relations, the focus shifts here to that of the boat’s operating environment of water, working to describe in further detail ways in which practices of EU surveillance and policing of the Mediterranean Sea work to orientate this space as an inhospitable space for the movement of migrant boats, with a further focus on the specific material discursive qualities that can be seen to inform such efforts of control and oppression.

Water and its challenge and call to inscription

The sea, that *other* seventy-one or so percent of the planet, has long presented a challenge to notions of boundaries, borders, territory and sovereignty. As a large, watery expanse, it suggests a

space of no readily demarcated borders. In the words of the European jurist and fascist theorist of sovereignty Carl Schmitt, “The sea has no character, in the original sense of the word, which comes from the Greek *charassein*, meaning to engrave, to scratch, to imprint” (Schmitt [1950] 2003, 42-3). Viewed from such a perspective of carved inscription in the name of occupation, the sea has often throughout Western history been cast as a suggestively amorphous and unruly space that challenges land-based politics of territory, rooted as they have been in practices of geography, or literally, “earth-writing.” Nevertheless, despite the open-ended and challenging presence that Schmitt attributed to the sea in his earlier work, as a theorist of sovereignty (and ready advocate of the Nazi movement of his time), he would nevertheless prove able in later writings to minimise land-sea antagonisms, moving towards an understanding in which the sea is ultimately presented as yet another space that might be orientated by would-be colonisers.

The history of Europeans powers of different kinds giving the sea a sense of inscribable and possessable qualities (be it the Mediterranean or other expanses of water), has typically begun with a process of making the sea legible to ostensibly land-based perspectives and their technologies of inscription and operation. In such a perspective, the contours of a body of water are initially defined according to the land that “surrounds” it. Indeed, the *Mediterraneum* of English and Romance languages is in its literal translation a “sea between the lands” (Iovino 2013). In such a denomination, the sea is orientated in relation to land and made measurable and capable of being plotted out according to existing techniques of cartography (with their own already strongly orientated polarities and histories of North/South/East/West divides).

This land-based perspective can be witnessed in the early maps of the Mediterranean region, such as the Tabula Peutingeriana (“Peutinger Table”), an influential Roman map whose original incarnation dates back to around the fourth century. The map is an illustration of the road networks (*cursus publicus*) of the Roman Empire, covering most of what is now understood as Europe, as well as sections of North Africa and Asia. Such a cartographic representation can be seen to highlight several related material discursive perspectives relevant to the period. As is evident in this and maps like it from the time, in the perspective of the Roman empire, roads are the dominant material passageway of power, and are therefore given cartographic pride of place on these tools that aid in the production of power. But the map also highlights aspects of the Mediterranean Sea as they were at this time (see Steinberg 2001, 61-4, for a brief summary). Particularly notable in the Tabula Peutingeriana map is the way in which it condenses the Mediterranean Sea into a kind of elongated river, reflecting the way in which the Sea would have been understood

most clearly as in direct relation to the coasts that it touched, rather than the large, open expanses of the sea itself. Such a cartographic neglect of the sea is also a direct result of the still comparatively undeveloped nature of shipbuilding and navigational techniques, which meant that the majority of sea navigations at the time were restricted to journeys that stayed close to the coast, rarely moving into the centre of the sea. Partly due to such restrictions then, mapping a large body of water was not yet an easily realised possibility. Furthermore, the tendencies towards coastal navigation were just as much a result of material features specific to the Mediterranean Sea itself, whose climactic and topographic properties create various forms of “microecologies” (Horden & Purcell 2000) that in many cases have encouraged more cautious and seasonal based forms of navigation within this space, as is also often the case in present migration journeys by sea. This elongation of the river in the artefact of the map is also a further result of the fact that the materials available to inscribe and make such a map portable would have likely been a papyrus roll, designed for carrying around in a *capsa* (a small box), and as such, its width would be severely limited, whereas its length would not. All of these factors, of power and its material discursive affordances and pursuits, merge into this artefact of the map in which the majority of the Mediterranean Sea was largely invisible and of less direct interest to powers of the time.

Figure 9.4. Segment IV of Abraham Ortelius's '*Tabula itineraria ex illustri Peutingerorum Bibliotheca quae Augustae Vindel*' (1598), as featured in Bertius (1619). Copperplate map in eight segments on four sheets, with added colour, each segment 19 × 52 cm, on sheets 41 × 53 cm. Commonly referred to as the Peutinger Table, this version of the map is a sixteenth-century printed copy of a thirteenth-century manuscript version of what is believed to be a fourth- or early-fifth-century map. This scan of the map is from Iovino (2013)

With the steady increase in the use of maps and the many other accompanying apparatuses necessary for cartographic representation and navigation by sea, one sees the much-discussed translation of “three dimensional” qualities of the world into the planar, two dimensional surfaces used in these forms of mapping. For all of their practically orientated qualities, such an agential

carving up and flattening of the phenomenal world into a discretely ordered representation can be seen to both represent and further mobilise a “jigsaw-puzzle view of the world” (Lewis and Wigen 1997); one in which the modern geopolitical imagination and its naturalisation of the act of “seeing the world-as-a-picture” has the effect of producing certain implicit orientations and a “hierarchy of places” within such a picture (John Agnew, cited in Perera 2007). In this way, maps and inscription technologies in general can be understood as products of power, at the same time that they in turn act as executable propositions that at the same time in turn mobilise further forms of power (Cowen 2014, 18). In the history of such representations, emerging as many of them did from European practices of cartography, “foreign” and unknown spaces were often presented as empty spaces. Not only did the will to inscribe mobilise energies of movement in the direction of such unknown territories, a very particular imperialist mind-set can often be seen to be at play in the ways in which such unknown spaces were often treated as blank spots whose very blankness asked to be “filled in” – with the would-be coloniser often taking a kind of *carte blanche* approach when moving into and through such spaces, such as in the infamous designation of unterritorialised lands as *terra nullius* (Miller 1985; Mignolo 1995; Ryan 1996; Perera 2009).

Such a projective nature of various forms of entitlement and intent can be seen in another naming convention, beginning in the age of the Roman Empire, in which this body of water was designated as *Mare Nostrum* (“our sea”). While hinting at potential new publics and shared collectives arising out of a shared space of the sea,⁵² the imperialist origins and overtones of this naming convention are clear. This was also the case in the early twentieth century, when Italian prime minister Benito Mussolini would invoke this naming convention as a further justification for the fascist incorporation of the Mediterranean within his renewed vision of empire (Gambi 1994). And in 2013, the Italian government would see fit to draw on this nomenclature for their search and rescue service Operation Mare Nostrum. Such examples indicate towards how, even in a mode of humanitarian intervention, European powers have never lost a sense of claim to the “guardianship” (Gold 1981, 30) and “stewardship” (Steinberg 2001) of this space within which they would operate and orientate according to their terms.

Forgotten space

In many ways, subsequent technological offerings in contemporary times have done little to challenge such ideological flattening of space. Even now, with the ostensibly more developed and multiform cartographic possibilities and techniques of the present, the various worldviews of such earlier forms of operational rep-

52 See, for instance, Adrian Lahoud’s “Project for a Mediterranean Union” (Lahoud 2010), in which he writes of his students’ work to imagine speculative architectures that might arise in a world in which President Sarkozy’s proposal in 2008 for a Mediterranean Union connected by a high-speed rail link was realised. Lahoud, in collaboration with Samuel Szwarcbord, would also produce his own two-sided dystopian and utopian takes on such an approach for the Geopolitical Borders Competition. For further discussion of potential sea-orientated communities arising in response to colonial legacies of violence, see also examples such as Paul Gilroy’s (1993) discussion of “the Black Atlantic,” or that of the “Great Southern Rainbow Republic,” as reframed by Perera (2009).

resentations can be said to have long since engrained themselves into certain prevalent material, cultural and political landscapes, and thus continue to exert their genealogical influence upon cartographic developments of the present. Presented as they often are in their still largely two-dimensional, screen-based versions and existing in a contemporary era of air travel (over land and water), the particular land-satellite-screen perspectives provided by mapping technologies have become increasingly naturalised amongst those that have access to their perspectives. Indeed, for those able to adapt such privileged positions and perspectives, contemporary perceptions of space could be said to have taken on an even more continuous, undifferentiated and taken for granted nature. Consider, for instance, recent public expressions in Europe and elsewhere of surprised outrage over sea-based incidents such as the Somali “pirates” and also the disappearance of passenger planes at sea. In such instances, it is possible to note both this sense of the sea as a smooth, undifferentiated space, but also the accompanying difficulty of comprehension and even fear that a privileged land-based perspective pronounces when faced with notions of unaccounted for spaces. In the words of Anil Dash, speaking on the public reaction to the missing Malaysia Airlines flight MH370, such an incredulity in relation to the possibility of uninscribed and unsurveilled spaces can also be seen as highlighting a particular “triumph of surveillance culture that people seem downright disappointed a plane can disappear” (Dash, cited in Chun 2016b, 67).

As Allan Sekula (1995) so vividly captures in *Fish Story*, his photo essay on the steady emergence of the sea as a space of globalised commodity production and distribution, such a fear and forgetfulness of the multiform qualities of the sea is a not at all surprising result of what can be seen as a centuries-old push towards a capitalist ideal of the sea as a flat, frictionless space without volume or history. Here, the “considerable mythogenic baggage” (Connery 2014, 156) that certain privileged perspectives can be seen to have carried with them on their real and imaginary vacations to and across these bodies of water are matched by what Sekula characterises as a “cognitive blankness” and “blinker narcissism” that one also sees reproduced in things such as perceptions of “cyberspace” as a similarly undifferentiated, immaterial ideal (Sekula 1995, 50).

As many have made clear (e.g. Sekula 1995; Steinberg 2001; Elden 2013; Cowen 2014; Heller and Pezzani 2014b; Steinberg & Peters 2015), such a flattening out of the material qualities of space requires a vast amount of geopolitical and ideological work in order to sustain such a mirage and orientation of the sea as a flat, frictionless space of ready flows to its would-be subjects. Orientations like this do not happen in isolation but rather require continuous work and enforcement in order to produce any sense

of “what appears” as that which is given. Indeed, as Ahmed points out, any discourse of “‘flatness’ is itself ‘orientated,’ in the sense that it still depends upon a point of view, as a point lost on the horizon, or that is concealed in the very mode of its operation” (Ahmed 2006, 113). As this research continues to emphasise, every orientation and connecting of one thing to another, at the levels of inscription and ideology, is always simultaneously a disconnecting of other possible connections. Every orientation, as with the process of making things executable, also involves certain displacements, with the manoeuvres of contemporary modes of capital being particularly notable for their “annihilation of ocean-space” (Steinberg 2001, 164).

Such a disconnecting and making given or invisible particular properties of the sea is only achieved and sustained via an ongoing series of material discursive techniques and practices, both at sea and on land. The container ship, the cruise ship and the battleship (together with the satellite, the robotic gantry crane and the mission control centre), all, to one degree or another, have a partial effect of abstracting or making less sensible many of the particular “characteristics of the environments across which [they] move” (165). Working at the massive scales that they often do, even their qualities as vehicles begin to become obscured. What is more flexibly mobile, a container ship travelling back and forth across the same narrowly defined and strictly calculated routes or the container itself that leaps from one moving platform to another, crossing land, sea or river, able to switch from one node and transport network to another?

Bernhard Siegert points to this act of displacement, writing of how seafaring, as an act of materially inscribing human endeavour upon the space of the sea, can be partly understood as a displacement and disavowal of the sea. Making reference to the fact that the Greeks had no word for “space,” but instead used the term *chora* as a referent for that which is occupied by a particular thing, Siegert writes,

***Choreo*, the verb, means “to make place” or “give room,” but it also translates as “passing through, penetrating, traversing successfully.” The ship makes space. ... Successful seafaring is forgetfulness of the sea. By turning the sea into a zone of inter-cultural contact, a space in which all kinds of histories of war, economy, and culture may unfold, the chorein obscures what this historical space emerged from. Only when we suffer shipwreck do we repay what we owe the chora for transforming the sea into a space of human history. (Siegert 2015, 69-70)**

By operationalising certain qualities of the sea in the name of the culturally motivated operation at hand (i.e. seafaring by boat; the expansion of empire; economically efficient modes of transport), certain qualities are made as given while others are disre-

garded in the name of the executing task at hand. In a comparison between European and Polynesian navigational techniques at sea, Luke Strongman similarly points to how European seafaring techniques, directed as they increasingly became by maps and charts, explicitly worked to elide phenomenological qualities of the sea, premised as these new techniques were “on the ability to make volume two dimensional; to reduce the complexity of the phenomenological world along the reductive axes of space and time into mathematical co-ordinates on maps and charts” (Strongman 2009, 59).⁵³

53 See also Haraway (1991, 188-9) on the “god trick” of disembodied visualising technologies that present a sense of seeing everything from seemingly nowhere.

As has been discussed in the previous chapters, such material discursive actualisations of certain aspects over others are inherent to any executable process, whether one is speaking of seafaring, mapping or software design. Consider the following instructive quote from a Navy staff officer speaking on the Eurosur (the European External Border Surveillance System) system for surveillance of migration: “in order to see and detect, the most difficult job is to select what we want to see, which vessels should be displayed on the map; indeed, if we visualise all vessels, the map ... [becomes] unreadable and the Mediterranean would appear as a coloured undistinguished space” (cited in Tazzioli and Walters 2016, 458).

These are seemingly obvious points, but nevertheless raise important questions that require reiteration and consideration. What is made to appear and disappear in any orientation? What vectors of actualisation inform and further frame such orientations? What bodies and entities are disorientated or excluded from such orientations? For whom is the sea not a frictionless, flat space? The shipwrecks and drownings at sea that one witnesses in the Mediterranean Sea are the results of a particular collection of politics and their actualised materialities. And in this case, the “forgetfulness” at play in this orientation is a particularly privileged one, in that while these shipwrecks and drownings make clear to all the deadly nature of European orientations and practices in regards to the so-called migration crisis, their consequences are enacted almost exclusively upon the bodies of non-Europeans. As discussed in the earlier examples around the visual politics of representation of the situation, it is little surprise then that such incidents have been and continue to be subject to a great amount of political framing, aimed in many ways at making invisible, forgettable or at least somewhat palatable these daily incidents of death and violence at sea and further onto land and the many other camps, detention centres and other forms of imposed struggle and precarity. In fact, it is often only through concerted efforts of will on the part of those that resist these taken for granted orientations and vectors of mobility that the specific contours and “faultlines in the smooth spaces of globalization” (Walters 2011a, 146) can be brought to the fore and

opened up for interrogation and reconsideration.

Verticality and volume

As a focus on a material artefact like that of the boat can help to make clear, the sea is a highly politicised, much worked over and decidedly un-flat space. Indeed, it is particularly noticeable for its dynamic material qualities as a “space of churning, where ... place is provisional and forever being (re)produced” (Steinberg and Peters 2015, 258). On the one hand, the sea has what the likes of Eyal Weizman and others have described as a strongly “vertical” dimension (Weizman 2002; Elden 2013; Heller and Pezzani 2014b). Territorially speaking, vertically determined categories of the continental shelf, the continental margin and the abyssal plane help in establishing internationally agreed upon juridical distinctions between the territorial seas, exclusive economic zones and the high seas. Economically speaking, many of the sea’s resources lie in the depths below the water’s surface, whether in the form of fishable resources or in the sea beds further below, upon which submarine pipelines and communications cables can be laid for the transportation of oil, gas and information, and also from which the potential extraction of minerals creates a new mineable surface of submerged geology. The securitisation of the sea also often operates at a vertical dimension both above and below waters, whether in the age-old form of lines of sight (and sound) from various elevated points on land (Horden & Purcell 2000, 123), or in the more privileged forms of various kinds of aerial and/or submarine visibility, such as those of remote sensing satellites or monitoring by aerial and subaquatic vehicles, such as in the case of helicopters or submarines.

As Stuart Elden (2013) and also Kimberly Peters & Philip Steinberg (2014) forcefully argue, it is not enough to challenge the classically flat discourse of maps with the addition of such a vertical dimension. One needs to further weight such accounts of the vertical with a sense of “the complexities of volume,” the ongoing back and forth of “issues such as reach, instability, force, resistance, incline and depth” (Elden 2013, 11), and “the ways in which power works through, under, and over space” (Peters & Steinberg 2014, 127). In the working through of such properties of water and the sea, both boat design and the now all-conquering form of logistical infrastructure known as containerisation (Cowen 2014; Klose 2009) are, each in their own way, intimately attuned to particular understandings of the volumetric. For instance, the growth of logistics and containerisation in the twentieth century involves a careful consideration of volume as defined by capitalist economics and their calculating logics of efficiency, as this materialist metric is tracked via the flow of goods from land to sea and back again, remaking ships, trucks and labour forces in the process.

Any such orientations and their materialised vectors of operation can be understood to both represent and further entrench particular logics and worldviews, while also instigating crucial material discrepancies and asymmetries amongst the different parties effected by them. As the oft-cited words of the American military historian and fleet captain Alfred Thayer Mahan make clear, with the arrival of vessels such as steamships and other advancements in maritime travel and logistics come new forms of relations. Mahan: “The sea, or water, is the great medium of circulation established by nature, just as money has been evolved by man for the exchange of produce. Change the flow of either in direction or amount, and you modify the political and industrial relations of mankind” (Mahan 1911, 139). As in the case of the previously discussed provisions of the electromagnetic spectrum, water here to is to be understood as a medium, a material discursive provider of certain executable affordances and relations, and in such cases, one which has increasingly been primed and orientated by inscriptions of power.

Figure 9.5. Stills from Allan Sekula and Noël Burch’s film *The Forgotten Space* (2010). In the second image, the containers are empty, signifying economic downtime and the unwanted and destabilising volumetric buoyancy it puts on ships designed to carry heavy loads

In considering such different dimensions and orientations at play in a space such as that of the sea, it is not a case of privileging one such orientation over the other—the vertical over the flat, the volumetric over the surface plane—but rather of studying the ways in which these different but often intersecting forces of inscription and control become orientated in practice. As will be discussed in further detail, the same body of water can be orientated according to a variety of practices: as a relatively flat surface area through which a shipping lane might pass; as a vertically surveilled space, whether from above (aerial vehicles, satellites) or below (submarines); and/or as a dynamic material volume weighted with economic value (e.g. fish, oil). In practice, none of these orientations are of a geometrically neat or consistent nature, but rather subject to what are often uneven forms of actual practice and enforcement. It is therefore the charge and material discursive articulation of these practices of movement and enforcement that determines the influence of any particular orientation in what is a meshwork of rigid and fluid forces. Just as

boat design and logistics are intimately attuned to an understanding of the volumetric, so too might enquiries into the material discursive nature of geopolitical power and its practices similarly seek to take into account the ways in which power is defined and enacted through a series of dynamic orientations and vectors of actualised reach and potential, as highlighted by many of the writers cited in these pages. In the case of the Mediterranean Sea, despite its status as a complex geopolitical nexus of powers, an important task then is to strategically work to describe the orientations at play and specific vectors of their articulation—as well as their accompanying displacements and disorientations—so as to bring to the fore the nature of each and the transformations and occupations that they involve.

Legal productions of the sea

Law acts as a key factor in issues of migration, and as with the other practices discussed here, one can also trace out a long history of ways in which a wide variety of legal rights have been put to the work of making the space of the seas amenable to the operative powers of law. Whether in the specific orientating of the Mediterranean Sea in favour of European interests, or in certain plans for extending European enforcement beyond the space of the sea, it becomes clear that political, economic and technological orientations involve a variety of overlapping and intersecting topologies of power that in turn put in place multiple and dynamically mobile forms of “border regimes” (Popescu 2012, 77). Each regime and set of orientations involves particular affordances in relation to mobility as they come to be performed and presented in the materialised orientations and vectors of connection and disconnection that they put into play.

Michael Kempe, in outlining various European powers’ many struggles with international law and its relation to piracy, speaks of how “the oceans were filled with conflicting legal strategies. Like ‘vectors’, they crossed the maritime sphere, and thus transformed the ocean into a ‘legal space’, in the words of Lauren Benton, a space characterized as a complex tangle of such strategies” (Kempe 2010, 359). Within such dynamic and mobile spaces of governance, any new law might reorientate maritime space in very particular directions, sparking off new vectors and counter-vectors of opportunity. With the spread and eventual hegemony of Westphalian notions of order and territory in the form of sovereign nation-states (from around the seventeenth century onwards), European maritime space gradually begins to take on a more readily apparent and executable legibility at the geopolitical level of emerging forms of international law.

As with the discrete cut of computation, it is worth pausing here to simply highlight how this foundational act of bordering via the division of territory makes space into a decisive geographic,

political and legally executable entity. What Schmitt describes as the *nomos*, “the first measure of all subsequent measures ... the primeval division and distribution” (Schmitt 2003, 70). And also what Benjamin Bratton, in adapting this notion of *nomos* to consider computationally-afforded forms of power, describes as a “primal first act of territorial inscription that gives rise to its subsequent formalization ... a making of a territorial order through the execution of a territorial claim and physical occupation that precedes it” (Bratton 2015, 25). The writing and enforcement of laws of the sea continue this operationalisation and making space executable according to these various territorial claims and occupations.

54 “Territorial sea” is a spatial right given to every coastal state to establish the breadth of its territorial sea up to a limit of 12 nautical miles from the state’s established baseline (typically the lower-water line of a coastal state). A “contiguous zone” is a space of a further 24 nautical miles from the territorial sea, in which a coastal state may exercise to punish infringements of laws relating to its territory and territorial sea. An “exclusive economic zone” is a space of up to 200 nautical miles from a state’s coastal baseline, over which the state retains special rights of access (but not full sovereignty) to resources both in the water and under the soil. And the “high seas” are a space of “freedom” within which no state can exercise its full sovereignty nor subject any part of this space to its own jurisdictions (UNCLOS, Article 88). This does not, however, mean that the high seas are a “legal vacuum,” as the rights and obligations of each actor and states continue to still be framed by international law.

Figure 9.6. Maritime jurisdictions. Image from Suárez de Vivero (2010, 27)

When, from 1929 to 1932, twenty-six American men convened at the Harvard School of Law on assignment from the League of Nations to begin drafting laws that would come to govern the planet’s oceans, they were addressing what the League had identified as an issue that was “ripe for codification” (Augenbraum 2017). At present, the current legal architecture of maritime governance and territory is largely codified in the 1982 United Nations Convention on the Law of the Sea (UNCLOS), which lays out several distinct formalisations for partitioning the sea into a legally inscribable and operable space (see Steinberg 2001 for a brief history of the competing national and economic interests at play in the eventual coming to fruition of the various UNCLOS conventions). This includes the key distinctions of “territorial sea,” “contiguous zone,” “exclusive economic zone” and the “high seas.”⁵⁴ In addition to such a partitioning of space, UNCLOS also serves notice to ships at sea and to the nearest coastal states of their unconditional “duty to render assistance” to any persons in need of rescue at sea in their vicinity, regardless of their national-

ity. The 1979 International Convention on Maritime Search and Rescue (SAR) further aims to delegate specific geographic zones that each state is responsible for coordinating rescue within; though some states (such as Tunisia and Libya) have not explicitly defined their SAR zones, while others (such as Italy and Malta, and Turkey and Greece) have overlapping SAR zones and are signatories of different versions of the SAR convention. Laws such as these and also those regarding the flying of flags on boats (as outlined most specifically in Articles 90-94 of UNCLOS), act as key markers for declaring the respective jurisdictional claims that can both be made by and also applied to any given boat. As defined within such a particular juridical-maritime nexus, these laws charge a boat with the powers of the relevant nation-state and, in doing so, immediately orientate any boat as a bobbing site and platform of jurisdiction.

Lauren Benton has highlighted how various legal methods for defining European from extra-European areas of the sea involved the use of “ships as vectors of law,” and that such extensions of European legal authority into maritime space was “limited in practice to the control over sea lanes rather than extensive ocean zones” (Benton 2005, 706). Nevertheless, wherever it was needed, European naval powers, via their ships and mariners (and their various non-European partners and competitors), have often proven more than ready to carry out a “law beyond the line” (706), creating various forms of regional political trajectories and often uneven forms of spatial distribution of regulatory practices and their resultant legally orientated spaces.

The same legal and material vectors of enforcement that Europe uses to facilitate spaces such as shipping lanes, naval corridors and other forms of economic zones are also invoked and employed to orientate the potential maritime routes of people on the move, denying access to safer forms and routes of passage, and in so doing extending precarity not only in the space of a sea like the Mediterranean, but further on into land and the similarly precarious journeys required to reach points of maritime transit. This practice of extending law and precarity both within and beyond the line, and similarly of space as something that has been orientated and along which specific lines of force and materialised vectors might extend, helps to highlight a *longue durée* of colonising European practices as they have been enacted in the Mediterranean region. The WikiLeaks release on Operation Sophia also highlights future suggestions for creating certain forms of legal exception while carrying out law beyond the line (EEAS 2016), providing another of numerous recent examples on the part of the EU to create such forms of exception and also potential expansion. Such practices involve both an extra-territorial and neo-colonial (Nkrumah 1965) nature to them and also highlight key asymmetries at play in the many wilfully contradic-

tory modes of enforcement and states of exception that the EU continues to permit.

These histories and practices of the past and present point to the ways in which the seas have long been and continue to be dynamically orientated spaces of both “elastic” and “patchy” sovereignty (Heller and Pezzani 2014b, 663-4). Elastic, in the sense of the various selective uses (and abuses) of laws and other forms of enforcement on the parts of various European practices in the Mediterranean Sea; and patchy in that any such enforcement is itself subject to its practical, often changing, material reach and implementation. As writers like Heller and Pezzani conclusively show, this elasticity of the law and its wilfully patchy and selective application can be used to deadly effect, as one sees over and again in the practices around search and rescue operations in the Mediterranean Sea. While search and rescue laws oblige a government to attend to distress messages or witnessed reports of a boat with migrants in peril, daily examples can be found (such as in the particularly notable case of the “Left-to-Die Boat”) whereby such messages are deliberately ignored on the part of the responsible nation-states. The EU has in recent years demonstrated a particularly strong penchant for elastically cruel forms of both direct and remotely enacted forms of what in the end is a hodgepodge but deadly form of *realpolitik*. At one moment purposely cutting down the knowingly strained resources of rescue operations such as that of Frontex’s *Mare Nostrum*, only to temporarily bump back up their resources a year later in the wake of one tragedy or another, and from one reactionary political wind to the next (with the important provision that almost any such increase in search and rescue to date have almost inevitably been accompanied by harsher tactics on land for dealing with those rescued).

Economics, calculation, risk

With its promise of economic opportunity within potential extra-legal spaces, the sea has a long history of acting as a lure for human endeavour, one that instigates both an impetus towards economic opportunity and at the same time a coinciding rush on the part of various powers to occupy and control (legally, technologically and materially) such spaces and potential horizons of opportunity. This nexus of shifting degrees of freedom and control in the sea continues into the present day, with various approaches of economics acting as a further powerful orientating framework for making executable various forms of practice in this space. Indeed, the EU, for all of its lofty and often well-meaning aims, has always partly been a coercive project and infrastructure for the capitalist model of the free market. In this sense the European project, while arising in relation to the aftermath of the Second World War as a project also aimed at ending such atrocities, is also a product of this taking hold of capitalist

paradigms and their models for the making structurally amenable and efficiently compatible the various economies and markets of different countries and their recourses. So dominant has this capitalist paradigm and hold of a particular brand of economics and its accompanying logics become in contemporary geopolitics that spaces of all kinds are often initially orientated from an economic vantage point, often to the point where an economic orientation becomes well established in advance of any other factors that might be taken into consideration. The Mediterranean, for all its multifaceted qualities, is in many ways understood by leading global power players primarily as a material space of economic infrastructure and circulation, one whose “freedom of the seas” is first and foremost a freedom of commercial shipping lanes, naval corridors and other integral maritime passageways of profit and power.

Total cost estimate approaches such as these can be seen to be at operate at many scales, working across domains of economics, politics and technology. In order to craft the kind of situational awareness that it does, as with any material discursive technique, a European border surveillance agency like Eurosur (the European External Border Surveillance System) weights its information according to certain levels of risk assigned to those entities tracked by its system along the various border zones it is tasked with covering. As a section on risk analysis within a Frontex report states, “Nothing happens without risk analysis” (Frontex 2010, 63). And later, “without doubt Risk Analysis is the ‘brain’ of Frontex” (67). As with cost-benefit analysis, forms of risk analysis are notable for the way in which they can be applied at a variety of scales and inform, in an often highly integrated fashion, a range of different practices. When applied to issues and decisions made in regard to surveillance systems, this determining mode of the calculation and brokering of risk becomes what David Lyon has described as an “actuarial” form of surveillance (Lyon 2009). In such a mode, issues of moral or ethical responsibility can quickly be subsumed within a view of seemingly utilitarian economic rationalism. For Lyons this is an expected result given the way in which many of the contemporary modes of technologically-informed surveillance are explicitly developed with cost efficiency as the prime determining factor involved.

Figure 9.7. “Table: Risk components (CIRAM).” CIRAM is the Common Integrated Risk Analysis Model. The table appears in the European Commission’s report “Adopting the Practical Handbook for implementing and managing the European Border Surveillance System (EUROSUR Handbook)” (European Commission 2015, 31).

In their helpful recent article on Eurosur, Martina Tazzioli and William Walters (2016, 449-50) describe how in one of the central monitoring rooms of a Eurosur control centre in Rome, a digital map is presented in which various streams of information (e.g. from a national Coast Guard, a Navy or other military actor, EU satellite feeds, an SOS signal sent by a boat, etc.) regarding vessels at sea are collected and visualised as a series of dots on a map of the region. The significance allotted to the dots representing the migrant boats is one of a calculus that aims to codify and rank the “level of impact” of any potential border violation on the part of these boats (European Commission 2016a). Tazzioli and Walters define this assessment of risk as the “governability” of the boat in question:

What is relevant to Eurosur is not data in itself or the number or the “size” of the phenomenon as such, but rather what we call its governability, that is, the financial cost and extent of forces that are required for managing it ... Eurosur’s map is far from being the outcome of a constant and overwhelming monitoring process. On the contrary, data put on the map are the result of multiple filtering processes and, despite the declared goal of producing a situational awareness picture, the map in fact makes visible only highly select events, which it translates into a specific language – of dots and lines. (Tazzioli & Walters 2016, 456)

Amidst all of this technology, the boat, as a key vector, takes on

various forms of orientated weightings and significance, many of which relate very little to the individual situations of those on board or, in the worst cases of dereliction of duty, to any present situations of distress, but rather to future moments of anticipated stress upon EU member states in the event of their potential arrivals into EU territory, as they continue to be defined and redefined at any one political moment in time and in further accordance with such systems of calculation. In such examples one witnesses how migration in the specific space of the Mediterranean Sea is partly turned into an assessment of risk, as it is defined in the cost-benefit style estimates of governability as they are made and remade on the part of the many different actors involved in EU policy creation and enforcement. More specifically still, such a cold calculus of life and death can be seen to participate in what Weizman has described as a “necro-economy” of state violence “in which various types of destructive measure are weighed in a utilitarian fashion, not only in relation to the damage they produce, but to the harm they purportedly prevent and even in relation to the more brutal measures they may help restrain” (Weizman 2011, 8-9). Furthermore, such approaches highlight the way in which any such calculations are always made up of patchy and often competing sets of affordances (technological, economic, legal, material), all of which are in turn shaped according to particular political decisions (both new and old) regarding how to operationalise and work with such affordances.

Via a calculative and filtering interface such as Eurosur, all of these potentially complex sets of intersecting relations are brought together and concretised in the form of a particular cartographic and operational representation of the situation. A migrant boat departs towards the European coastline and, in the words of Ruben Andersson, “Suddenly an object might appear: a pixelated boat with a vector attached indicating its speed and direction” (Andersson 2012, 9). And in the process, “As if by a conjuring trick, a migrant boat has become a source of risk sold on to industrial investors. This risk has been rendered on-screen as arrows and zigzag lines before finally being abstracted into the three-dimensional fields of information and risk flows of the Eurosur interface” (11).

Figure 9.8. Image from a Frontex archive of images for Operation Hermes, which operated in the Central Mediterranean. The finger is pointing at the island of Lampedusa. <http://frontex.europa.eu/photo/hermes-operation-jA6Vly>

These calculative logics and lenses of the economic and risk analysis can be seen to operate across many scales, dispersing from the macro- to the micro-political level. William Walters gives the example of how, by implementing a system of fines aimed towards fleet owners whose boats might be wittingly or unwittingly employed as vessels for clandestine migration, European nations are able to instigate a form of market-orientated calculations of risk cost estimates, in which the vehicle owners are induced into “seeing migration like an insurance company” (Walters 2001b, 12). As Ginette Verstraete remarks, such an economically-orientated gaze can also cut two ways. Having often been made to be intimately aware of the economic advantage enjoyed by Western countries via their many aggressive economic and cultural exports, such a dominant paradigm of the economic as it plays out within migration and mobility is not hard to miss by those moving within them. Verstraete:

the stowaway can laugh because he knows his illegality is marketable, even supported by the state in the end. He simply needs to understand the contradictory logic of Europe’s economy to enter the EU. Money is what loosens the conjunction of one nation and one state: money produces the hyphen in nation-state, the imprecise fit between nation and state and between identity and territory, where ethnic, gender, and economic differences come to the surface on a European and global scale. The man laughs because he knows that this gap, which expands as global capital flows into the common market, is his way into the EU. (Verstraete 2010, 104-5)

Such an economic calculus can be traced up and down various chains of command, surfacing at the macro level, such as the cold economic calculus of weighing the “burden” of asylum and human rights and their cost to the state, and similarly at the micro level of their effects on the bodies and material artefacts that work their ways through such limits and zones of orientation and disorientation. It can be directly witnessed in various reports emanating out of Brussels, such as CIVIPOL’s “Feasibility study on the control of the European Union’s maritime borders,” with its recommendation that “a common cost accounting standard should be established” in regards to control and surveillance of EU’s maritime borders (CIVIPOL 2003, 6). As the report notes, “This is common practice regarding weapon systems and makes it possible to take investment decisions on the basis of the real price to be paid” (6). With the current rise of stricter bordering monitoring regimes between Schengen countries in response to “high migratory pressures,” one now sees the scrambling together of new economically orientated reports, such as the European Commission’s (2016) “Back to Schengen – A Roadmap,” in which the financial costs of “non-Schengen” internal bordering regimes are highlighted as dramatic new threats to the EU’s financial well-being. The humanitarian crisis that it has been unwilling to face up to now forcefully spiralling back into and across the EU’s many nation-states, whom have so far proven largely incapable of mustering up meaningful and effective forms of solidarity.

While economic and calculative logics and arguments such as these can readily help to orientate and mobilise all manner of forms of maritime transport and security, a right to freedom of mobility and migration from areas of unrest, war and other forms of precarity can also be rapidly shut off according to the same terms of such an economic logic. For instance, one only needs to consider the many different versions of the rather fine neo-colonial claim that Europe can’t afford the financial burden of migrants arriving by sea who, in some cases, may inevitably be further influenced by the very competitive advantage that European nation-states and companies (and their various global partners) have aggressively secured for themselves through an economic dominance of spaces like the Mediterranean Sea (and along the many further vectors travelling into and out of the Mediterranean). Such often vast resulting forms of economic disparity are also materialised just as forcefully at the level of mobility, in which Europeans and their commodities enjoy almost unfettered mobility in the region, advantages of mobility against which the “desperate mobilities” (Martin 2012, 364) of those trying to make their way to these zones of privilege lie in stark contrast to.

Such imbalances in power relations often necessitate strategic reframings of such disparities, and, as we have seen in other examples as well, it is possible to discern a variety of sleight of

hand strategies on the part of those in power who would preserve long-standing structural forms of colonial and imperial privilege. One such strategy can be detected in the manner in which systemically achieved privileges (and the accompanying acts of force which they necessitate) are often cloaked and exculpated via a shifting of the emphasis from the clearly oppressed bodies of the colonised over into what are comparatively rather more hypothetical but nevertheless suggestively distracting points of potential stress for those in the position of power. A similar tactic of deflection can be seen to play out in the intentional shifting away from Europe's dereliction of duty in carrying out proper search and rescue operations via an intentional pivot of attention onto so-called smugglers and unseaworthy boats, as if these political economies of migration broking weren't direct results of ongoing European practices in the region. In all such calculative and calculated framings, the further making executable of deadly practices via such thresholds and filters of the (necro-)economic.

Technological zones and the cruel abstractions of surveillance

Figure 9.9. A graphic giving an example of the Global Maritime Distress and Safety System (GMDSS) process in action, with specific attention given to the connecting systems for vessel tracking and communication. Image from Prescom (2016)

With these other key orientations and networks of relations in mind, we can now turn more squarely towards the specific orientations and vectors of the technological. At first glance, the material properties of the sea might be seen as a potentially challenging space to certain forms of technical inscription. For instance, as Heller and Pezzani point out, in water, a contact and its trace seemingly drift apart from one another, loosening certain land-based bonds between cause and effect (Heller and Pezzani 2014b, 657). Nevertheless, as is evident in the example of the Mediterranean Sea today, in which human activity, enterprise and the will to inscribe this territory have been ramped up to significant degrees, all manner of forms of traces can be detected,

much of them as a result of this very active will to inscribe and, in doing so, orientate the sea. Technological devices involved in such inscriptions and orientations at sea include a high-tech sensorium of remote sensing involving geospatial, meteorological and oceanographic apparatuses of maritime surveillance, as well as closer to sea level devices such as flags, passports, shipping logs, checklists, maps and other forms of inscription technologies and networks at work in this geopolitical body of water.

Andrew Barry describes the way in which such technologies can, in tandem with the enforcement and regular putting to use of their capacities, create various forms of “technological zones,” defined broadly by Barry as “a space within which differences between technical practices, procedures or forms have been reduced, or common standards have been established” (Barry 2006, 239). Such forms of space are not necessarily readily demarcated on a map nor stable in their alignment, but they do involve particular affordances and “various forms of limit (technical, political, practical) to their reach” (239), and as such have a dynamic and important role in the production of space via the actualisation of various forms of power relations. They are furthermore often notable for the extra-territorial way in which their technological borders “may extend beyond the formal borders of any particular nation-state and into other territories” (240-1), further mobilising the kinds of “law beyond the line” discussed earlier.

As we have seen, in applications of enforcement in the name of migration management, a key determining force is that of risk and cost-benefit analysis. But while a prevailing political will might have a very clear sense of how they would prefer to orientate a particular space, the actual practice of doing so inevitably comes with a whole set material affordances and related costs, for which decisions must be made in regard to where to focus available resources. As highlighted by Heller and Pezzani (2014b), one example of cost-benefit analysis as it is worked out within intersecting questions of technology, economics, politics and the material artefact of boats can be observed in a 2011 case study carried out by Frontex and the EU’s Joint Research Centre (JRC). As the study reveals, the typically small size of boats used for clandestine migration (often falling in the range of 10-15-meter Zodiac style rubber dinghies and wooden or fibreglass fishing boats) proves very difficult to detect using Synthetic Aperture Radar (SAR) imagery. Such boats can only be captured in high-resolution SAR images that cover a small area, but given the expanse of a sea as large as the Mediterranean, the report concludes that “maritime surveillance with high resolution images would require a large number of images to cover wide maritime areas, which is very expensive and for the time being technically not feasible” (JRC-Frontex 2011; see also Heller & Jones 2014).

These limits of the affordances of the technologies of SAR satellite imagery points to how “the Mediterranean’s scopic system operates a form of incomplete and patchy surveillance that runs up against the frontiers of information quantity and resolution” (Heller and Pezzani 2014b, 667).

Such conflicts between resolution and swath are more specifically conflicts between the affordances of inscription technologies and their accompanying costs, and again point to the way in which orientations of any kind are enacted and sustained via the situated, often patchy, vectors of their material discursive execution. The great expense of monitoring a vast space such as the Mediterranean Sea currently involves decisions as to the scope and resolution of image and data capture, the number of boats to employ towards tasks of surveillance and/or rescue, and so on, with most state agencies choosing to “focus the attention of their mobile governmentality on the main vectors and lines of sea crossing,” while also adopting further technological agents such as anomaly detection algorithms “To deal with the ensuing information overload” (667). Within such a “code/space” (Kitchin & Dodge 2011) or technological zone, it is the overlaying, intersecting and bordering nature of these affordances and orientations and the various executable practices and potentials initiated in these competing overlaps and intersections that create and afford the kind of coercive but also uneven orientations and vectors spoken of here.

Figure 9.10 Uneven orientations and vectors of control. Density of Synthetic Aperture Radar satellite coverage in the Mediterranean Sea in 2001. Image from Topouzelis et al. (2008, 10), and also featured in Heller and Pezzani (2014b, 665)

This patchy actualisation of vectors of control as they are exerted in the Mediterranean Sea by Europe is also evident in the already mentioned example of Eurosur (the European External

Border Surveillance System), as it has steadily materialised into operational capacity since its launch in 2013. Eurosur is at present a key information collection and exchange system aiming “to provide situational awareness of conditions and activities along the external borders as well as all the necessary tools to react accordingly” (European Commission 2008, 6), with a specific aim “to detect, identify, track and intercept persons attempting to enter the EU illegally outside border crossing points (3). By working to facilitate the collection and exchange of information between national immigration agencies and in the process provide further visual tools for representing this data, Eurosur can be seen to create not a single pantopicon-like gaze, but rather multiple regimes of visibility (Tazzioli & Walters 2016) that often involve complex and at times competing webs of diplomatic protocols, inter-organisational rivalries and restrictions in regards to amount of access (Andersson 2016).

Such claims and impositions of legal inscription in regards to forms of mobility involve the difficult task of aligning the various institutional and information protocols and databases of the border enforcement agencies of different nations. Such technical challenges can be aided by the development of technologies such as the Schengen Information System, a database used to maintain and distribute information on individuals for law enforcement purposes by EU partners. Here, a cooperatively managed networked database aims to allow for a migrant rejected by one EU nation-state to be more readily rejected by other states in the system, with national differences in relation to asylum laws becoming potentially flattened by the operational logic of the system. Such alignments of political will with legal and technological logics can further enable and quicken the punitive adjudications of European will against incoming migrants that one witnesses today (unless of course the migrant individual in question might be able to fulfil a particular need, almost always an economic one). With systems such as these in place that capture, monitor and designate various forms of rights and forms of mobility, “Europe can thus preserve the image of a homogeneous space without internal frontiers, while decreasing the power of the individual asylum seeker” (Verstraete 2010, 99).

At the same time, as Steinberg (2001), Andersson (2016) and others demonstrate, it should be remembered that the actual practice of unifying any “system of systems” across terrains of nation-states, legal systems and/or technological protocols is typically fraught with difficulties for all cooperating parties involved, almost inevitably involving clashes of competing factional interests and a whole set of institutional affordances and constraints to be navigated at each step along the way. In a discussion of the examples of Eurosur and Operation HERA’s “Seahorse” initiative for a cooperative satellite network linking European and African

border forces, Andersson shows how one can often explicitly witness in such examples the way in which the “coercive infrastructures” of EU migration management, in addition to aiming to bolster methods of control and enforcement, often have an equally strong goal of intentionally orientating their own administrators, police forces and other participants who come under their sway. Attempting in their systematic approaches to “hard-wire” particular forms of cooperation in the name of securitisation and enforcement (Andersson 2016). Such efforts provide another example of the issue of processing power that arises in questions and practices of execution, the working to make coercive various bodies, data and relations in ways that produce what are deemed to be executions of the task at hand. At the same time, as is visible in the constantly changing and mutating nature of each of these systems, any such systems of orientation are always open to destabilisation and institutional drift on the part of all those protocols, processes, bodies and other entities that both compose them and with which they come into further generative contact with in their actual executions.

Figure 9.11. Eurosur Fusion Services uses a combination of different and separated services provided by internal and external agencies to create one single, combined service for visualising migration events onto various EU surveillance systems, including those of Eurosur and Frontex. Image from the “Eurosur Handbook” produced by the European Commission (2015, 27)

Part of the power and also danger of these systems of information gathering, remote-sensing, computation and visualisation is not only in their ability to provide readily executable vectors of pursuit for EU border management, but also simply in their suggestive proposition of a kind of mythical situation of total information awareness. As Ellebrecht highlights in a citation of a comment made by a border official, simply seeing such situational awareness technologies in action is seemingly half of their power to both their would-be financiers and operators, with the official in question commenting that, “When I first saw the EUROSUR on the screen, I finally understood what it was all about” (Ellebrecht 2014, 241). Even more importantly, as with the jigsaw puzzle-style nature of two-dimensional cartographic maps discussed earlier,

these suggestively powerful new forms of electronic mapping and surveillance provide their own forms of “virtual borderings” that can readily act as “guiding models” that provide potential visual cues towards further courses of pursuit—often of an extraterritorial nature—that might otherwise not be considered were it not for the particular dynamics of the system in question and its suggestive forms of representation (241).

Figure 9.12. Still image from the “Frontex Situation Centre” promotional video (Frontex 2015)

Figure 9.13. Frontex Situation Centre Dashboard and the Eurosur interface. Still image “Frontex Situation Centre” promotional video (Frontex 2015)

As indicated in the term itself, practices of surveillance and remote sensing as seen in examples like Eurosur involve what for human operators can be considered as involving a sense of remote distance that has a certain “hands off” quality to it, at the same time that it suggests modes of control via the forms of contact that it provides in its interfaces for interaction. Consider the following description by Caroline Bassett:

Remote sensing is a form of interrogation at a distance, a mode of engagement at arm’s length, but still an engagement. It is

a question thrown across a space in the form of energy and a response bounced back, which is then transformed into an answer through processes of analysis and visualisation. ... remote sensors make it possible to touch a surface, to interrogate it, without being in direct contact with it. (Bassett 2006, 200)

These forms of control via remote sensing indicate again towards a particular kind of violent abstraction that all of these various executable technologies and techniques put into motion. These violent abstractions create lived effects and experiences in their propagative and projective modes of biopolitical and networked forms of surveillance and control. Leading to, as Jasbir Puar describes it, the creation of “intimate proximities” that are “viciously intimate”:

Networks of surveillance ... are not removed, abstract, or cohered, but viciously intimate ... They are discontinuous in that intimate proximities are orchestrated to produce the ephemera of nonconnection, of not-touching – not through a vacuum of distance or of severing or separation, but in the proactive, provocative swerve away from contact, the refusal of tactile knowing: the discontinuity is a deliberate rupturing, not simply a missing or a missed connection, but an intimate, brutal, almost-but-no kind of taunting. (Puar 2007, 154)

Via such calculative, abstracted and elastic modes of both direct and also remote technologies and techniques of control, European practices bring about a particular orientation of the Mediterranean Sea. Each of these executing practices should not be understood as independent of one another, but rather as working in at times well-aligned and at other times contested relation with one another. It is the intersecting, overlapping and uneven nature of such orientations and in turn the various material discursive practices and potentials initiated in their enactments that create the kind of executable vectors of violence and also potential spoken of here, whether the vector in question is a particular migratory route that opens up (or closes down), a newly assembled and applied technology or set of laws that can be used for further forms of oppression or activist interventions that work to unravel or work around the gaps that open up within these practices and their uneven orientations. These processes and practices are always in continual negotiation with one another and the unruly entities and relations they aim to control, with the vectors that connect one thing to another within such executable systems always involving co-constituting material discursive forces, including those of matter, the technical and the political. In their executions, they all participate in ongoing acts of world-making that are unevenly applied and thus experienced differently according to their situated actualisations.

In the particular flexible and asymmetric application of such

intersecting forces in regards to the issue of migration and mobility at sea, they represent both new and yet recognisable forms of power. Such orientations and vectors point towards “imperfect geographies” of control and the way in which empires of all kinds “[do] not cover territory evenly” but are rather made up of differentiated corridors, enclaves and zones of various sizes and forms, with authority radiating out unevenly from the various connecting nodes and edges in any such network (Benton 2005, 717). As the interventions and individual cases archived by researcher and activist groups such as the WatchTheMed Alarm Phone group (discussed in the next chapter) are able to clearly show, this simultaneously cruel abstraction and intersection of laws, economics and technologies, and their wilfully patchy and selective application on the part of EU forces is currently being used to deadly effect, as one sees over and again in the practices around enforcement and search and rescue operations in the Mediterranean Sea.

In their variable and flexible applications of power they help to put in place asymmetric and in many cases overtly neo-colonial forms of relations, presenting a continued lineage of European exceptionalism and its production of spaces of exclusion and exception, each producing within them various forms of “graduated sovereignty,” as Aihwa Ong (2000) so aptly describes it. Or what Doreen Massey has termed as the “power geometries” of globalisation (Massey 1994, 149; see also Cowen 2017), whereby experiences of mobility, connectivity and place are different and dependent upon who it is that is moving within the space in question, with such orientated space producing variable relations, experiences and abilities to move through space. Such asymmetries remind one yet again that the production and experience of space is continually orientated by a nexus of overlapping executions of power that are charged by the form and force of the particular vectors of their situated material instantiations. These orientations and their materialised vectors bear witness to what Suvendrini Perera (2007) characterises as a “scarred and knotted fabric/ation of bodies, topographies and geopolitical regimes,” each connected to “other spaces, circuits, distributions and relations” that actualise, orientate and potentially take hold in the space in question.

Where technologies such as maps and calculations of economics and risk analysis plot out possible orientations of the sea, boats act as particularly important and notably dynamic artefacts around which these ensembles of orientations gather and attempt to exert their material discursive force upon. In the example of the Mediterranean Sea, this body of water has been orientated in such a way as to create very fluid routes of navigation for certain legalised boats, and considerably more dangerous conditions for other illegalised boats. Where the boat as a material artefact is

articulated and designed in relation to certain materialised properties of the sea (and the further economic, legal or technological relations that inform such materialisations), as these pages have aimed to make clear, the sea can also be designed and orientated. Thus, the geopolitical will of Europe capitalises and activates particular material discursive properties of the sea, the electromagnetic spectrum and other elements, weaponising their particular affordances via a series of coercive infrastructures, strategies and further practices that would mobilise this body of water against those whom Europe would prefer to keep out. Such forms of remote yet also intimately vicious techno-rational modes of engagement on the part of European border agencies represents a “diffused and dispersed” kind of violence, a conscious form of governmentality in which violence “is exercised less by effecting a destructive force onto a given actor, than by creating the *conditions* in which the sea becomes a liquid trap” (Heller and Pezzani 2014b, 671). Having specifically orientated the particular conditions of the Mediterranean Sea as they exist today, Europe can then, whether in an active mode of enforcement or passive mode of inaction, be seen to apply selectively elastic, mobile and asymmetric forms of control. In such a way, what was once a seemingly unengraveable body of water becomes a geographically inscribable entity, politically operable site and consequently dynamic and mobile space of sovereignty, one whose deadly effects are clear to see.

ORIENTATING OTHERWISE AND ANEW

Europe and the EU does not look the same when experienced from the position of migrant boats, oil tankers or Frontex drones. Europe extends its powers of control at sea along the very specific shape, design and utilities of specific compositional affordances and their co-constituted sets of relations and practices that help to shape a body of water into the site of the Mediterranean Sea and political space of Europe. Through a variety of techniques and logics, an orientation of the sea is enacted so that certain actors, artefacts and sites are considered as legal or illegal, seaworthy or unseaworthy, worthy of rescuing or not rescuing. These orientations act as coercive factors in encouraging certain vectors and possibilities of movement over others. In their repeated performance and enforcement of certain executable vectors of control, such orientations can tend to inertia, taking on qualities of normalcy and continuity, thus eliding or masking their qualities as ongoing manipulations of a space that leads to specific executable articulations and situations over others.

The boat is one artefact that comes into material discursive being and operation within such a mesh of orientations, and the act of orientating should similarly be understood as flowing from the artefact of the boat to the sea and from the sea to fur-

ther objects and techniques that are produced and installed as forces aimed at operating within this ecology of executable relations. All such artefacts and practices are, in one way or another, extensions of the key affording material discursive affordances involved—such as those of water and the electromagnetic spectrum—just as they are also orientated by further forces and wills that inform their operation. The boat is not isolated from the water nor the political, economic, legal and technological forces that purposely orientate such a space of water as European and thus subject to European claims of “stewardship” (Steinberg 2001) and enforcement.

Against a continuity and presentation of a certain set of politics and orientations as necessary or given, the “unseaworthy” boats of irregular migration can be understood as forceful movements that resist such orientations, and in doing so, bring to the fore many of the particular orientations of this space. In this sense, these boats are both orientated but also disorientating. They are framed as unseaworthy and illegal within the hegemonic orientations through which they move because they specifically do not follow or accept the designated orientations. But they are disorienting because their movement through this space reveals the asymmetric orientations and violent practices of European migration politics that undermine many previous ideological framings of the European project. To put it another way, irregular movement disorients the very repetitive, “regular” attending towards certain directions and vectors of possibility over others. As Ahmed puts it, such forms of movement can be understood as both a refusal to accept as given the existing lines to follow, and at the same time a wilful commitment to materialising different lines to follow, different articulations of the given and different possible orientations and modes of existence (Ahmed 2006, 178).

Europe can be looked at anew when reorientating oneself to the lived experiences of those frequently referred to as “illegal border crossers.” Such reorientations of the networks of relations and operations that are concretised in the artefact of a boat on the move lead to new vectors of mobility and the political openings that come with such wilful acts, potentially challenging and reshaping the very orientations that would control and direct their usage. In rejecting and disorientating European and EU will they point to ways in which this will and its orientations might be remade. In the words of Suvendrini Perera in her writing on beaches, borders, boats and bodies, “border spaces engender their own defiances, practices of connection, and potential for contestatory actions. Refugee bodies, blocked, disallowed, and terminated, still produce new maps; they fashion new passages and points of transition in and through the border, marking the possibility of other spatial relations and new, as yet unrealized, geographies that confound the territorial trap” (Perera 2009,

79). The movements of these boats and the many other activist networks and political movements that would support their movement highlight an ongoing practice of rethinking and reorientating long-held notions of Europe, the nation-state and the many material discursive relations, practices, occupations and imbalances of power have and continue to underpin their quality as given.

As this chapter has aimed to show, part of this political work of orientating otherwise and anew can be carried out via strategic material discursive interrogations that aim to open up those dominant actions, practices and networks of relations involved in the production of certain orientations over others. As has been the case throughout this research, the approach adopted here was one of carrying out such a strategic interrogation via material discursive, genealogical and multi-sited descriptions of these orientations, looking at the affordances of technology and the sea, the material discursive and visual politics of boats, and further key informing factors and relations, such as those of economics, risk analysis and the law. As a way of concluding this section and the research as a whole, the next chapter will involve looking at an example of activist practices that work through many of the same material discursive relations and affordances discussed in this chapter, in order to create their own infrastructures for intervention and resistance at sea, providing one final example of the kind of political strategies and oppositional practices whose possibilities point towards concrete applications for such projects of orientating anew.

10 WATCHING THE MED: ACTIVE AND OPPOSITIONAL INFRASTRUCTURES FOR INTERVENTION AND RESISTANCE AT SEA

What is one to do in the face of deliberate and persistent forms of sanctioned, structural cruelty? Such is the situation today that Guglielmo Marconi's century old feat of successfully transmitting the letter "S" (encoded as three short-press "dits" in the discrete digital messaging system of Morse code) wirelessly on a 3,200-kilometre-long journey across the Atlantic Ocean is now replaced by that in which SOS calls from migrant boats in desperate situations of emergency can be purposefully ignored by a host of rather more technologically capable actors. Marconi, looking out on the sea from Signal Hill in St John's, Canada, was able to see distance and the particular challenges of communicating over water as something that could be overcome with the powerful affordances of the electromagnetic spectrum. Today, the crew of a Frontex military boat, communicating and charting their travels via a range of bands of the electromagnetic spectrum, traverse the seas in expensive and well-suited modes of transport, relaying their findings with control rooms that sit in front of rows of screens and interfaces that bring such signals together to form a particular picture of movement and mobility. Amidst all of this activity and signal traffic, those boarding boats from coastal locations along the wide expanse of the Mediterranean region, having already undergone many forms of physical and emotional duress in getting to this point, board with a powerfully inscribed and embodied sense of the challenge of distance that comes with the more uncertain and highly restricted forms of access to movement as it has been for them in their journeys so far. In the unstable physical object that is in this particular case – most likely an overloaded rubber dinghy, this embodied quality of very particularly orientated forms of access to movement and the traversal of distance again finds expression, this time in the form of being forced close together on the distressingly fragile material of rubber set upon water. A cramped condition set in rather stark contrast against an open but clearly threatening expanse of water. Upon departing, with the sounds and smells of an on-board motor filling the air, some travellers might take out their mobile phones to update family and loved-ones of this beginning of the next stage of an uncertain journey. Time is of the essence. With each passing minute, the bars of signal reception disappear one after the other, until finally cutting out altogether. After this,

only those very few individuals who have a satellite phone stay in touching distance of this question of connectivity. The batteries of all devices continue to drain. The fragile waves of connectivity are replaced with the buoyant but now threatening ones of water.

Experiences and situations like this are sustained from one year to the next. EU politicians continue to fail to put an end to violent strategies of prevention and non-assistance in the Mediterranean Sea. Meanwhile, the solidarity amongst the majority of the member states continues for the moment to reveal itself to have been rather more tenuous, self-interested and inward facing than some might have thought. Despite such a grim and prevalent outlook, a host of many different actors (including some politicians), work to challenge and intervene upon the situation as it currently is. This final chapter will look at one such endeavour, the joined-up work of the WatchTheMed (<http://www.watchthemed.net/>) and Alarm Phone (<https://alarmphone.org>) networks and their collective efforts at providing both support for those at risk at sea, as well as further political efforts at mobilising resistance and change in the face of such oppression. As with the previous chapters, the focus here will be on the incorporation of various technologies and techniques in support of these efforts. This is not to fetishise the use of particular technologies in an activist movement, an all-too common obsession of media representations of activist movements in recent years. Rather, it is to show the particular ways in which—just as was the case with EU policing of the Mediterranean Sea—an ensemble of different technologies can be gathered together and collectively employed so as to effectively intervene into the very same spaces of technologically-supported oppressions.

The project of putting an end to regimes such as those that one sees in play in this example is a political task of both direct and longer-term strategic forms of action, projects in which the use of technology can be one important component within an ensemble of developing practices. This research has been working to highlight certain tactical and politically-orientated approaches that might serve these goals of intervention and structural change, highlighting potential points of entry into which such oppressive and violent orientations of the present might be intervened upon and changed. Where the last chapter highlighted the many different technologically-informed practices applied by EU policing forces in this space, this chapter looks at the way in which these activist efforts have put together their own oppositional infrastructures and ensembles of different collaborative methods and practices to intervene and work to counteract the forces at play. The work of WatchTheMed Alarm Phone, as well as that of interventionist research efforts such as Forensic Architecture, points to what Heller and Pezzani (themselves members of Forensic Architecture with direct involvement in WMAP) describe as

a certain redistribution in the access to various tools of surveillance and monitoring – “an important shift has occurred: states, the military, and other actors at sea no longer have the monopoly over watching” (Heller and Pezzani 2014b, 680). As groups and initiatives such as these demonstrate so effectively in their practices, many of the same affordances that make it possible for those in power to surveil and orientate a space like the Mediterranean also have the potential to be employed and configured by others who might wish to counter-act such forms of control. This is done in a fashion that works to create active and oppositional infrastructures capable of documenting and intervening into incidents of violence, so as to be able to save lives and also to build an ongoing case against such oppressive practices of power. Groups and movements like these show how the many different signals and “ecologies of transmission” (Gabrys 2009, 47) and inscription in contemporary life might be brought together in effective ways. And in doing so, as Zeynep Tufekci has recently written, they can be seen to both signal a capacity for collective resistance and aid for those in need (and also those wanting to join in with such causes), as well as to signal to power that its oppressive actions are being put under scrutiny and opened up to politically-orientated forms of interrogation (Tufekci 2017, 191). This final chapter takes a brief look into such forms of oppositional coding and capacity building, looking to learn from their techniques and practices.

INFRASTRUCTURES FOR INTERVENTION

To see WatchTheMed Alarm Phone (WMAP)⁵⁵ in practice is to see the ever-present fact that even with only the most basic resources it is still possible to make various forms of interventions into situations of oppression. In this particular case, as with many others, the prime resource involved is the ability to establish a collective network that is both resilient and able to stay with the trouble and work that comes with effecting change. As a transnational network built around the simple but powerful premise of providing a continual point of telephone contact and support for those on the move and in specific need of assistance at sea, the members of WMAP have worked to establish an infrastructure able to fulfil the demands that running its 24-hour support line involves.

To date, this has involved the establishing of a network of volunteers spread across many countries (with several volunteers being people who have themselves made the journey to Europe). Created in 2012 by Lorenzo Pezzani and Charles Heller, the original WatchTheMed online mapping platform for monitoring the deaths and violations of migrants’ rights at the maritime borders of the EU used testimonies of survivors and a range of sensing and visualisation technologies to recreate sea journeys that had ended in death. The creation of Alarm Phone meanwhile was

55 Because the two networks have so much overlap and work so closely together, they will be referred to by this shared name (as they sometimes do themselves).

inspired by other telephone support networks like it, particularly that of the Eritrean priest Father Abba Mussie Zerai, whose mobile phone had long been circulated amongst those navigating to Europe from Africa. Based at the time in Italy, Zerai, together with voluntary organisations such as Agenzia Habeshia, worked to provide telephone hotline support for those whose calls for help might otherwise not be answered, using his familiarity with many different languages to relay their calls to the relevant maritime rescue bodies. Zerai would eventually be short-listed in the 2015 nominations for the Nobel Peace Prize (see Schwartz 2014 for a profile and interview with Zerai) and has also worked together with WMAP. WatchTheMed and Alarm Phone set to work to combine their collective forms of expertise and create their own network for similar such forms of support aimed at both intervention and ongoing documentation of these cases of migration by sea (see Stierl 2016 for a helpful insider's overview of this history of the projects).

In the informative and powerful 2016 report, *Moving On: One Year Alarmphone*, the WMAP network describes the beginnings of their efforts to mobilise this initiative in response to a particularly intense period of ongoing mass deaths of migrants at sea in the summer months of 2013 that featured, amongst other incidents, the tragic Lampedusa shipwreck. In this incident, 260 people, predominantly Syrian refugees, drowned despite having contacted the Italian Coast Guard authorities on numerous occasions with SOS calls, with assistance later revealed to have been knowingly deferred and ultimately withheld, as documented by Italian journalist Fabrizio Gatti at the time (Gatti 2013). As the report describes, this incident highlights what would become a series of key question that WMAP would aim to address:

For the activists of WATCHTHEMED, this case was a key moment, raising various questions: What would have happened if these people in distress and systematically ignored by coast-guards had had the option to call A SECOND, INDEPENDENT PHONE-HOTLINE? Would it not be possible to document distress calls in real-time and to amplify them through immediate appeals to the public? Would this allow us to move beyond the reconstruction of maritime tragedies and towards real-time interventions? There were various technical and organisational challenges to overcome: Would we be able to create an emergency phone-line for boat-people, following existing ›call centre‹ structures and systems? Could we construct a network and collective structures to run a hotline 24/7, able to immediately generate public pressure in several European countries and in those around the Mediterranean Sea? (Alarm Phone 2016, 19)

After a year of preparations and testing, the Alarm Phone service went operational on 11 October 2014, exactly twelve months

on from the Lampedusa incident. In the report's update on WMAP's operations, produced a little over a year after this start of the network, they report that their transnational network had grown from 60 to 120 active members, located over 13 countries in locations such Amman, Marseille, Tangier, Amsterdam, Tunis and Berlin, speaking more than ten languages amongst them. After only 12 months in service, they report fielding as much as a hundred emergency calls per week, working to assist tens of thousands of people in distress at sea during this period (Alarm Phone 2016, 21).

Figure 10.1. Front and reverse sides of the Alarm Phone hotline cards produced for distributing to those making the journey by sea. Image from <https://alarmphone.org/de/material-3/>

By the summer of 2015, the WMAP operation was structured roughly as follows. Volunteers make themselves available on what are typically 4-hour shifts (though these were sometimes extended in cases when someone else was not able to fill in), in which the volunteer has to be ready to field any incoming calls. Wherever possible, WMAP tries to ensure the availability of two members on these shifts (preferably with one who is able to speak in a further relevant language besides that of English, with several members actively attempting to learn further languages for aiding in the process), and these members are trained so as to be able to field distress calls directed to the Alarm Phone hotline. The answering of calls, which might arrive at any moment (and possibly with further calls being received while doing so), is a challenging mental and emotional task. Firstly, the caller will almost always be in a situation of great danger and distress, a situation that is often compounded by factors such as bad reception on the line making it difficult to hear, having in some cases to communicate in a language that is not one's mother tongue,

and being continuously aware of the fact that one's phone battery is continuously draining during the course of each call. For the WMAP member, the crucial task is to help this caller through the process of providing different forms of details that can help in specifically coordinating their location. This involves seeing if a GPS reading can be supplied by anyone on-board the boat and gathering details as to where the boat embarked from, which route it was taking and how long they have been at sea. In addition to this information, details as to the numbers of people on-board, their specific physical condition, the state of the boat and its engine and fuel supply are also important factors to gather. Finally, it is important to try to assure the caller that help is being sought after and also aid with any further specific questions the callers might have. All of this information will be logged by the WMAP member into their live internal forums and databases used for tracking the development of each case received.

Following such calls, WMAP will then immediately attempt to notify the relevant nearest Maritime Rescue Co-ordination Centres and national coast guard(s) of this distress call for which they are legally responsible for coordinating search and rescue operations in response to. Such a call is often in stark contrast to the intimate and fragile nature of the call just carried out, involving a strategic negotiation through institutional chains of command that in some cases, though not all, are not necessarily predisposed to fielding calls from an outside network such as WMAP. In one way or another, the WMAP member must try to make a connection with a relevant party within these institutions, so that the process of launching a search and rescue operation can be put into motion. In some cases, a coast guard will reply with non-committal claims that they will look into the situation, making it unclear as to whether a search and rescue operation is indeed underway.

During all of this work, the WMAP member will continue to log and update details of the case so that the shifts following them will be able to pick up on where things stand. Summaries of these logs are eventually written up and shared in a public archive on the Reports page on WatchTheMed website (<http://watchthemed.net/index.php/reports>). In addition to seeking help from the coast guard, and especially in those cases of particular urgent emergency or where it is unclear whether the coast guard are in fact acting on the information received, there are also further avenues which the WMAP member can pursue. Prime amongst these is the ability to go onto publically accessible live vessel tracking websites like MarineTraffic and VesselFinder, which display up to date information on the location at sea of commercial and private ships via the global automatic identification system (AIS) network. AIS is a commonly used system adopted by boats at sea that enables them to both share their own location and to view

that of other marine traffic in their area, so as to better navigate at sea and also for help in situations of emergency. AIS integrates a standardised and dedicated VHF transceiver with a positioning system such as a GPS receiver (as well as further possible navigation sensors) in order to share its position, and requires an AIS enabled chartplotter or computer monitor to view the marine traffic information. Thanks to the free and public availability of such live vessel tracking websites that map this location data, it is possible to see the locations and names of many ships in a particular region, and thus a WMAP member can seek out ships closest to the vicinity of the distress call received. When clicking on the ship or boat in question on such websites, it is often possible to get further details as to the commercial owner of the boat, and thus the WMAP member can attempt a process of searching for a relevant number for making contact with this nearby boat. In those cases where they are able to reach the crew of the boat, they can then ask whether they would be able to redirect their course of travel so as to look for the boat in distress. Further publically available websites giving things like weather reports and sea conditions are also used to get further details on the environmental conditions faced by those on board and also in order to try to further triangulate their possible position.

As these attempts unfold, the WMAP member continues to update the satellite/mobile phone contact of the boat in distress, typically by SMS, so as to preserve battery life. In many instances, these phones on the boats are turned off or put into “airplane mode” in order to save battery life, and thus are only intermittently accessible, often requiring repeated attempts on the part of WMAP members when the time comes to contact them. In those instances where the boat in question is able to make it to land, whether on the shores of Europe, a neighbouring country or back to the country departed from, the WMAP member has a collection of other relevant on the ground and online networks, contact points and sources of information which are passed on to the disembarking passengers on the boat. While focused on intervention at sea, WMAP members typically remain in contact with callers, having often built up a rapport and relationship of trust over the course of what are often lively, ongoing conversations.⁵⁶

In this arrangement of WMAP we see a different kind of maritime control room at play. The entire operation is carried out with a well thought through collection of relatively basic technological supports. On the hardware side, this predominantly involves mobile phones, laptop/desktop computers and internet connections. On the software side, it involves internet browsers, reconstructed message board forums that act as live archiving resources and communication hubs for each case in question, shared calendars of time tables of the members of the team, email, instant messaging and chat applications of different kinds

⁵⁶ For an example of this, see the transcription of a WhatsApp dialogue carried out between a WatchThe-Med Alarm Phone member and a caller on board a boat in distress as feature in the Alarm Phone (2016, 74-5) report.

57 The phone bills alone can reach over a thousand Euros a month, and require constant topping up and calls for donations so as to be able to pay them.

(such as Skype, Facebook, WhatsApp, Viber), translation software, call management software for re-routing the many calls received, financial applications for monitoring the resources available for things like topping up the expensive phone bills,⁵⁷ publication software for the production of digital hand-books, the live ship tracking sites and other relevant online sites for relevant up to the minute information. To this technological infrastructure one then needs to add the many hours of freely volunteered labour required to carry out this work, the further work of finding more members to help and also the working to establish forms of coordination and collaboration with other similar networks dedicated to helping those in need. Amongst other things, this includes finding relevant people, organisations and sites all around the Mediterranean region for getting the Alarm Phone cards into the hands of those who are most likely to need it. Through this continuing effort on the part of all involved, these many forms of labour, technologies and sources of information are brought together towards the ongoing task of helping those who contact the network. Able to be carried out in any location that has reliable mobile phone coverage and an internet connection, this results in a patchwork but highly capable, active collective infrastructure and transnational network in solidarity and support of the right to move.

OPPOSITIONAL INFRASTRUCTURES

As can be seen in this setup, WMAP uses quite a few of the very same technologies, signals and sources of information used by those in power. In this repurposing of existing tools towards the work of creating a counter-surveillance and interventionist network, WMAP does the unwished for but important work of aiding those whose movements the EU works to prevent through its aggressive and deadly orientations. The very simplicity of the setup is part of its great efficacy.

In the examples of the Frontex control rooms and also that of Facebook looked at earlier, one saw ways in which a suite of technologies and techniques are combined, potentially drawing various compound and interactive forms of multiplier effects and projective efficacy. As the example of WMAP shows, a similar kind of bringing together of various technologies can be carried out so as to enact forms of resistance or alternative collective endeavours in the name of change. The Radio Alice free radio group of left-wing Autonomist activists in 1970s Bologna, Italy, gave the famous example of how, via the seemingly simple but inventive and highly generative hack of directly broadcasting—and specifically not screening or censoring—the calls of anyone who phoned into their station, it was possible to provide a radical infrastructure for a bottom-up, free for all community broadcast (Ordóñez 2010; Guattari 1993). This was a dormant, combinato-

rial potential lying in wait from the moment the technologies of the telephone, the radio and the microphone existed beside one another (see also Fuller's 2005 reading of UK pirate radio and its own unruly use of such combinatorial energies of various media devices). WMAP enacts a similarly simple yet powerful and combinatorial bringing together of the many available devices and signals of the electromagnetic spectrum in order to create a telephone hotline for helping those at sea.

In historical and present examples like these one sees the profound transmitting powers but also inherent leakiness of the electromagnetic spectrum and various forms of putting into active use its specific affordances via particular technological implementations. These affordances and also the combinatorial potentials of bringing such existent and emergent media and technology practices into productive relation with one another point to important tactical and strategic possibilities for political action, while also raising questions as to how they might be further configured. As in the previous chapters, these questions involve discussions of access, openness and the means of control provided within such setups; the potentials but also dangers in their affordances; the inclusions and exclusions that their executable functions involve; and the forms of relations that they participate in putting into play. They highlight the importance of capacity building and thinking through the configuring of oppositional infrastructures and the orientations and possibilities that such infrastructures might involve.

In the original example of Sputnik, the first artificial spaceborne satellite for radio signalling and remote sensing, one sees at the birth of such technologies of remote sensing and surveillance both the active orientations of a Cold War between nation-states but also a putting into motion of a set of signals that were themselves capable of being monitored by both governments but also amateur radio operators (Siddiqi 2003). Today a range of satellites are accessible to the public, providing potential infrastructures and tools for forms of observation, rights claims and activism (Notley 2016). At the same time, these forms of remote monitoring and their captured data are not equally accessible, with differing "thresholds of detectability" and image resolutions made available to different actors, pointing to the politics involved in such infrastructures of monitoring (Weizman 2015).

As highlighted by Danny Butt in his helpful article questioning the various oligopolistic structures involved in many present platforms for various modes of algorithmic forms of governance, issues such as these highlight the need to continue to work to build sociotechnical frameworks that specifically place an emphasis on "decolonisation, collective ownership of strategic information resources, and documentation of powerful transnational entities" (Butt 2016). In the article, Butt gives the histori-

cally interesting and relevant example of the New International Information Order's (NIIO) articulation of a critique of dominant media-enabled practices of mostly Western control, and its own countervailing conceptualisation of a global politics of information, as discussed at the 1973 Fourth Summit Conference of the Non-Aligned Movement of nations in Algiers. Debates such as that of the NIIO highlight continued questions discussed in areas such as modernisation and dependency theory, asking in what ways innovative but often nationally or privately-owned monopolistic forms of technology and media might be employed towards such acts of decolonisation (Butt 2016). The question of how effectively a centralised, dominant and/or privately-owned platform can really be in working towards practices of decolonisation. And also the continuing risk that the particular forms of "platform organisation" that they provide—for all of their ability to be appropriated—might still in the longer term "re-architecture" or infuse any acts of decolonisation with their own ideologies, logics and forms of relation making (Claudio Ciborra 1996, cited in Butt 2016). Highlighting again the questions of centralisation and decentralisation and freedom and control involved in platform architectures discussed in the earlier chapters on Facebook.

Further important questions for those working with building such oppositional infrastructures involve the notable quality of "leakiness" in networked technologies for connecting and sharing, a leakiness that has both powerful and potentially dangerous effects (Chun and Friedland 2015). As technologically-informed activist movements of recent years have continually experienced, a transmission and its signal is always at risk of being intercepted or reverse-engineered in ways that can be traced back to its source. In employing such powerful tools of transmission and communication, both governments and activists open themselves up to surveillance. As Ivan Sigal and Ellery Biddle (2015) highlight in their article on the use of digital tools of various recent protest movements, while the examples of newly emerging forms of networking like that of the use of FireChat in the Hong Kong protests or the walkie-talkie app Zello in the Venezuela protests were widely celebrated, both were highly susceptible to being intercepted and monitored by those in power. What can be seen to be at stake in such examples, including that of migration by sea, is specifically the question of what Sam Gregory describes as "the friction between dual desires for visibility and obscurity" (Gregory 2015). For Radio Alice, this radical sense of leaky openness was central to their use of radio to open up other forms of discourse, politics and expression (and they were eventually shut down by the local authorities because of it). For WMAP, this leakiness is helpful in that it both helps them to work to make those in need of rescue visible to the gaze of power, at the same time that the detectability of various forms of signals also plays an

important role for monitoring those in power, who would prefer to keep their unlawful and deadly actions less visible. In the end, for many oppositional movements and also those on the move, depending on their situation and the orientations in which they find themselves, this will involve a need to be able to move strategically between and across such spectrums of visibility and opacity.

In the examples from Facebook considered in the previous section, we saw how its power as the preeminent and dominant platform for social sharing gives one potential access to massive numbers of viewers of one's messages. At the same time, in its pushing for "real-name" user identities and attempts at restricting anonymity, it also potentially puts certain users of its services at risk. Drawing specifically from Karen Barad's writing on entanglements, Megan Boler and Jennie Phillips speak of situations such as this in Facebook as "entanglements between corporate platforms and radical democratic ideals, and subsequent frictions between activists' ideals and more pragmatic, DIY practices" (Boler and Phillips 2015). They give the example of Occupy protestors who in fighting specifically against corporate greed are nevertheless reliant on utilising several networked platforms provided by dominant corporations who are themselves known for the accumulation of capital and avoidance of paying tax.

At the same time though, in situations of precarity and desperate need, concessions will be made. As described by Suvendrini Perera in her writing on "survival media" and the experiences of the Tamil diaspora, the various technologies and media apparatuses that participate in the experiences and practices of bodies in motion are never totalising or fully determinative. Rather, they point towards the energetic and expressive combinatorial ways in which media of any kind can be remade within emergent collectives that are ready to plug into their energies of exchange and expression just as they are also able to move on from one to another, highlighting a willingness to live and resist "by all media necessary" (Perrera 2016, 50). In such "polymedia" (Madianou and Miller 2012) and often transnational environments, the affordances of this or that medium become malleable and combinatorial, gathering multiplier effects and suggesting more flexible architectures of communications that can rapidly swap in one media component for another. While it is important to think strategically and tactically in regards to how one might build certain components and architectures of resistance that have larger scale capacities that can stay with the trouble of longer term political projects, this important quality of adaptability and agile readiness to move across media and affordances also points to the dangers of trying to create too programmatic or rigid forms of infrastructures. Like Perera, Ravi Sundaram captures the dynamic ability of Indian communities to manipulate and alter mainstream media

infrastructures towards other informal networks of circulation that empower their users, creating “horizontal networks that bypass state and corporate power,” enabling volatile, disruptive and lively forms of emergent political-aesthetic action. What Sundaram describes as “shadow networks” of a “post-postcolonial sensory infrastructure” (Sundaram 2015).

Again, it is important to understand that these technologies and their possibilities lie in continual wait for use and further implementation and construction by those whom would do so. As evidenced in the chapters on Facebook, they can be used and manipulated by many ends of the spectrum. One sees this in an example like the recent “alt-right meme wars” (Cramer 2017), and their mobilisations of various media platforms and techniques to push a white supremacist agenda. In regards to sea and border crossing, there have also recently emerged currently minor but perhaps telling and foreboding examples of attempts at engaging individuals into crowdsourced acts of surveillance. As highlighted in Audri Augenbraum’s recent article on this, these include the creation of various websites and apps aimed at policing sea-based issues such as illegal fishing. Such a crowdsourcing of surveillance aims to tap into a notable vogue for online vigilantism, one that can also be seen in other attempts at creating participatory online platforms of surveillance, such as those of RedServant or BlueServo.net that allow for the reporting and monitoring of activity along the U.S.-Mexico border from one’s own home (Augenbraum 2017). Technology is thus, of course, never the answer in and of itself, but rather an important strategic tool that opens onto various possibilities. In their current expansive and dispersed participation in affording acts of oppression and resistance, they call to be interrogated and adapted in ways that further mobilise political potentials and forms of direct and longer-term intervention.

WMAF is one such notable example of an oppositional infrastructure that mobilises many such combinatorial affordances of media and technology as they currently are. Their example is instructive on many levels. For instance, their core infrastructure, while using a range of platforms that are themselves “closed source” or corporately owned, is not reliant on these tools. Rather, their infrastructure is built around the largely “open” tools of email, telephony, message boards and personal web pages, making their use of technology both more resilient and flexible. Were there to be a clampdown on something like WhatsApp messaging, they could for the moment easily move over to other alternatives (e.g. Viber), highlighting the importance of having alternatives rather than any one kind of dominant overarching oppositional infrastructure. Furthermore, their setup is relatively simple and low cost (except for the phone bills and free labour given), highlighting an ability to be replicated and used in

other situations, as well as a potential to scale up where possible. While not given access to all signals and thresholds of detection of the electromagnetic spectrum that are currently available, they nevertheless are able to use certain publically available ones to great effect.

In addition to this work, in their further maintenance and participation within a range mailing lists aimed at direct political action, they also work further towards the task of mobilising forms of political intervention *within* Europe, so as to also work towards the ultimate goal of dismantling such forms of oppression, while also working to engage and gather around other forms of political and collective being. The way in which WMAP also consists of those who have successfully crossed into Europe is also key. As highlighted by Dimitris Papadopoulos and Vassilis Tsianos in their writing on “mobile commons, “People on the move create a world of knowledge, of information, of tricks for survival, of mutual care, of social relations, of services exchange, of solidarity and sociability that can be shared, used and where people contribute to sustain and expand it” (Papadopoulos and Tsianos 2013, 190; cited in Stierl 2016). WMAP’s working to incorporate and learn from such lived knowledge and expertise in regards to the issue of sea-crossings becomes in this way another key factor in this collaborative and knowledgeable nature of the network and its ability to gain the trust of and link up with many different relevant actors.

In addition to enabling a rapid live-response team for helping those in need of assistance at sea, WMAP’s infrastructure also points to the important ability of archiving and making publically available these many cases of imposed violence and ongoing neglect or non-assistance at sea. As the *Moving On* report states, this is a particularly important act in that it aims to counter-act the way in which “migrants’ acts of unauthorised border crossing are spectacularised,” while “states seek to keep the violence of border control in the shadows” (Alarm Phone 2016, 25). In producing such archives, WMAP is able in many instances to “reverse this regime of selective (in)visibility by claiming a right to look and a right to listen that challenge the borders of what can be seen and heard” (25).

And this proves to be the case, as all involved in the WMAP network continue to make effective use of the affordances of various forms of collective media and technological infrastructures for surveillance, inscription and sharing to create disobedient and oppositional gazes and their accompanying archives of oppression and resistance. In doing so, these networks are able to save lives, shine a light on specific abuses of power and oppression, and also seek out active gaps and openings in which these structures might be subverted, unravelled or constituted anew. They provide one powerful and instructive example of oppositional

coding and the putting into place of active and politically-orientated infrastructures for change. And also, amidst all of its difficult and sad reading, it also possible to see in their interventions and also the many pages of their archive an ongoing practice of transnational solidarity and collaboration that points to a future that WMAP and the many other networks and movements like it continue to support and build towards.

SECTION SUMMARY

As this chapter has aimed to show, connectivity, whether technological or communal, is both given and not given. Relations ebb and flow in their coming into and out of being. Power, even in its most settled and taken for granted contexts, is a processual thing and in materialising its claims must eventually find material expression and modes of connection of one form or another. Similarly, each new technology brings with it new claims on the possible, just as it also an emergent enactment and articulation of existing material discursive affordances and relations and their variously discovered executable intensities. As Edward Said tells us, the kinds of orientations that one sees in inscription practices such as those of mapping and their prescriptive productions of space remind one that, “Just as none of us is outside or beyond geography, none of us is completely free from the struggle over geography” (Said 1993, 6). The same holds true for technology and the particular struggles and orientations it is put to use within.

This section aimed to trace and track particular trajectories of European power as they can be seen to have been applied within the space of the Mediterranean Sea. It highlighted some of the particular ways in which this space has been orientated by European forces using a variety of coercive techniques and practices so as to turn it into one in which certain bodies and boats can travel easily through while others cannot. Many tens of thousands of lives continue to be lost at sea as a result of this, and the structures of violence and oppression that they point towards instantiate and further solidify what is rightly referred to as “Fortress Europe.”

At the same time, via continued claims of the right to move as well as those who work to document and cast a critical, oppositional gaze on European practices in response to such claims, we now witness a situation in which the once seemingly universal and stable entity known as the European Union has entered into both an existential and very real crisis. This crisis has seen the many possible forms of support and solidarity that European nations might have worked to mobilise in dealing with this issue disappearing rather more quickly than its supporters might have believed possible. For those whom would see the EU as force of good intentions, this is a very real problem to be dealt with. For those critics of the EU who struggle to see beyond an underlying

history of ongoing exploitative and regularly self-serving motives, it presents a challenge of what comes next. But for every act of violence, one can also witness continued efforts on the part of others in Europe to find alternative solutions. In the emerging networks of solidarity and intervention witnessed in this chapter, we see how the processual matrix of domination is never total and that new forms of politics and collective relations and actions are always possible.

In this research's overall focus on technology, we also saw once again how manifestations of power involve very specific material discursive negotiations of affordances, such as those of water, boats, the electromagnetic spectrum and the political economies needed to hold up these executable infrastructures of surveillance and control. At the same time, we also saw how affordances of technology are not simply in the hands of those in power, but can also be accessed by others. In the case of WMAP, one example was given of methods and actions for reconstituting existing networks of relations in the name of intervention and political change. The same machines that can enact modes of enclosure are always still open to the capacity to be appropriated, reverse engineered or repurposed and set towards other tasks. But their long trajectories of often coming into specific being as "the master's tools" (Lorde 1984 110) will continue to present challenges of attempting to see beyond the most common ways in which they are constituted and applied.

Finally, this section also aimed to show that, even in an issue as complex and multifaceted as that of the migration situation in the Mediterranean Sea, it is still possible to negotiate and work through such complexity. The approach of doing so here, as in previous chapters, was of treating power relations and manifestations of power as consisting of intersecting and also contested orientations and vectors of actualisation, with a specific focus on the ways in which issues of materiality, the law and economics worked themselves into the technologically-informed practices looked at. Complexity in this view then is not something to be treated as overwhelming, but rather as pointing towards many possible sites and relations (small and large scale) for possible intervention. In the understanding of orientation that was developed out of Sara Ahmed's formulation of the concept, this partly involved a continued attempt at showing how such relations are historically and culturally situated, and how such a genealogical approach always involves demanding questions, particularly those of *for whom* are these orientations intended and presented as given and in what ways do they potentially disorientate those for whom they are not intended or experienced as given. By looking into such histories and their "arrivals" into given executing practices of the present, it becomes possible to further critically address certain dominant practices and orientations such as

those looked at here.

In contrast to the many acts of attempted domination and oppression that were considered in this chapter, we also saw examples of resistance and the will to reorientate this space. This included the work of the WatchtheMed Alarm Phone network, whose carefully crafted creation of an ensemble of technological supports aimed at intervening into situations of distress at sea highlighted several effective methods and strategies for intervention. Like the attempts of those coming to Europe, persistent acts of resistance and engagement like these require continuous repetition and reiteration if they are to be successful and achieve the further effect of reorientating the particular set of dominant relations through which they move. They bring forth their continual questions of how to mobilise forms of intervention and change, highlighting the need for disobedient and oppositional forms of coding and infrastructure building that support the political task of intervening upon such relations of power, while also looking towards other tools and methods beyond merely the technological. These questions extend across the political, the cultural and the technical, asking for active and careful consideration of both their current and further potential infrastructures and practices of execution. A boat, like a technological platform is, simultaneously, a proposition, a vehicle, a journey and a promise to be held up. In each and every situated negotiation and engagement with such propositions, the highlighting of the validity of these promises and their many affordances, relations and claims on the executable.

11 FINAL REMARKS

This research set out to develop a concept of execution that would act as a relevant and politically-orientated concept for describing and engaging with important features of contemporary networked and computationally-informed situations. To this end, it has developed certain approaches that it highlights as being useful for what has in each chapter been an approach of describing and analysing forms of execution, and in doing so, working towards thinking how such descriptions and analysis help in opening up certain political points for consideration and potential intervention.

In working across a range of different sites and practices of execution, one of the prevailing themes has been the way in which the concept of execution as it has been developed here continually opens onto what are seen as formative *questions of execution*. These included questions such as What is executing here? What defines execution? What makes the cut in any such understanding of execution and its instantiation in the world? What executions are presented as more likely than others, and why? What histories of execution might be of interest? How are power relations composed specifically within networked and computational environments? How do such forms of power relations further interact and intersect with other domains of practice? How is it that we end up with the particular forms of execution that we do? And how specifically might these practices of execution be otherwise? As has continually been emphasised, with each answer posited to such questions of execution, still further questions arise, highlighting the generative way in which execution breeds execution, marking bodies and mobilising connections and disconnections of different kinds in each of its situated instantiations. Such a questioning was treated as being particularly useful in regards to the strategic intention of not treating these processes as given, nor as fully separated or distinct from other related practices of execution. In such a problematising mode, every act of clarification opens inevitably onto new questions and possible connections, and the examples looked at aimed to pay attention and give life to this sense of the way in which things are always moving in and out of different forms of executing relations and their predictable and unpredictable contours of execution and executability.

At the same time, this research committed to highlighting certain dominant and prevalent practices and techniques of execution. In the first section, these included what Turing characterised as the “profitable” (Turing 1950, 439) cut of making things discrete so as to be executable, with all of the various inclusions and exclusions

that such a cut inevitably involves. An often coercive practice of disciplining entities so as to make them efficiently executable elements within an executing practice was also highlighted, typically with a recurring technique of division of tasks and forms of labour being employed in doing so. This in turn points to how the project of making something executable is always crucially a process of negotiating between issues of matter and meaning. Where successful, such computationally-afforded practices then open up to the ability to project their modes of execution into the world. Where any such executing practice would aim to establish itself as a dominant power and force in the world, the further process of structuring forms of exchange was shown to be particularly important, with this research looking particularly into examples from Facebook and its engineering of such forms of exchange and relation-making, often by cultivating what were described as multiplier effects and also asymmetric forms of flow and access within such structures of exchange. Also of important note was the ongoing question of the different and uneven forms of power relations that the making of certain things executable involves, and the potentially political way in which every execution participates in the practice of privileging certain relations and forms of decision making while also excluding others.

The concept of execution as it was further developed through each of the examples looked at was orientated and described in such a way so to be particularly sensitive to such issues, highlighting the uneven and asymmetric nature of such manifestations and projections of power, while also pointing to their unpredictable energies and the ways in which they might be intervened upon and remade. Strategies that were shown to be particularly useful in this respect included modes of appropriation and reverse engineering that employ many of the same tools of dominance to work against them. These included oppositional and disobedient media practices that catalogue and archive abuses of power while using the power of networks and collective action to further intervene in such issues, as well as modes of oppositional coding that work to build alternative infrastructures and ensembles of agile and combinatorial media practices in the name of political and other forms of change. Along the way, the research regularly paused to consider a number of individual actors and their participations and movements in and across such practices of execution. These included Alan Turing, Martin Howse, Yoko Ono, Charles Babbage, Mark Zuckerberg, Diamond Reynolds and those travelling by boat across the Mediterranean Sea. As well as larger collectives and organisations employing these tools of media and technology, including Facebook, Cambridge Analytica, #BlackLivesMatter, Frontex and WatchTheMed Alarm Phone. With each of these actors forming and being informed by these ongoing questions of execution.

All of these examples and cases were crucial to this research's gradual development of not only a concept of execution but also a set of particular approaches for addressing and working through such cases. Prime amongst these approaches was that of studying and thinking through the compositional affordances involved in the process of making certain things and relations executable. In speaking of affordances, this research was particularly interested in describing the material discursive (Barad 2007) relations involved in ongoing compositional acts of making things executable, attempting to further develop Barad's concepts in relation to examples of computing and technology. In further adding particular insights from intersectionality studies towards an approach that aims to address forms of relation-making and their accompanying acts of materialising forms of difference and particular marks on particular bodies, these approaches and their methods were particularly helpful in attempting to provide careful understandings of the many performative and iterative processes of mattering and positioning involved in such descriptions and acts of execution.

These approaches were further supplemented by the strong media genealogical bent of this research, which worked to strategically contextualise the executing practices under consideration by situating their present dispositions and actions within greater historical trajectories. In each chapter and case studied, this involved addressing how executing practices come into being amidst already active and established relations and their various dispositions of power, whose valences the practices in question can be seen to be working with and/or against in various important ways. By considering such trajectories and what in the final section was described as their orientations (Ahmed 2006), it became possible to situate still further the ways in which executions descend, emerge and take hold in relation to such orientations, highlighting the political and formative nature of such orientations.

All of these approaches were further mobilised towards the politically-orientated task of describing and interrogating networked and computationally-informed practices of execution so as to consider in what ways their techniques and technologies might be intervened upon or further orientated in particular ways. As was emphasised, the same machines and media that can be made to participate in forms of oppression can also be repurposed and set towards other aims. To this end, particular examples and strategies of what was described as oppositional coding were given, highlighting in what ways these examples can be understood as being operationally and politically effective, as well indicating towards further questions and possible points of intervention. These forms of opposition were shown to involve their own forms of material discursive negotiations of intersect-

ing sets of affordances and relations, highlighting again how the approaches given here might be of help for not only addressing questions of power and expression, but also those of working towards the creation of alternative infrastructures and practices of the executable.

With the ongoing participation and spread of networks and computation in the world, it is important to continue to address these questions and practices of execution and their emerging trajectories and orientations that can be seen to take hold in their ongoing instantiations in the world. The rise of a “Twitter president,” whose coming to popularity was partly built on a mastery of both “old” and “new” media practices, highlights the need to follow the ways in which the bringing together of both new and familiar energies participate in bringing about ongoing manifestations of power and their forms of discrimination, exclusion and oppression. In the final days of writing this research, the verdict of the Philando Castile case discussed here was reached, with Officer Yanez being pronounced not guilty on all accounts (as have almost every one of the police officers captured in other recent recordings of police shootings), highlighting that new forms of technologically-mediated visibility will of course not be enough. Further recently uncovered documents also reveal that Facebook admirably refused to comply with warrants from the police aimed at accessing the private messages and photos belonging to Diamond Reynolds. Elsewhere, it would appear that the inventor of the Oculus Rift virtual reality platform, having being ousted by Facebook for what was deemed to be his problematic role in certain political movements of the present, is now looking to follow in the footsteps of the EU and weaponise further bands of the electromagnetic spectrum towards the task of border surveillance in America, apparently by using infrared sensors and LiDAR (light detection and ranging) technology to do so (Wingfield 2017). A wall doesn’t have to be made of visibly material properties. Be they filter bubbles, restrictions to archival access or a LiDAR-equipped drone hovering along the border, such enclosures and their generative forms of division and segregation can and will take on many different executable forms.

But these new and familiar forces can be opposed and constituted otherwise. Having participated in early 2017 in rapid and successful interventions aimed at counteracting President Donald Trump’s “travel ban” on a number of Muslim-majority countries, the non-profit American Civil Liberties Union (ACLU) (discussed in the earlier chapter on Facebook) has since made contact with Y Combinator, that most venerable of Silicon Valley tech incubator venture capital firms, and are currently receiving funding and help with expanding their technological capacities. A potentially uneasy but interesting alliance and acknowledgement of the pressing questions of infrastructure, processing power and

the need to be able to scale in accordance with these computationally-infused political economies and practices of the present.

Similarly, in the approaches provided by some of the researchers used for developing the thinking in these pages, one sees both old and new examples of scholarly efforts that look to work through such urgent issues of the present with forms of research aimed at addressing and also actively intervening into such intersecting compositions of power within various domains of living. As Rob Nixon highlights, at stake in these approaches are questions of strategy. “The critical question remains the question of strategy—how, in our transnational quest for stronger alliances, to combine activist staying power with new media agility” (Nixon 2007, 277). This research has been inspired by such approaches, and also that of the actors and actions looked at in the pages here, working to further contribute some of its own strategic suggestions and approaches for considering certain important qualities of networked and computationally-informed practices as they continue to be composed from one execution to the next.

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This research looks at questions of power and expression as they are composed in various ways within networked and computationally-informed situations of the present. Drawing from the term as it is originally invoked in practices of computing, the research puts forward *execution* as a central conceptual framework for its investigations. In a computer program, a program becomes executable when it is able to execute a set of procedures within a designated set of relations and affordances. Similarly, the concept of execution developed here looks at the ongoing negotiations of various formative relations and affordances (technical, cultural, material, political) in practices of execution, describing certain notable techniques applied towards the task of making things executable.

The examples looked at include several dominant media and technology practices of the present, as well as several alternative practices that point to other possible modes of execution. In doing so, the research highlights certain politically-orientated issues involved in questions of execution, working to further develop specific approaches aimed at describing, questioning and intervening into practices of execution as they occur in the world.

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