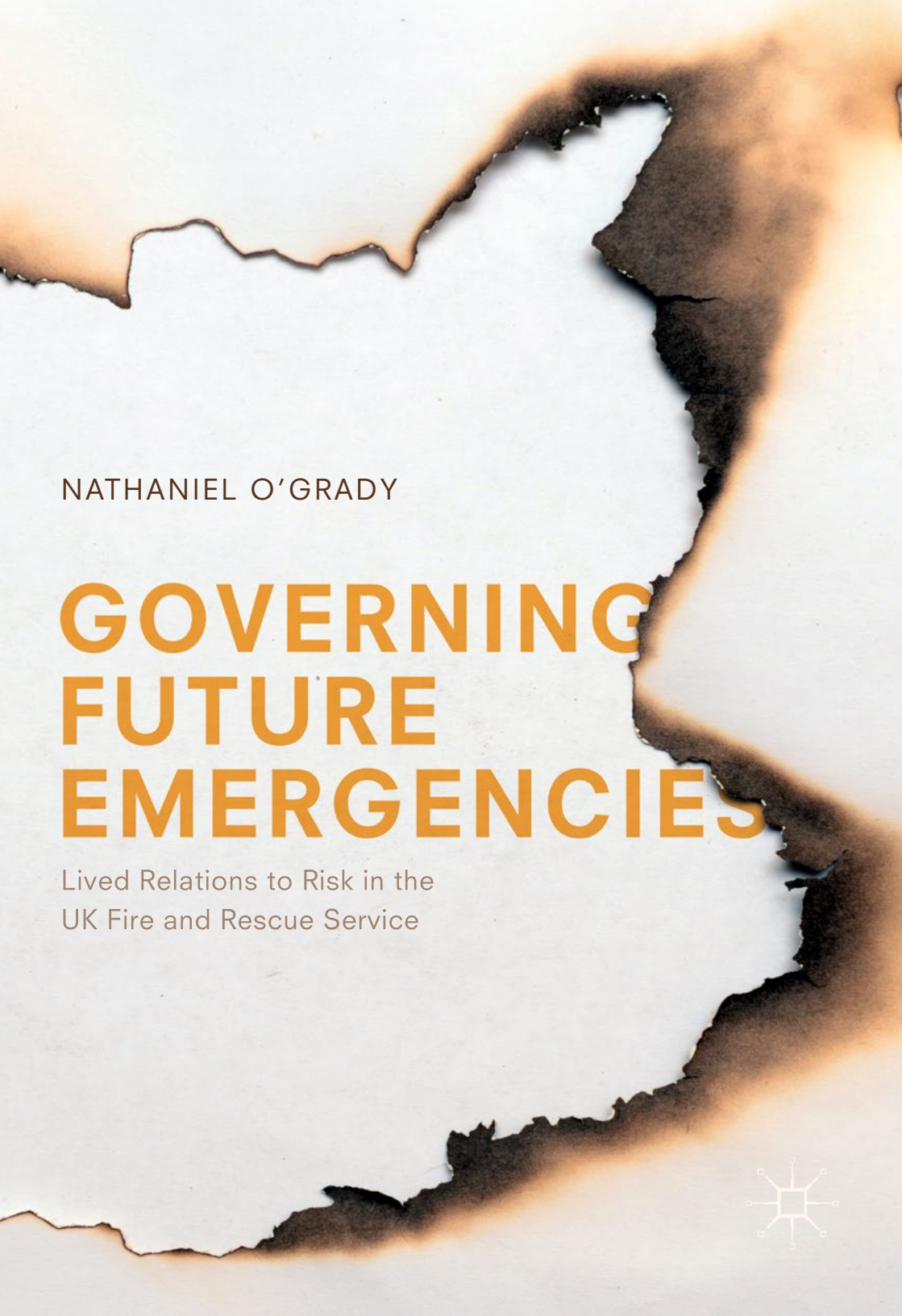
NATHANIEL O'GRADY
GOVERNING FUTURE EMERGENCIES
Lived Relations to Risk in the UK Fire and Rescue Service

Governing Future Emergencies

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palgrave
macmillan

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ISBN 978-3-319-71990-0 ISBN 978-3-319-71991-7 (eBook)
https://doi.org/10.1007/978-3-319-71991-7

Library of Congress Control Number: 2018933619

Cover illustration: happyfoto/getty images

Printed on acid-free paper

This Palgrave Macmillan imprint is published by the registered company Springer International Publishing AG part of Springer Nature.
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

For Sophie

Acknowledgements

Many people have contributed either directly or indirectly to both the writing of this book and the research underpinning it. Most important was the help and guidance of Louise Amoore and Ben Anderson. A special mention should be reserved also for Claudia Aradau whose advice was crucial towards the end of this research when I moved back to London from Durham. The comradery of the many brilliant PhD students and staff in Durham University's Geography Department between 2010 and 2013 is also etched into the pages following. A massive thanks to all the talented researchers who I have befriended in the wider geography community and further afield over the last seven years too. My gratitude extends to my wonderful colleagues in the Geography Department at the University of Southampton who I have had the pleasure to work alongside over the last three and a half years. The support of my friends outside of academia has been fundamental to this book. I would also like to thank my family and Sophie Hainsworth for their love and support. Lastly, I would like to record my appreciation for the many personnel in the Fire and Rescue Service without whose participation this book would have been impossible.

Contents

Abbreviations

AFS	Auxiliary Fire Service
COMAH	Control of Major Accidents and Hazards
EFEE	Edinburgh Fire Engine Establishment
FDNY	Fire Department of New York
FRS	Fire and Rescue Services
FSEC	Fire Service Emergency Cover Toolkit
HFSC	Home Fire Safety Check
IRS	Incident Recording System
LFB	London Fire Brigade
LFEE	London Fire Engine Establishment
SOP	Standard Operating Procedure
SSRI	Site Specific Risk Assessment

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Introduction

1.1 Introduction

February 2012. I'm in the passenger seat of a large SUV. In the driver's seat is Mike, a firefighter for the Fire Department New York (FDNY) for over 25 years and chauffeur for one of the Department's chief officers. He's driving me back to my hotel in Manhattan from a meeting at the FDNY's headquarters in Brooklyn. Lasting for three hours my meeting had centred on the forms of data and methods of analysis the FDNY harnesses and deploys to make sense of fire emergencies as risks of the future and the various strategies that, in turn, are used to intervene before these risks have a chance to occur in the present. Mike and I have been shooting the breeze since I got in the car, him asking me how my meeting with the Chief went, me asking him what it's like to work for the Chief and discussing what kinds of knowledge a firefighter needs, an issue which troubled Mike, because of what he saw as new guys in the Department lacking the necessary 'street smarts' to secure the city from fires. Amidst the mid-day flowing traffic of the Brooklyn Bridge, Mike peers to the left, beyond my seat, onto the space where the twin towers once stood to the emerging scaffold of what would become One World Trade Center and says, almost to himself, 'I was there that day'. 9/11 hadn't been on my

N. O'Grady, *Governing Future Emergencies*,
https://doi.org/10.1007/978-3-319-71991-7_1

discussion itinerary for that day but out of courtesy, and knowing the drive would take some time yet, I replied 'oh yeah?'

'Yeah I was on my vacation when I saw what was happening on the news, the Chief called me up and we went over in the car… it was horrible… we lost a lot of good people that day… we still can't hire because people's families, their wives are too scared about what might happen'. I'd been apprehensive about discussing 'that day'. It had haunted my time in preparation for and during the trip. In the weeks before I'd re-read the Commission report into 9/11 (2004) and watched too many Youtube clips of 911 calls made by those in the tower as masses of smoke billowed above them. I'd even been to the yet incomplete memorial ground (and incomprehensible souvenir shop) the day before my visit to the FDNY headquarters. With all this weighing on my mind I mumbled my preference not to talk about 9/11 further. We're exiting the Bridge now and, caught between my discomfort and a desire to continue the conversation, Mike attempts to lighten the situation, changing the topic somewhat: 'You wouldn't believe the kinds of fire dangers coming from these buildings' nodding towards the myriad labyrinth of high-rise buildings in Chinatown. 'We don't even know what the buildings are because all the signs are in Chinese!' he laughs, then continues 'and anytime we ask them they don't speak English!'

My meetings with his supervisors had been fruitful, but the conversation I had with Mike himself was in some ways just as important. Although in completely different ways, they had both revolved around the same thing. Mike lamented a past global catastrophe that happened on his watch and how traces of its trauma shape what is, and what is to come, for cultures of emergency response. He also joked about the potentially serious events that might or might not prevail in the areas of his patrol. His seniors, on the other hand, had explained in depth the technologies, strategies and institutional arrangements that underpin the Department's attention towards the ever-imminent risk of fire emergencies that form a constant spectre over New York. What both situations reveal is how, in what still can be called a post-9/11 security context, fire governance and indeed emergency response in general are more oriented than ever before towards the future and take steps to govern this future before it unfolds in the present. Fire emergencies that disrupt cities across

the world have, in many places at least, become an object of anticipatory governance in other words. The term anticipatory governance will be loaded with more significance the further the book goes. For the meanwhile, anticipatory governance might be taken to refer to an organisational ethos and set of practices in which the same legislative, political and strategic emphasis is bestowed on attending emergencies in real time as is placed on intervening based on an emergency's perceived potentiality and futurity.

A brief glance at relevant academic literature suggests that, in organisationally and strategically tuning itself to enact anticipatory forms of governance, fire governance has become rationalised and activated in a similar way to other forms of security. As Claudia Aradau and Rens Van Munster (2011) argue, for instance, attempts to attend future catastrophes, from terrorist attacks to climate change, have significantly stretched the imaginative capacities of governments whilst simultaneously allowing for ever more speculative renditions of the future to influence the modes of action used to intervene on emergencies in the present. These imaginaries of future catastrophe find points of normalisation in various security techniques and technologies. They incubate at the border between nation states (Amoore 2006; Leese 2014) and where people and things are in transit (Bellanova 2017; Cowen 2014; Salter 2013). Flows and connections found in the material world of cyber-space are increasingly thought of as taking up a larger proportion of concern around future emergency issues (Simon and de Goede 2015; Dunn Cavlety 2013). At the same time, a range of other events known in the UK under the nomenclature of 'civil contingencies' are all in part governed in anticipation of their occurrence through forms of preparedness, resilience, prevention and protection for instance (Adey and Anderson 2011, 2012; Chandler 2014; Cooper 2006; Coaffee 2013; Evans and Reid 2014; Grove 2014).

Acting in anticipation of the event itself, the operation of fire governance is increasingly shaped, facilitated and indeed legitimated through risk. Perhaps, in an unsatisfactory way, risk might be summarised as a means by which to express the probability that an event or set of events might come to unfold based on analysis of a presently perceived state of affairs that has been adjudged to build up through time. One place where

this incarnation of risk was exemplified in its enactment was in the meeting I had with FDNY Chiefs in Brooklyn. Here, we discussed software and data sharing arrangements amongst New York's municipal authorities and how they differed from the UK's, the forms of calculation used to make sense of fire's future and the resources that could be deployed in advance of the event of fire itself. In these conversations, the risk of fire was understood as something that could be identified by capturing trends emanating from its occurrence over time. Risk was acted out in various exercises that imagined different kinds of fire scenarios that analysis revealed could blight the future. Calculations concerning the risk of fire could be represented in maps, charts and graphs whilst simultaneously being articulated by its variance in relation to different 'types' of people divided from one another according to demographic categories of wealth, residence, ethnicity and so forth.

But the role of risk in the organisational parameters of fire governance was also present in my chat with Mike as we made our way back to Manhattan. What my conversation with Mike attested to was how, as something that has come forth to organise emergency response and security governance, risk cannot be confined simply to its appearance as a calculative mechanism that tells of the probability of future events, appearing through black-boxed processes enclosed in software and projected in translated form onto a computer screen. Mike showed instead how risk is something that in some way is embedded in, emerges from and affects the daily lives of those that govern and those that they govern. From Mike's perspective, Chinatown is of course risky due to its location in Manhattan, one of the most densely populated places in the world, and the myriad uncertainties concerning the kinds of business taking place there. But the risk of the place also told of his previous encounters with the area's residents, many of whom he does not share a common language with. In the first place, furthermore, his risk assessment was made not only to evaluate potential dangers but to allay a potentially awkward situation that was developing with me.

Literature has pointed to this before to argue that risk should be conceptualised as a social construction (Amoore and de Goede 2008; Lupton 1999). Rather than reflecting a future that may or may not come to unfold, risk here refers to a set of knowledges concerning the vulnerability

of the world, knowledges that are situated within and generated through relations that proliferate between people in their daily lives. Research has purported to this notion in various ways, from showing how the rhythms of risk's absence and its presence shape mining communities in North-East England (Bickerstaff and Simmons 2009) to how its prevalence is always conditioned by mass media and spatial proximity (November 2008). The way risk arises to make sense of the future is shaped, furthermore, by wider political and technological circumstances in which it is deployed. As Louise Amoore argues in her book, *The Politics of Possibility* (2013), the risk calculus of our times has shifted in its focus from one operating purely on the basis of seeking to render the most probable futures to one that desires to grasp, and in turn govern, what is merely possible. In contrast to probability, articulating future possibilities is premised less on intimate connections to the past and relies instead on speculating and imagining the novel disruptions that might come. This epistemological shift in the parameters of what is included in risk calculations has been facilitated by the development of ever more sophisticated calculative devices that gain credence when governments recognise that the future to be secured is something that possesses uncertainty in ways never experienced before.

As a social construction, the effects that risk has in the world might best be described as performative. In its iteration here, performativity initially refers to how knowledge concerning realities of the future does not simply shape the action we take towards the future. Nor are potential future realities reflected seamlessly in the statements we make about the future or the decisions we execute to attend to the future. Instead, performativity hones our locus of attention onto everyday lives and the practices that constitute it. In particular how, through daily life, we actively shape the contours of knowledge concerning the future overall and, in so doing, influence how the reality of the future might appear and how it might not. A performative approach, however, not only allows us to understand properly the set of practices that bring risk and the future into being. It gives these practices, as conduits for the generation of risk knowledge, a particular dynamic of being ever in a cycle of becoming. In *Difference and Repetition* (1994), Gilles Deleuze accounts for this notion of becoming when engaging with Nietzsche's advancement of the concept

of eternal return. For Deleuze, 'Return is being, but only the being of becoming. The eternal return does not bring back the same, but returning constitutes the only Same of that which it becomes. Returning is the becoming identical of becoming itself' (51, 1994). In relation to risk, becoming allows for a conceptual emphasis on how the knowledge that we generate and that we enact to intervene upon the world is never finalised. Risk might be described as made and remade through the daily life found in the sometimes banal, sometimes provincial, localities of power.

The approach taken in this book, where risk is considered a social construction that is performative both as a force constitutive of futures but undergoing continuous re-making, allows for serious attention to how those involved in fire governance open themselves up to being able to attend to the future. It allows the book to afford attention to the way in which risk emanates from and is governed through the daily lives of governing authorities. But if literature on risk has proliferated for quite some time and we already understand it in performative terms, what is left to say? Why, to put it more bluntly, do we need yet another book on risk and risk governance?

Three responses attend to these questions. All of these responses capture risk as a rendition of what Brian Massumi calls a 'lived relation' (2011, 42). For Massumi, a lived relation begins from the premise that objects bear specific qualities afforded to them by abstracted forms of knowledge. But these abstracted notions concerning the 'qualities' of objects only exist in potential and are fulfilled, made real and consolidated at the point that we relate to them as such through daily life. Massumi discusses the weight and volume of objects to exemplify what he refers to as lived relations, stating that: 'The reason we're directly seeing an object and not just a surface is because we can't not see what we're seeing without also experiencing volumeness and weightiness- the object's invisible qualities' (ibid.). In relation to risk, yes, it bears the qualities of a set of technologies and mechanisms assembled to gauge future probabilities and possibilities. Yes, these qualities appear too in a socially constructed fashion, being made visible and invisible with varying degrees of force according to relative conditions of everyday life. At the same time, however, risk also needs to be understood as something brought to life on ongoing experiential registers. In particular, how the liveliness of risk is

orchestrated by the relations that it affects with human and non-human things alike.

To come to the first response concerning why another book about risk is needed, understanding risk under the light of a lived relation allows us to get to grips with the temporal dimensions of risk with more clarity. If risk emanates from everyday affairs, it does not simply belong to the temporal domain of the future. Nor is it just something simply projected onto the future according to present circumstances. As something that becomes operable in governing techniques, risk instead relies on relations configured between past-present-future in a variety of different ways. Mike's memory of 9/11 fed directly into how, in the present moment, he makes sense of the risk of emergency in the future. His past experience of trying to make sense of signs and interacting with residents of Chinatown told him of the difficulties of understanding the dangers lurking in the buildings. These connections between the past and future are brought to life in the present moment as we make our way across the Brooklyn Bridge, a moment in itself charged with and mediated by the murmurings of awkwardness that existed between Mike and I.

As the enfolding of different temporal domains, risk might be said to operate with a sense of what Henri Bergson referred to as duration. For Bergson our experience of time is one that calls for a new set of temporal metrics altogether. Considered both an experience that is intensive and one that can be extensive, the metrics required should not capture how time might be separated and categorised into discrete temporal domains of past-present-future but should emphasise the mutual weaving of one temporality into another. So rather than appearing as a categorical designation of some future event, risk embodies the collapsing of past-present-future into one another in the lived experience of duration. As I show in this book, this sense of duration is mobilised and remade across an array of registers in the daily life of the Fire and Rescue Services (FRS). This might be how analysts are forced to use their imagination and memory to speculate on and adjudge renditions of fire risk generated at the interface with a catalogue of analytic software. Equally, it might mean infusing within projections of a population's vulnerability to risk past case histories of fire fatalities. Furthermore, it might mean how lines of continuity and discontinuity might be drawn between calculative mechanisms used

to make sense of the future a hundred years ago and those used in the here and now.

But, and to come to the second response to the question, the envelopment of and configuration between temporally discrete domains which underpin duration also have a material base for Bergson. For Deleuze (1991), Bergson's characterisation of intensive experience speaks of the entanglement of cognitive and sense-making processes with the material world. In being lived through the enmeshing of temporal realms risk also allows us to inquire into the relations between materialities, whether human or non-human, that underpin its generation as a form of knowledge able to enact modes of governance on events yet to unfold. Although certainly a performative and social construction, taking cue from Deleuze's colouring of Bergson, means risk needs decentring from human affairs. For all the discussion of the importance of digital software to risk governance now, such technologies most of the time appear as executioners of human whim. As recent literature attests, however, the conceptualisation of the non-human agencies in computational process is emerging (Ash 2015; Kitchin and Dodge 2011; Starosielski 2015; Thrift 2006). Furthering Karen Barad's work on what she calls post-human performativity (2003), the different material components of the digital world can be comprehended and characterised as agential forces upon whose capacity rests the ability to make sense of, visualise and govern future emergencies. Risk is thus a product of the relations held both between these non-human agents and how these agents extend to relate to the humans that, as shown in more depth later, interface with them.

1.2 Risk and Reproblematisation

New conceptualisations of risk like the one offered in this book require attention to and examination of wholly new empirical cases. And, as a third response to our question, the book delivers such a case by focusing on risk as a lived relation in the context of the governance of fire risk, predominantly in Britain. At the turn of the twenty-first century, government criticism of fire brigades in the UK was rife and widespread. Fire governance was in the throes of what Michel Foucault would refer to as a

process of problematisation (1984). The organisational structuring and operation of fire governance at this time was critically appraised and, ultimately, found wanting. The 2003 white paper *Our Fire and Rescue Service* summarised accurately the general evaluation of fire governance, stating that the 'statutory basis of the fire and rescue service is outdated, having been framed soon after the Second World War' (2003, 14).

Following a Foucaultian approach, we might seek to identify different factors that underpin this problematisation of fire governance. Of pivotal significance here would be the perceived magnitude of changes to the security landscape and threat horizon that fire governance would have to play a part in confronting in the twenty-first century. In light of the advent of 9/11, FRS reform was needed to ensure their robust contribution to 'tackling new threats we are now facing, including terrorism, and threats such as flooding and other environment factors' (ibid.). This new set of threats that emergency response would have to contend with brought conventions of fire governance *en masse* into question. But processes of problematisation, to return to Foucault, never revolve merely around the identification of shortcomings in practices of governance. As a means to appraise the operations of agents of a wider security apparatus, problematisation enacts what Antonio Negri (2013) would refer to as power mobilised as *potentia*. Problematisation is a positive and productive power-laden process that seeks to imbue its object of consideration with new force and purpose. Rather than shutting practices down, problematisation reproduces such practices anew. Thus, in 2004, the *Fire and Rescue Services Act* (2004) was enshrined into British law. For the purposes of this book, the first point to make about this act is that the reforms to fire governance it instantiated were to be coordinated by an overall epistemological shift in how fire was to be captured, comprehended and conceptualised. Up to this point, those conducting fire governance had emphasised understanding fire, at least primarily, as an emergency to be responded to as and when it happened. The potential of fire to occur has been captured for some time, as will become apparent in a later chapter. But the priority of brigades had been ensuring in different ways their capabilities to attend to fire emergencies in their spontaneous and real-time unfolding. After the act of 2004, the risk of fire was to be afforded the same emphasis in terms of governance as had been afforded the

spontaneous occurrence of fire emergencies. Along with incorporating the ever important need to respond to fires in their immediate combustion, the FRS would have to conduct itself by 'making an informed assessment of the risks in the area and the best way to manage them' (2003, 26). What was to be changed was the whole way in which fire brigades, known after the act as FRS, were to make sense of and rationalise their operation. Central to this new rationalisation of fire governance was an understanding of fire as a risk.

The emergence and embedding of risk as a central force in the FRS' rationalisation of its operation signify the UK's version of the aforementioned acclimatisation of fire governance to new anticipatory forms of governance found across the security apparatus in the aftermath of 9/11. In the context of the UK, this turn to anticipation is most obvious in the rolling out of a set of nuanced and discrete strategies deployed to govern fire in advance of its occurrence. As will be elaborated on throughout the course of the book, these strategies go by different names and attend to fire risk in different ways. The FRS seek to develop the capability to prepare for fire emergencies. At the same time, they also take proactive steps to prevent fire from happening in the first place. The FRS have also created new arrangements to protect the built environment from fire risk. As shown in more depth momentarily, however, this shift in epistemologies concerning fire governance and how it has ushered in new forms of action both necessitates, and is made possible by, a range of digital technologies. These technologies primarily serve to identify fire as a risk to which strategies of governance can be directed and organised around. But the projections regarding fire risk that they make are only a small, admittedly significant, aspect of the life of such technologies in the FRS. Furrowing deeper, the multitude of complex processes such technologies instigate and get enrolled in become observable, from sourcing data and calculation, to numerous modes of interface with human analysts, integration of discrete data sets and monitoring. Paving the way for digital technologies to shape and mould the enactment of new anticipatory strategies, it is by investigating such routines that risk as a lived relation can be thoroughly explored. Paying attention to the daily life prevailing in the FRS reveals, however, that risk does not simply and unproblematically make possible new forms of governance that are enacted without qualm. Instead the

instantiation of risk within the practices and routines that make up everyday life compels new lines of contestation, uncertainty and grey areas for the FRS politically, culturally and ethically.

1.3 Methods and the Digital Infrastructure

How, then, should the everyday life of risk governance be captured in research? What methods to use? What conceptual ideas underpin the approach taken to investigation the making of risk and the facilitation of risk governance practices in the FRS? What the book predominantly focuses on empirically is the digital infrastructure which operates to make projections on fire risk and in turn shape and legitimise decisions made to intervene on fire emergencies before they happen. This infrastructure is composed of a set of agents and entities that are materially heterogeneous. It is composed of data, fibre-optic cables, software and hardware. But at the same time, it encapsulates the human bodies that relate to these technologies too. As intimated towards above, the digital infrastructure is not just a set of entities either. Instead, it refers to the everyday processes within which these things are enwrapped and have a part themselves in instigating. Running parallel and simultaneously to one another, these processes work to make possible the generation of risk knowledge. Encompassing both entities and processes, the digital infrastructure is characterised by particular types of movement too. Although it attains some kind of meta-stability, different components within the infrastructure are continually on the move in a variety of ways. Data are exported from one place to another, software that was used for one thing gets redeployed for another purpose. At the same time both paper-based and electronic reports move up and down the hierarchical scales that reflect the organisational structuring of the FRS itself. Bodies move through exercise sites and, in doing so, make the future that they need to prepare for. What movement suggests is that fundamental to the digital infrastructure and the function with which it is bestowed are the relations configured between its parts. These relations are performed in a way that shows the entanglement of different agential forces in producing risk statements.

The main difficulty in researching this infrastructure was capturing how it operates through a form of what John Law, in relation to the assembly of aircrafts, calls 'fractional coherence' (2002, 2). Law's point with the term fractional coherence is to express how technical objects need to be conceptualised as serving and oriented towards a specific purpose whilst simultaneously relying on an abundance of other parallel and co-existent processes. In other words, how the singular act of a technology's function at any point can be understood as situated within the multiplicity of processes and other functions that underpin it. In relation to the digital infrastructure present in the FRS, fractional coherence might be used to understand how risk projections are generated. On their own, risk projections refer to calculations made concerning the potential for fires in the future. But behind these projections, behind the enactment of this function of the digital infrastructure, are an abundance of processes that make it possible. These processes might refer to the specific calculative logics which underpin risk projections (Aradau and Blanke 2015; Amoore 2013; Collier and Lakoff 2008; de Goede 2012) or the processes of circulation that characterise the movement and integration of data. Similarly, through risk projections can be gauged the relations between human and non-human agencies that are mobilised where security takes an anticipatory turn (O'Grady 2017). Framed through fractional coherence, rather than being considered secondary in any way to the projections themselves, these processes are treated as vital to understanding the wider stakes of risk governance and the deployment of the digital in enacting security and emergency response.

Capturing this fractional coherence as it unfolded in the everyday life of risk governance in the FRS, the research was based initially on ethnographic observations that took place at an FRS headquarters in the North-East of England. Lasting six months overall, the ethnography involved shadowing different FRS personnel as they went about their daily business. The aspects of their daily business I sought to capture were the moments of encounter between staff and the various digital technologies used to express and imagine fire emergencies of the future. I prompted personnel to narrate and articulate their encounter with these technologies. The research participants were asked technical questions about these encounters. What, for instance, were the different algorithmic processes

through which software harnesses different strands of data? Where and how were the data sourced? What software were connected to one another? These technical questions might be said to turn strategic when shadowing other personnel. Here participants would elaborate on what kinds of risk knowledge were drawn upon to shape, and justify the enactment of, specific types of anticipatory intervention on fire emergencies. These narrations, whether judged technical or strategic, were often evaluative too. Some evaluations might revolve around whether the technologies function properly or whether they helped or hindered the tasks of risk governance. But evaluative commentaries frequently exceeded the pragmatic too. Embedded in their narration were statements that revealed much about how firefighters thought of the risk landscape that these technologies had been brought in to understand better. Firefighter commentaries also turned to reflect upon the affect that the digital was having on the FRS and firefighting more generally. They also afforded some insight into the way in which populations secured through the meeting of risk governance practices and digital technologies were understood. These elements of narration allowed me to understand the functioning of the FRS' digital infrastructure from different viewpoints, all of which feed into important issues at the heart of tracing risk as a lived relation punctuating the FRS' day-to-day existence. Its technical and strategic functioning shows how the digital infrastructure goes about the task of making sense of fire as a risk of the future. Although appearing initially technical, to go beyond the veneer of such processes is to begin to understand how risk governance is made and remade through the performance of relations between materially heterogeneous actors. Similarly, the evaluative narrations that personnel afford open the digital infrastructure up to query in terms of wider political and ethical issues at stake.

1.4 Chapter Outline

The book proceeds in six subsequent chapters. In each chapter, risk appears as a lived relation that permeates and prevails everyday life in the FRS as it goes about governing fire. The book shows how what we know as 'risk' and how it is used in the exercise of governance is grounded in

relations coordinated and orchestrated on different material-affective registers between an array of human and non-human actors and processes. Conceived as a lived relation, risk is made and remade whilst also turning to weigh in and shape daily life of those governing it. At the same time of course, risk opens up the possibility of new forms of governance to take flight and intervene in the present world.

In *Genealogies of governing the future: The emergence of fire governance in the United Kingdom*, the book situates fire governance in its development through time. The locus of attention here in empirical terms is the case of the knowledges and practices through which authorities have articulated and governed fire at important points. Much of this chapter focuses specifically on the development of firefighting in London. The accumulation of months sifting through records in the shape of scraps of paper, pamphlets, advertisements, local government reports and parliamentary acts, some of which dating back to the Great Fire of London in 1666, the chapter documents the different sources of information and calculative mechanisms drawn upon and crafted by the variety of organisations, corporations and public bodies that, at one time or another, have been responsible for fire governance. In so doing, it unveils the different ways in which fire has appeared as an object of governance, both as an event whose past occurrence was to be reflected on and as a potential state of affairs in a not so distant future. The chapter is, however, shaped much more by Foucault's methodological description of genealogical method than historical methods seeking a chronological retelling of times past (1991). As a consequence, it focuses on how the rendition of fire emergencies through calculative techniques is embedded within the wider set of permutations which characterise the distribution of power between an array of disparate institutions at particular moments. At the same time as revealing the often inchoate and far from linear development of risk as a corpus of knowledge and governmental technique that firefighting organisations have incorporated, the chapter shows how risk and the modes of governance it opens up are shaped and made possible in line with the broader arrangement of fire governance across different institutions and the different interests within those institutions.

If in Chap. 2 the book seeks to account for distinctive moments in the past, Chap. 3 hones in on localised and confined practices that underpin

the FRS' attempts to make sense of fire risk in the here and now. In Chap. 3, the book examines the modes of interface that characterise risk analysis processes. Following the work of scholars like James Ash (2015), Brandon Hookway (2014) and Alexander Galloway (2012), I show here how interface might be conceptualised beyond merely accounting for screen-mediated modes of interactivity between humans and computers. Instead, interfaces can be used to delve into intricate processes found deep within digital infrastructures in organisations and to show how such processes actively shape the modes of relation performed between computer, screen and human analyst. I argue that such relations exist across different material and affective registers. They are crafted, furthermore, towards actualising particular governmental ends. In showing how interfaces operate and for what purposes, the chapter argues that the relations that prevail between human and computers are themselves enacted as devices that are crucial for governing the future.

Considering the focus on relations and how interfaces operate as security devices in and of themselves, the book moves in its fourth chapter to engage the question of the forms of knowledge that feature in risk governance. Encountering a future premised less on its probability and more on its possibility for producing a new state of contingent affairs, Louise Amoore has shown how aesthetics takes an increasing role in evaluations concerning the valency of future calculations and the material devices that underpin them (2013). Taking lead somewhat from Amoore's work, the chapter examines staged exercises in which future emergencies are simulated in various ways to test, train and develop the skills of firefighters. The chapter shows how aesthetics is important to imagining future emergencies with no precedent in the past. My emphasis is placed on how aesthetics is mobilised through decentred relational processes that are performed. I show here how computer-based visualisations of future emergencies projected onto material spaces are brought together by moving, feeling human bodies to allow future possible emergencies to be experienced, and to some extent governed, in the present. Along with being fathomed according to its relation to algorithmic processes, aesthetics enters the security imagination through practices that are performative and which stitch technological objects together, from the computer image, to the many props which exist in the exercise site and

the sensorial maelstrom of emergency responder bodies in the midst of being trained.

In some ways, the exercises assessed in Chap. 4 raise important questions concerning the co-production of risk knowledge between firefighters themselves and the material surroundings in which they live out their daily life. The coalescence and entanglement of what traditionally have been considered the separate entities of subjects and objects of governance are more clearly reappraised, however, in Chap. 5. In this chapter, the book turns to consider how the FRS craft and assemble profiles of those members of the population considered most vulnerable to fire risk. Such profiles are established by interweaving predictive lifestyle analysis with information from fire fatality investigations. But another form of enmeshing is enacted here in which subjects of fire risk governance are demonstrated to be emergent in a way contingent upon the articulation of fire as an object itself. This process by which the object-subject of governance rises to the surface is one that speaks also to the way that the anticipatory strategy of fire prevention is ingratiated as an everyday mode of intervention enacted by the FRS. Furthermore, the chapter also documents how commercially available software is appropriated and deployed for new purposes.

As Chap. 5 shows, risk, along with the technologies and practices through which it is brought to life, can be usefully characterised as immersed in processes of what others have called detournement and reapplication. The theme of reapplication is returned to in the penultimate chapter. Taking my lead from and contributing to debates already well established (Anderson 2010; Grove 2012; Massumi 2007; Brassett and Vaughan-Williams 2015) the locus of attention in this chapter are the strategies by which risk-based anticipatory forms of emergency governance are enacted. A variety of such strategies will appear throughout the book in less explicit ways. Here, two strategies are engaged with specifically: preparedness and protection. Taking examples that range from life in the FDNY control room to aspects of the built environment that we navigate everyday, the chapter shows how each strategy is underpinned by a temporally punctuated relation to the future it is designed to attend to. In addition it shows how such a temporal relation is enacted and actualised through relations affectively and materially inscribed

between the range of actors involved in their deployment. The distribution of authority that these strategies embody, furthermore, tells more about the reapplication of risk governance across different types of institutions and towards specific objects. The book shows here how tracing lines of reapplication throws up an array of political complications that run across an organisation's capacity to govern the future.

In the final chapter a number of trajectories are pursued to conclude the book. It first returns to the central conceptualisation of risk as a lived relation. In respect to the foundations laid in this introduction, the concept of a lived relation is expanded on in the conclusion through inquiry into the different forms of relation to risk that prevail across daily life in the FRS. The conclusion outlines too the range of agential forces through which risk becomes mobilised in the FRS. As suggested above, risk governance has been able to take hold in the FRS owing to the gradual composition of a digital infrastructure in the FRS. The conclusion attends to this digital infrastructure by clarifying how the book opens up for a critical reappraisal of the forms of knowledge found to organise risk projections. I focus attention here on how the complex entanglements that make up everyday life in the FRS make possible a reconceptualisation of data as a notion for thinking the capture and articulation of reality. The conclusion turns next to address how the book allows for a reading of risk by what might be called its temporal referents. That is, how risk as a construction of situated knowledge creation practices is composed through nuanced temporal configurations. Relating back to claims made at different points throughout the book, the question of the politics that underlies lived relations to risk is explored in a number of ways throughout the conclusion. In its last section, the book points to how perturbations in the wider context in which risk governance and security are situated might provoke some rethinking regarding risk's conceptual efficacy in a world increasingly animated by contingency.

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2

Genealogies of the Future: The Emergence of Fire Governance in the UK

2.1 Introduction

What follows is less a recounting of the history of fire governance *per se* and more what Michel Foucault would refer to as a genealogy. Initially genealogy might be distinguished by its stylistic approach, as a matter concerning how the recanting of times past should be ordered and narrated. Genealogy does away with seeking to establish clear, linear lines of continuance from one point in time to the next. For Foucault, striving towards the construction of such tidy and sequenced renditions of history is to advocate an approach that assumes that 'words have kept their meaning, that desires still pointed in a single direction, and that ideas retained their logic' (1991, 76) through time. From such a remark it can be inferred that the importance of genealogy moves beyond mere stylistic issues to have ramifications as an alternative means for writing and thinking about the past. Genealogical investigation seeks explicitly to avoid the teleological implications that appear wherever history is ordered chronologically. Creating such chains in the world's becoming runs the risk of assuming that time is inexorably oriented towards the fulfilment of a

N. O'Grady, *Governing Future Emergencies*,
https://doi.org/10.1007/978-3-319-71991-7_2

particular finality or structured according to some original and all-pervasive law or truth established a long time ago. One might consider Foucault's critique of these types of historical retellings and the consequent need for another way to write history, as directed towards the Marxist accounts of his day.[1] But this linear approach to history, which fixes the fate of historical development upon a supposedly universal force or law also has more recent iterations too. One might think, for instance, of Donald Trump's election campaign or the campaign for Britain to leave the EU as underpinned by such teleological motivations. Trump's so-called pursuit of 'making America great again' and the Leave campaign's promotion of taking back control rest on the imaginary that at some point in time the two respective nation states concerned veered away from a pre-existing track towards a desired end point. On this basis, a change needs to occur that will realign a country's trajectory with what Donald Trump in his acceptance speech called its 'destiny' (2018).

Rejecting such 'ideal significations and indefinite teleologies' (1991, 77) that filter into our understanding of history, the practical task of genealogy is based on two initial premises. Firstly, rather than searching and, in turn, producing a story of the past characterised by linear development, genealogy emphasises how the past must be perceived as overcast with contingency, rupture and discontinuity. 'Genealogy' (1991, 81) as Foucault elaborates, 'does not pretend to go back in time to restore an unbroken continuity that operates beyond the dispersion of forgotten things… Genealogy does not resemble the evolution of a species and does map the destiny of a people' (ibid.). Instead, genealogy sets out to identify 'the accidents, the minute deviations—or conversely, the complete reversals—the errors, the false appraisals, and the faulty calculations' (ibid.) that played their part in the unfolding from past to present. To characterise the development of things past by their contingent nature, secondly, requires us to undertake research from a different position than endorsed in linear historical accounts. Taking his lead from Nietszche's conception of monumental history (2013), Foucault argues that some forms of historical recounting look to load significance on to specific events whose occurrence can be rendered to resonate with

[1] Foucault's relationship to Marx and Marxist thought in France is well documented in a number of texts. See, for example, Elden (2016) and Bidet (2016).

and reveal the force of a higher truth or origin. In contrast, genealogy focuses on aspects of life in moments of time that might evade these approaches. Genealogy takes note of how the past is reflected 'in sentiments, love, conscience, instincts, 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 were engaged in different roles' (1991, 76). Where this focus is practically applied in parts of Foucault's *oeuvre*, it is evident that these small aspects of time's past are enveloped in, enact and work to symbolise wider power relations they are circumstantial to. For instance, in the third volume of *History of Sexuality* (1988), Foucault traces the development in Ancient Rome of practices and moral reflection around the self as an entity withdrawn to some extent from political life. For Foucault, the emergence of new modes of subjectivity which emerge here needs to be articulated in relation to the much broader decline and reformation of city states in a developing moment of Roman imperialism. Additionally important here is that practices which arise under specific power relations are rationalised and legitimated through the adoption and deployment of particular regimes of knowledge. In the preface to the second volume of *History of Sexuality*, Foucault writes that his intention in the series was to think sexuality overall as a 'complex experience…constituted from and around certain forms of behaviour: an experience that conjoins forms of knowledge (connaisance) (with its own concepts, theories, diverse disciplines), a collection of rules (which differentiate the permissible from the forbidden, natural from the monstrous, normal from pathological, normal from what is not…) and a mode of relation between the individual and himself (which enables him to recognise himself as a sexual subject amid others)' (1994, 200). What can be read from the emergence of particular practices in a specific 'period' of time is not just the broader dynamism of variant power relations which induce them. Instead, genealogy stresses the need for focus on the forms of knowledge that are inseparable from these power relations.

Whilst Foucault's genealogy opens up to investigation the power relations and associated regimes of knowledge in which fire governance is situated and practiced, the case of the development of fire governance through time compels an expansion into other conceptual fields. Over recent years, literature has shown a sensitivity to the importance of non-human objects

in having an efficacious role in determining how they feature in affairs that have been conceived up to a point as exclusively human. Indeed, work has begun to explore the agency of the non-human particularly in relation to material forces that might be described as elemental (Adey 2015; Amoore 2016; Edwards 2010; McCormack 2016; Parikka 2015). For object-oriented philosophers such as Levi Bryant (2013), attempts need to be made 'to think an object "for-*itself*" that isn't an object for the gaze of the subject, representation or a cultural discourse' (2013, 19). Delving into different points in time, there can be no doubt that fire itself, as an elemental-material entity constitutive of emergencies, plays an important role in shaping its own governance and, thus, of the genealogies that emerge concerning fire governance more broadly.

2.2 The Great Fire of London

Standing 61 metres high and completed in 1677, the monument found on the north side of London Bridge today was erected to memorialise an event that is perhaps unsurpassable in terms of the damaging, but also indeed restorative, effects it had on the city: the Great Fire of 1666. This event also led to the development and consolidation of organised fire governance in Britain. On Sunday the 2nd of September 1666, the fire ignited in a bakery on Pudding Mill Lane. But, and as witnessed throughout the chapter, fire's material agency in such events is not always primarily manifest in its combustion (Clark and Yusoff 2014). In many ways the fire's initial striking to life plays second fiddle to the mobility of the fire and how the fire's movement creates a space that relies upon the connections it subjects different material entities to (Law and Mol 2001). Accounting for its cause and spread, a circulatory description of the fire was offered in *Short Narratives of the Late Fire in London* (1986) by Edward Waterhouse, for whom the fire 'forwarded by a Bakers stock of wood in the house, and by all the neighbouring houses, which were as so many matches to kindle and carry it on to its havock' (1986, 3). According to Waterhouse, the fire was proliferated by 'other combustibles, and with the houses opposite to it, and closed with it at the top, burned three ways at once' (ibid.). Understanding the fire as an event underpinned by connections between

multiple material forces is evident in the findings of King Charles II's committee investigating the Great Fire. Despite claims of a Catholic-led conspiracy (Dolan 2001), the only conclusion the committee could actually reach was that 'after many careful examinations … nothing hath been found to argue the fire in London to have been caused by other than the Hand of God, a great wind and a very dry season' (2001, 323; 1667).

This reading of the fire by its mobility and circulation was accompanied by an emergent obsession across different areas of British public life with lists. As Wall documents, the Great Fire

> coincided with and perhaps contributed to a cultural fascination for lists: newspapers tabulated victories at sea… topologies and maps increasingly listed as well as depicted streets: The Royal Society was busy identifying and labelling the phenomena of both microcosm and macrocosm. (1986, 26)

Lists were generated to demonstrate the damage to buildings, loss of human life and the spatial extent of the Great Fire. The Ordinance Office, which charted the spread of population in London, estimated that 'the fire had laid waste to about 436 acres, 400 streets, 89 parish churches and 13,200 houses' (2001, 382) although the fire 'does not seem to have caused many deaths' (ibid.). A map produced by Wenceslaus Hollar shows the extent of the fire (see Fig. 2.1).[2] Overall, the fire itself lasted for three days, decimating around four fifths of London (Dolan 2001; Wall 1986) having 'left some 100,000 people homeless' (Blackstone 1957, 37), around a quarter of the whole city's population.

Along with presenting itself through a mobility that creates new topological expressions of space, fire's agency was evident in this case in terms

[2]Apparent in the aftermath of the Great Fire was an early intimation towards the hold information in the form of spatial knowledge and lists would have in knowing and understanding populations. Such knowledge was pivotal to describing the changes afoot in London. At the time of the fire London was becoming an 'industrial rather than pre-industrial city' (Wall 1986, 5). This historical shift was symbolized for Wall in Charles II's 'encouraging new forms of arts and sciences, trading power and (the fact that) … merchant's power was increasing' (ibid. my brackets). New companies such as the East India Company were being established along with the Bank of England at the end of the seventeenth century.

Fig. 2.1 Wenceslaus Hollar's map of the damage caused by the Great Fire of London 1666. Title of the map is an exact surveigh of the streets, lanes and churches within the ruins of the City of London

of the contradictory effects it has in its relationship to humans. In *The Psychoanalysis of Fire*, Gaston Bachelard goes so far as to suggest that fire is 'the ultimate living object' (1964, 7). In some ways fire is vital to human life. But because of this it also possesses the capacity to exceed human malleability and in turn render human life precarious. 'It is' for Bachelard 'gentleness and torture' (ibid.), it is 'cooking and the apocalypse' (ibid.). The 'destruction' (1964, 16) fire might cause cannot be dissociated from the 'renewal' (ibid.) that it both paves the way for and plays precursor to. The regenerative effect of the Great Fire is evident in a number of ways, so much so in fact that Christopher Wren initially planned for a phoenix to be built taking flight from the fire on top of the monument referred to at the start of the section (1852). In more concrete terms, the fire of course led to the rebuilding of London and the creation of much of the city that we now see. It also stopped entirely the great plague that had ravaged the city for some time, taking the lives of 70,000 of its inhabitants (ibid.).

The regenerative effects of the fire are evident too in relation to matters of fire governance. The fire was revelatory in many ways. In its early throws, no government reaction was forthcoming and insinuations were made against Mayor John Bludworth 'of not working hard enough to contain the fire' (Dolan 2001, 383). Only on Sunday night were initial interventions made. In lieu of an actual fire brigade, an informal London militia known as a Trainband were hired by the Mayor to enact a fire-fighting technique known as fire-breaking. Showing how fire itself shapes what forms of governance are possible, fire-breaking involved establishing a gap in the built environment in order to stop the spread of the fire. Using fire-hooks, the Trainband attached rope to the top of wooden houses about to be consumed by the flames and tore them down. With widespread condemnation of the government after the fire, *An Act for Preventing and Suppressing of Fires within the City of London and the Liberties thereof* (1668) was established in 1668. The city was divided into four geographic quarters and '800 leather buckets, 50 ladders… 24 pick-axes, 40 shod shovels' (Blackstone 1957, 47) were distributed. This equipment was put to use when alarms were raised by watchmen who surveyed each of the four quarters of the city. Revealing its orientation towards fire as a potential event, the Act states that the provisions made were a reaction to the 'Dreadful danger of fire in the future' (1668, 3). As Wright (2008) notes, however, the response of the King and the government to fire emergencies subsequent to 1666 was perceived by many London residents as inadequate because not enough resources were supplied for the number of fires which routinely occurred. At this point, firefighting broke away from being a minimal concern of the sovereign and became the responsibility of private companies. In so doing, a new agent of urban governance emerged: the insurance companies and the fire brigades they formed.

2.3 The Insurance Brigades

In the seventeenth century, insurance in general was in its infancy. At the time of the Great Fire 'there was no fire insurance' (Bell 1923, 17) at all. It was only 'After the Great Fire of London that the problem of security

for possible fire victims becomes accentuated' (Evans 1987, 89) and insurance arose as a solution. After the Great Fire, fire emergencies became problematised in a new way. One key factor in the problematisation of fire at this point was how fire was conceived in terms of temporality. Understood through emergent actuarial logics (Ewald 1991), fire was increasingly comprehended as an event of the future. Developing in tow with the growth of insurance, risk begins to appear as a calculative mechanism to make sense of fire. Additionally, fire's problematisation became increasingly mapped onto a particular arrangement of governance. Fire becomes understood as something that will be attended to and governed not by centralised authorities but in a way that is decentralised, diffused across disparate sites in society. Fire and its inevitable recurrence in the future came to fall under the purview of private insurance companies who themselves became agents of urban security. How fire and its governance was problematised was not simply a reaction to the Great Fire. Insuring fire was but one aspect in the broader rise to prominence of insurance at the time. As Evans notes insuring fire was refined alongside 'other forms of commercial enterprise and insurance contracts that took place' (1987, 88). Fire insurance was part of a wider set of techniques that arose specifically, as Luis Lobo-Guerrero (2011) holds, to protect, consolidate and advance liberal economic principles whose underpinning of many Western European societies was at a formative stage.

As London's buildings rose in a new incarnations out of the ashes of the Great Fire, petitions were being made to local government by different insurance companies to establish commercially available fire insurance premiums. Such companies would propose different kinds of hypothetical premiums in the hope that the City of London authorities would agree to their appropriateness. One such premium was that; 'For a premium of Twelve pence per £20 rental value an insured would have his house rebuilt in case of fire' (Evans 1987, 88). It was not until 1681, 15 years after the Great Fire, that local municipal authorities agreed the first fire insurance premiums. Between 1681 and 1684, 4000 houses were insured (Cockerell and Green 1994). These premiums were shaped and differentiated according to knowledge derived from past events, like the Great Fire, that told of the relationship between fire and other aspects of the built environment. For a wooden house, the premium 'was 5% of its

rental value' (Carlson 2005, 40) whilst the rate 'was 2% of the rental value for brick' (ibid.). The fixing of such premiums, however, 'was a matter of trial and error' (Evans 1987, 89). Although enacting rudimentary modes of probabilistic thought to develop premiums, insurance companies quickly discovered that their latest endeavour was proving less lucrative than first thought. In the 1680s, for example, although houses had been insured for aggregate 'premiums of £18,000…more than £7,000 had been paid out in claims' (1954, 47).

Combined with the sovereign failure to sufficiently provide adequate fire governance mechanisms and resources, the shortcomings of privately owned fire insurance companies gave rise to organised firefighting in the form of fire brigades. Insurance companies were haemorrhaging capital from the frequency of fire emergencies and the 'Lack of any organised fire fighting created a necessity for the insurance companies to employ a brigade to minimise the losses of fire' (Carlson 2005, 40). Fire brigades emerged, separate from other militia-based activities, as an appendage to the insurance companies and techniques that had developed. As with insurance itself, the brigades served to secure nascent forms of liberal life lived in London in the seventeenth century. In a more minute way, they specifically preserved insurance companies whose livelihood had been rendered precarious by their failure to accurately calculate fire. As evidenced by early adverts for fire insurance companies, brigades were promoted to attract new clientele. The adverts also offer initial descriptions of the brigades themselves. As an advert from the Sun Insurance Office from 1712 attests:

> For the further encouragement of all Persons, there are actually employ'd in the Service of the Said Company, thirty lusty, able body'd Firemen, who are cloth'd in Blue Liveries, with Silver Badges, with the Sun-Mark upon their Arms, who will always be at Hand to assist in quenching Fire and Removing Goods, whenever any one shall have the Misfortune to have his House on Fire; who have given Bonds to the Company … And that the Houses of those Persons insur'd may be known by the said Fire men, the Mark of the Sun shall be fix'd upon their Houses gratis. (1712, 1)

Plaques would be erected on the exterior of the buildings of the insured so the brigades would know to respond in the case of fire. In contrast to some understandings, however, the practice of erecting plaques did not

mean that people who were uninsured would not receive the same privilege of response as those that were. 'Irrespective of insurance' (2005, 40) then 'insurance brigades were in the practice of providing services to all who were in need' (ibid.). Many reasons underpin the indifference on the part of insurance companies as to the deployment of the brigades. Travelling in carts emblazoned with company logos, brigades responded to any fire to enhance both the public visibility and moral reputation of insurance brigades. But the elemental force, efficacy and agency of fire itself played a pivotal role here too. For as every description of the Great Fire attests, fire was known in part by its mobility and ability to circulate. Fire's circulatory capacities made response a necessity no matter the actuarial status of the building because houses of the insured were always deemed vulnerable.

The primary goal of fire brigades was to secure an insurance industry failing in its infancy. But the universal response ethic developed by these brigades on the sound of a fire's alarm suggests too that the function of the brigades might be understood in more extensive ways. In short, they became commonly perceived as a public good but one subsidised by and ostensibly serving private interests. This tension in the definition of the role of fire brigades, as a private enterprise and as a public good, was fundamental to the way that fire governance was assembled and re-assembled through the eighteenth and nineteenth centuries.

2.4 A Public Good and Private Enterprise

By 1725, London's insurance brigades were 'most willing to make contributions' (Wright 2008, 27) of equipment to volunteer brigades across London. In line with the popular conceptualisation of fire's elemental agency through its mobility at the time, these donations appear as much prudential as they were philanthropic. Providing equipment to volunteers further added to the general distribution of resources across the city which, in turn, quelled somewhat the possibility that fires would spread to the houses of those insured and thus increased the profits margins of the insurance companies. Along with influencing the measures

taken to govern fire, insurance companies developed new forms of knowledge through which to gauge the likelihood of fires. The mechanism of hazard calculation became crucial at this point. Hazard extended the variables upon which fire calculation was made. Rather than just basing fire probability on aspects of the built environment, the occupation of the insured was accounted for too. These more complex aggregations of fire's probability led to more nuanced forms of insurance too. Whilst 'Hazard Insurances' (1757, 1) were sold to occupants of 'Timber and Plaister Buildings' (ibid.) whose 'Goods and Merchandise therein (are) not Hazardous' (ibid. my brackets), 'Double Hazardous Insurances insured "Thatch'd Buildings wherein Hazardous Goods or Trades are deposited or carry'd On' (ibid.).

It was not only however private insurance companies who established new techniques by which to attend to future fires. In 1774, the government's *Fire Prevention Act* was enshrined into law. The Act sought to regulate the materials used in building construction, the size of buildings and area density to stop the spread of fire. Applying to 'anywhere within the cities of London and Westminster' (1774, 1), the Act categorised buildings in seven classes according to the required thickness of external and party walls[3]. Building on the hazard ratings through which fire was known, class one included 'every house or building for distilling and brewing liquors' (1774, 2) and any property which 'shall be the height of thirty one feet from the surface of the pavement' (ibid.). Buildings in class seven included 'every cranehouse… or any wharf or quay, and every shamble, windmill or watermill' (1774, 10). Up to this point, fire had been accepted as an inevitable hazard of daily life. Although remaining inevitable, the *Fire Prevention Act* sought to regulate the built environment in a way that could stop fires before they occurred.

The roll-out of new fire governance mechanisms which bore the hand of both public government and private enterprise extends even more as processes of urbanisation and industrialisation took hold in Britain. In rapidly industrialising cities, examples of how fire brigades were formed through negotiations between insurance companies and civic authorities

[3]The classes worked as a scale to indicate the exposure of buildings to fires. Class one was the most exposed and class seven the least.

were evident. For Wright, the establishment of fire brigades in Sheffield was of interest due to the multiple and disparate sites which worked to supply resources:

> The parish engine and volunteer brigade at Sheffield were partly funded by the Phoenix Assurance Company from 1800, but by 1805 the town council were sufficiently worried about its running costs to ask Phoenix not only to continue its support for maintaining the service but also pay the wages of the men… the town council presented its engines to the Directors of the Birmingham Fire Office, who undertook to keep them in good repair and supply men to work them. In return the council agreed to try and encourage the inhabitants of Sheffield to insure with that company. (Wright 2008, 29)

By the early 1800s, calculations concerning fire's likelihood became more refined and a 'more or less common tariff for fire insurance' (Wright 2008, 26) for different types of buildings had been established. The development of calculations and premiums happened because insurance companies increasingly shared information they had acquired on fires. This practice of information sharing would seem to run counter to the fact that insurance companies were in competition with one another to sell premiums to customers. But, and in fitting with the public service that they undoubtedly, if unintentionally, executed, the sharing of information had an effect on fire brigades strategy for governing fires. Although certainly still confined to and prioritising ways to respond to emergencies as and when they unfolded, elements of preparing response crystallised at this moment. Coincident with accumulating renditions of fire by its potentiality, present here is the emergence of imaginaries through which to organise and coordinate fire governance spatially. Along with mapping the location of resources, engines were kept 'at strategic points to give as full cover as possible' (Wright 2008, 113). Firefighters were also allocated an 'area of operation' (Wright 2008, 116). These areas of operation dictated the space in which specific firefighters would respond should a fire occur. In addition, these areas of operation would be patrolled by firefighters.

Both in terms of insurance and response, governance of fire expanded and became more diverse and refined through this period. However, it

remained a private enterprise albeit for the public good. In the years up to the twentieth century this tension would intensify, with calls to make fire governance a public service becoming louder due to a string of disastrous fires in the nineteenth century. The first of these calamities was the Great Fire of Edinburgh in 1824. This event would instigate dramatic shifts in how the brigades were organisationally arranged, how brigades understood fire as an event and the techniques brigades deployed to deal with fires. Two large fires happened in the city in 1824, one in April and one in June. The most significant in terms of re-problematising fire and fire brigade operation, however, occurred in November 1824. Lasting over two days and containing three simultaneous outbreaks of fire, what became known as the Great Fire of Edinburgh damaged much of the city centre. Much like the description of the fire in 1666, the fire in Edinburgh was understood by its movement, being articulated in connection with the circulatory pathways running through the city. The fire spread by: 'four blocks of tenements…along the High Street; two wooden blocks by Conn's Close; four blocks… in the Old Assembly Close… four blocks of six storeys in the Old Fishmarket… and four double blocks…on Parliament Square' (Ewen 2010, 33).

Assessing the damage, reactions were recorded from both the insurance companies that subsidised brigades and authorities governing the city. Applying an actuarial logic that had developed through the years, the secretary of the Scottish Union Insurance Company[4] understood the fire according to the hazard categories discussed above: 'Some of the buildings are occupied as dwelling houses, some as taverns, some as printers' workshops, others by pawnbrokers or by persons carrying on business-some hazardous, others doubly hazardous' (Ewen 2010, 34). This reaction was accompanied by local municipal authorities' creation of a committee to assess the performance of fire brigades responding to the fire. The main conclusion of the committee was that 'a total want of organisation and unity of action… the deficiency of Fire Engines… the bad condition of their apparatus and insufficiency of mutual assistance for a protracted fire' (Ewen 2010, 33) had been at fault for the damage

[4]The Secretary of the Scottish Union Company at the time was Frederick Smith (see Ewen 2010).

the fire caused. The fragmented and unorganised approach to tackling the fire was deemed a direct result of the private ownership of the fire brigades. Each brigade being attached a specific insurance company, the response to the fire had been convoluted. Brigades, as was their legally inscribed function, acted in the interest of their host insurance company and prioritised saving buildings that were insured at the expense of the city in general.

The conclusions of the committee prompted a major institutional shift for Edinburgh fire brigades. Despite retaining subsidisation from insurance companies, brigades were amalgamated to form the Edinburgh Fire Engine Establishment (EFEE) and placed under the control of local government. The enfolding of the brigades together meant that any ethos of competition diminished quickly, as was any vestige of the brigades attending only to fires that solely affecting the insured. Overall command was granted to James Braidwood. Braidwood set out to rationalise fire brigade operation outside of the profiteering motives of insurance companies. He was instructed to report on the condition of fire engines and equipment, to make recommendations on the location of engine houses and the number of personnel to be allocated for each engine. From the time of his appointment, Braidwood kept a log book 'in which he meticulously recorded every fire call attended by his fire men' (Ewen 2010, 44). How Braidwood used the data generated reflected the changing purpose of fire brigades. Rather than being used to adjudicate premium claims, Braidwood recorded incidents to understand fire outbreak in more detail and improve strategy for future outbreaks of fire according to previous incidents.

Perhaps most tellingly in terms of using a wider and more detailed understanding of fire to prepare for their future occurrence was the introduction of training by Braidwood. Firefighters were drilled every Wednesday at four o'clock in the morning. Explaining the rationale behind drills and the time at which training was carried out, Braidwood remarks that,

> The mornings… at this early hour, are dark for more than half the year, and the fire men are thus accustomed to work by torchlight, and sometimes without light whatever… And, as most fires happen at night, the advantage of drilling in the dark must be sufficiently obvious. (Braidwood 1866, 100)

Something of major significance is suggested here. Exceeding the calculations advanced to establish correlations between the built environment and fire outbreak that had preceded this period, training was structured for the first time by fire trends. Understanding fire incidence through the 'stable relative frequencies' (Hacking 1975, 1) of trends shows how strategy was assimilated to a new rendition of fire. Trends relating to the time at which fires most commonly took place were used by Braidwood to understand the probability of fire. Aligning strategy to a future understood through trends: 'Braidwood was able to claim that engines, complete with three lengths of coupled hose, could be ran out (ready for use) by his men in one minute and ten seconds' (Wright 2008, 164, my brackets). Although fire was increasingly understood by its potential in more nuanced forms, its governance remained confined to responding as and when it occurred, with the rapid mobilisation of resources deemed the foremost achievement.

The success of the EFEE under Braidwood influenced changes to fire brigade strategy in London. In 1831, proposals were drawn up by local government 'for improving and making more effective the Fire Engine Establishments of the London Fire Offices, with the view of bringing them under one Management' (Wright 2008, 165). This plan saw the amalgamation of the insurance brigades and the forming of the London Fire Engine Establishment (LFEE). Although private insurance companies retained their control, any notion that the brigades would only attend to fires of those insured were dispelled in an announcement that the LFEE was: 'prepared to give the most prompt assistance on all occasions of fire' (Wright 2008, 166). In 1832, Braidwood was appointed as Chief of the LFEE. One of his first acts was to make further provisions for quick mobilisation to fires as they occurred. Instituted into LFEE operations was 'a continuous duty system where two men were put on a two-four hour watch while the rest of the men were on standby' (ibid.). He also immediately sought to enhance the experiential knowledge of members of the Establishment. 'Every fireman' (Ewen 2010, 167) 'was required to get to know his district by walking around it to become familiar with the location of water supplies and those buildings which presented a particular risk' (ibid.).

This emphasis on experiential knowledge coincided with an increasingly complex understanding of fire in terms of its likelihood and probability or the risk of its occurrence. The extent of variables considered to influence the causes and consequences of fire were laid bare when, soon after the inception of the LFEE, a major fire occurred at the Houses of Parliament. To quote Braidwood's investigation into the fire:

> The cause of the fire proceeding so rapidly in the work of destruction I believe to be as follows:
>
> 1. The total want of party walls
> 2. The passages which intersected the building in every direction, and acted as funnels to convey the fire
> 3. The repeated alterations in the buildings which had been made with more regard to expediency than security
> 4. The immense quality of timber used in the interior
> 5. The great depth and extent of the buildings
> 6. A smart breeze of wind
> 7. An indifferent supply of water which, though amply sufficient for any ordinary occasion, was inadequate for such an immense conflagration. (Wright 2008, 169)

Fire outbreak here appears not just by its circulatory capacities. Instead, fire is articulated as phenomena underpinned by and enwrapped within an assemblage of material-elemental forces that come together to forge a temporary atmosphere. But this specific emergency not only evidenced a rendition of fire as an event emanating from atmospheric conditions. Especially due to the fact that the Houses of Parliament themselves were not insured, it also made more acute the tension between fire brigades being privately owned and their service as a public good. In a letter sent by the LFEE to the Prime Minister in the aftermath of the blaze, the situation was described as such:

> Although always ready and anxious to afford all the assistance in their power upon every occasion of fire… (brigades) are nevertheless private establishments… They still form the main security against the spread of fires; but where their service might require to be absorbed in the protection of the peculiar interest of the insurance companies, the uninsured portion

> of the public and Government works must be left to the care of the public. (Wright 2008, 171, my brackets)

Even with this implicit threat in hand, no action was advanced from government to publically subsidise brigades for the next two decades. More surprising is this negligence in light of the fact that the regulations of the *Fire Prevention Act* of 1774 were being continuously undercut as industrial and mercantile activity accelerated in London. Building capacity for the growth of London's economy meant that new extensions were being made to pre-existing buildings without municipal approval. The next major fire in London was caused and spread precisely due to the continuous disregard and surpassing of the *Fire Prevention Act*. In 1861, directly across the river from where the Great Fire of 1666 had started, a fire ignited in illegally built jute and hemp storage warehouses on Tooley Street. Upon combustion, the fire circulated through the many buildings and wharfs which lined the south bank of the Thames. Judged by Braidwood as impossible to fully extinguish, the fire raged for two days and only subsided completely 12 days later, damaging 11 acres of land. In fighting the fire, Braidwood died.[5] Taking record of the damage the fire caused, insurance companies were forced to pay out around two million pounds in claims. Although the claims were paid, premiums were raised by between 50 and 100% after the fire (Blackstone 1957). For the first time since the fire brigades were formed, insurance companies began to make significant losses. In 1862, a select committee was founded to understand why 'a body of men…so devoted to public service…should be paid and supported, not…by the Government for the good of the State, which it undoubtedly is, but by the combined efforts, the wealth and the public spirit of the private companies' (Blackstone 1957, 52).

The committee found complete inactivity on behalf of the government since the *Fire Prevention Act* of 1774. It was decided that the LFEE should be situated under local government control. This transferral of fire brigades into the public sector in London was formalised with the *Metropolitan Fire Brigade Act* (1865) of 1865. The Act itself states that 'Fires and protecting Life and Property in case of Fire shall within the

[5] See *The Times*, *The Great Fire* (1861).

Metropolis be deemed for the Purposes of this Act to be entrusted to the Metropolitan Boards of Works'[6,7] (1865, 818). Concurrent with situating fire brigades under public remit, the Act modified the object to be secured through fire governance. The story of the development of fire governance is one conducted by a tension between being a private enterprise that protected the built environment and insurance industries and a service that, in the very acting out of its duty, almost inadvertently fulfilled the public need of securing lives from fire. With its formal appointment as a public service, fire governance makes human life a central and primary object of its actions, alongside the broader built environment and market forces it has sought to secure since its inception.

This concern with human subjects was reflected in the brigades' increased use of statistics to understand the probability of future fire events. The new chief of the LFEE James Shaw oversaw an expansion in the calculative techniques and variables used to know fire and its future. As annual reports reveal, human life was a thoroughly embedded factor through which to understand the risk of fire by 1880, for example:

> The number of persons seriously endangered by Fire has been 160, of whom 127 were saved, and 33 lost their lives. Of the 33 lost, 14 were taken out alive, but died afterwards in hospitals or elsewhere, and 19 were suffocated or burned to death. (Shaw 1880, 4)

The emergent category of human life intersected with other variables referred to above and meant that fire was conceptualised as a multi-variant phenomenon. In terms of method, fire continued to be known not only through trend identification but also through correlations between fire occurrence and specific categories such as deaths, occupations and the time at which fires occurred. This quantification of fire was actioned through aligning statistics to decision making on what resources might be needed. The strategic purpose of statistics was not to facilitate intervention in antici-

[6]Between 1855 and 1889, the Metropolitan Board of Works oversaw the delivery of improved infrastructure to cope with London's rising population (see Owen 1982).

[7]Although overall authority for firefighting was transferred to public authorities, the insurance companies would still have to subsidise fire brigades to the amount of £35 for every million pounds accrued in claims. The Metropolitan Board of Works limited its subsidies for firefighting to £10,000 annually.

pation of fire's occurrence however. Instead, the purpose was to make fire's statistical expression central to the operation of the brigade in adapting to the risk presented. 'By incorporating statistical tables' (2010, 97) as Ewen notes 'which reported the number of fires, their causes and locations, the time and season in which they occurred … chief fire officers directed the deployment of resources' (ibid.). The techniques for both knowing and, indeed, governing, fire that were gradually elaborated through time, however, would be of little use in attending to the potentially catastrophic fire emergencies which would rain down and rush through cities across Britain in the blitzkrieg of the Second World War, as discussed in the next section.

2.5 Fire and War

Contorted, twisted desperate faces torn from limbs left scattered across the canvas, Picasso's Guernica depicts the macabre melee of one of the first instances of aerial attack that the world witnessed. Although east London suffered from air raids in the First World War, it was the '25 tonnes of bombs' (McCutcheon 2007, i) that obliterated the population of Guernica in the Spanish Civil War, along with similar attacks on Barcelona, that proved fundamental to the precautionary measures taken by the British government in lieu of the growing possibility of air-raid attacks that developed through the late 1930s. The attacks on the Basque country and Catalonia told a story of damage inflicted from the skies that was catastrophic. They were attacks whose occurrence and consequence reached far beyond the calculative capabilities of those techniques and statistics refined to capture and articulate fire as a risk in the last section. Nevertheless, the British government was compelled to act in anticipation to secure against them. The threat was sketched at the time vaguely in the shape of what would much later, in the aftermath of 9/11 and the continuing War on Terror that has ensued, be referred to by the US Secretary of Defence Donald Rumsfeld a 'known unknown' (Daase and Kessler 2007): a threat considered by governments as uncertain but somewhat inevitable and imminent. With risk's emphasis on developing renditions concerning the future on the basis of the accumulation of trends from the past, the uncertainty of such threats has been suggested to exist beyond the parameters of risk (de Goede 2008).

This does not mean of course that security organisations do not seek to understand the nature of known unknowns. The threat of air raids instigated the development of new ways to perceive, imagine and render thinkable potential futures. Furthermore, it paved the way for the instantiation of new forms of governance. In 1938, the Institute of Structural Engineers set about to analyse the consequence of a potential incendiary bombing on Britain. As an opening caveat to what readers would find as they leafed further through its pages, the report opens by stating that: 'In the complete absence of experimental results it is necessary to fall back on either theoretical calculations or on the tables published in the handbooks of several European Governments' (1938, 11). Taking a view informed by two additional reports produced for government, the hypothesis below is an intermixture of speculation on the weaponry and strategy of the enemy and knowledge of the built environment. It was estimated that a 'large bomber' (1938, 1) would be able to carry between '1000 and 2000 small incendiary bombs' (ibid.). Impact was gauged by assuming the angle at which the bomb would make contact with a building and the bomb's 'velocity at its arrival' (1938, 9). The angle at which the bomb might make contact with a building was dependent on the speed and height of the bomber. The report continues to state that: 'Over defended towns it may be expected that bombing will be carried out from greater heights' (1938, 9), as such, 'the angle will be between 15 deg. and 20 deg. from any of the greater heights' (ibid.). The path of bombs flying at such an angle increases their potential consequence, being more likely to fall on exterior walls rather than roofs.

Air raids were understood predominantly to disrupt infrastructure. As a report goes on to suggest 'chief damage done (by incendiary bombs)… is done to pipes and wires' (1938, 17). This focus on infrastructure informs Ewen's commentary on how provisions were made by the fire brigade in Birmingham 'on the assumption that roughly 1000 simultaneous fires would be started in the city from air raid attacks. With the consequent effects of disrupted water mains, blocked roads, broken communications, damaged fire stations and appliances' (2010, 137). With regard to the effect that incendiary bombing might have on fire brigade response, Ewen continues to state that 'water mains might be damaged… with the result that there might not be enough water… for a fire engine to use' (ibid.) alternately 'roads might be damaged by high explosive bombs and so prevent a fire engine from reaching a site on fire'

(ibid.). The consequence of air raids was fathomed too in relation to human life. Using data acquired from air raids in Barcelona; 'The effect' (1938, 19) of incendiary bombs on five to seven storey buildings 'in terms of material damage and loss of human life is, from the point of view of the attackers, 100 percent' (1938, 19). Leete's research shows that the Institute of Structural Engineers disseminated information to other government departments stating that a single 'air attack on London could result in over 1,500 people being killed and over 3,000 wounded' (2008, 5). Governing techniques in the War on Terror operate through an imaginary of threat horizons taken by their worst-case scenario (Aradau and Van Munster 2011; de Goede 2008; Grusin 2010). As the above examples show, this projection of the future at the very limit of its sayable and thinkable disastrousness is evident too in the hypotheses advanced to know the uncertain but imminent air raids of the Second World War.

Understood as a frontline in civil defence, the operation of fire brigades was brought into reappraisal because of the projections concerning the potential effects of air raids; 'fire risks in war time' as Leete puts it 'presented a problem of such alarming proportions that the peacetime conception of adequate protection was not in the same realm of discussion' (2008, 14). Since the late nineteenth century, fire governance had been arranged in a decentralised manner, publically funded but diffused across regions and localities scattered through the country. With the onset of war, the Home Office began to concert more control. This control was consolidated through two pieces of government legislation: the 1937 *Air Raid Precautions Act* (1937) and the *Fire Brigades Act* of 1938 (1938). Along with instigating the production of air-raid precaution schemes throughout the country,[8] the most significant change to the brigades that the *Air Raids Precautions Act* brought about was the introduction of the Auxiliary Fire Service (AFS). Consisting of volunteers, the introduction of the AFS increased 'the numerical strength of professional fire brigades tenfold' (Ewen 2010, 127). The AFS received training in fire precautions from full-time members of brigades and would be called to duty when attacks took place (1939).

[8] Applying generally to the public and organisations other than the fire brigade, the schemes would enact precaution through building air raid shelters, communication technologies and decontamination services.

The Fire Brigades Act also formalised further the methods through which brigades collected information to prepare for future emergencies. Being 'understood as integral to matters of national defence' (Bevir 1938, 11), all brigades were to generate data about local areas. Including:

> obtaining by inspection… information about:
>
> (i) The character of buildings and other property;
> (ii) The available water supplies;
> (iii) The means of access to such waters and
> (iv) Other material local circumstances. (1938, 2)

As with ARP estimations, this data collection strategy taking precaution revolved specifically around the impact incendiary bombs would have on infrastructure and the availability of resources to respond to bombing. Further arrangements were made for response at this juncture. Standard times for response were formalised. Preparing resources ready to respond should take one minute for 'important industrial areas' (ibid.) four minutes 'in residential townships' (ibid.) and six minutes 'in rural areas' (ibid.). Furthermore, the Act required 'mutual assistance' (1938, 6) frameworks to be established between brigades in responding to 'exceptional fires' (ibid.). These mutual assistance frameworks outlined how regional fire brigades would collaborate with one another in the event of an extremely severe fire.

For those in charge of developing precautionary measures, the war appeared as 'phoney' (Wallington 1981, 2) in the immediate aftermath of its declaration as no air raids took place across the UK in 1939. The catastrophic projections on the future made did not synchronise with this future when it unfolded into the present, leading some to state that the Home Office and the ARP committee 'were led into over-estimating the material impact of German attacks' (Harrison 1976, 32). Between September 1940 and May 1941, however, the Luftwaffe dropped 45,000 tons of bombs across Britain (see Wallington 1981). Although understood as a failure in terms of stunting the production of military equipment and falling very short of Air Raid Precaution committee estimations, the blitz was catastrophic, both in terms of causing the loss of

approximately 41,000 lives and decimating infrastructure. In London, the fire brigade attended over 13,000 fires alone during September and October 1940 (2010, Ewen). As with the Great Fire of London, Edinburgh and the Tooley Street, the emergencies caused through the Blitz had a major effect on fire governance more generally.

The failure to accurately estimate the potential of air raids had severe consequences by leading directly to strategic planning that was misaligned with emergencies when they came to occur. This was evident, for instance, in terms of the mutual assistance plans that had been established between brigades. In a bombing of Thameshaven oil depot in Essex, a major fire broke out. Being outside of a heavily industrialised space, the local brigade requested equipment and personnel from the London Fire Brigade (LFB). On request, the LFB sent water pumps and appliances along with extra personnel. However, 'under the statutes of the *Fire Brigades Act* 1938' (Hollis 1985, 104) no previous agreement had been made by the two brigades and the equipment of the LFB was sent back. Eventually, William Spens, Commissioner of Local Civil Defence, had to intervene to over-ride the statutes of the Act to allow the LFB to help the brigade at Thameshaven. By the time resources had returned to Thameshaven the havoc the fire caused had intensified. The convoluted approach to coordination evidenced here was affected by how mutual assistance frameworks were based on regional boundaries. As noted, different response times were established for different areas in Britain. However, as summarised by Ewen, 'air raids paid no attention to local government boundaries' (2006, 210). Although representing the worst-case scenario, estimations did not account how fire incidents might blur the ordered, neatly inscribed space upon which response had been planned.

The experience of air raids in 1940 proved 'the catalyst for major restructuring, highlighting serious inadequacies in the effectiveness of fire fighting' (Ewen 2006, 221). In reaction to air raids, the Fire Services (Emergency Provisions) Act (1941) handed complete control of fire brigades to central government. Until 1947,[9] 38 fire brigades operated across Britain. In the midst of heavy raids, Home Office Secretary Hurbert Morrison explained the reasons for full nationalisation:

[9]At this point, the Fire Services Act (1947) placed fire brigades back under the control of local authorities.

> Now with intensified attack, a drastic change of organisation must be made. In spite of all that has been done, or can be done, to develop and improve … a fundamental difficulty remains and springs from the fact that the Fire Service is a local service. (1943, 1)

2.6 Conclusion

For Foucault, the application of a genealogical approach means re-conceptualising dominant narratives of times past. Rather than seeing it as a serialisation of different 'eras' or 'periods' placed neatly on a continuum of 'progress' to form a linear narrative, conceptualisations of what has happened should be characterised by the ruptures, failures, reversals and complexities that inevitably punctuate the dynamism of power relations. As an object of governance fire must be understood as emergent in a way hinged on the negotiations between different actors which underpin the application of power. The valence of this approach has been exemplified in this chapter by tracing the shifting arrangement of fire governance across different sites and the various conflicting interests represented therein. As an object, fire undergoes continual remaking as responsibility for its governance ossifies and extends across different interests, industries and organisational domains.

This messy and shifting arrangement of fire governance dictated what information and what calculative techniques were deployed to represent fire and mediated the relationship attainable to its future through hundreds of years. In a time when brigades were coordinated by private enterprises, fires were known through rudimentary actuarial logics, whilst more multi-variant renditions of fire developed when governance was subsumed within the public domain. Whereas risk was articulated here through probability logics, more possibilistic forms of sense making, which do not rely on trends established gradually through time, began to appear in precipitation of the Second World War.

Accounting for fire, its risk and its governance has compelled additional elements to the genealogical approach however. The story told of

fire through time is one that has to be sensitive to the elemental-material capacities of fire itself. In the chapter, the agency of fire has been evidenced largely by its capacity for movement and mobility. Fire's mobility is directly complicit in knowledge production practices. At different historical moments, fire emergencies have been conceptualised by their spread and ability to create new temporary spatial formations when entangling with the wider built environment. Prevalent in anecdotal accounts stretching back to 1666, fire's mobility also informs the articulation of fire risk. The creation of hazard ratings, for instance, developed with knowledge concerning how fire, through its movement, interacts with different types of material that buildings are constructed through. Under a genealogical approach, the forms of knowledge mobilised are tied to the forms of power exercised in any specific historical moment. Not only, then, does fire produce the knowledge generated concerning its own proclivities. Moreover, it is directly involved in shaping the modes of governance arranged to attend to it. Fire's articulation has, at the very least since the Great Fire of 1666, affected the spatial arrangement of the fire governance apparatus. Similarly, the incendiary calamities characterising the fires of the Blitzkrieg informed the organisation of mutual assistance arrangements premised on regional boundaries. The efficacy of fire thus manifests itself in how it shapes and reshapes the techniques, mechanisms and arrangements created to govern it.

The themes of the politics of governmental arrangement, calculative techniques that articulate fire risk and how the material-elemental agency of fire effects its representation and governance all feature in important ways through this book. They are all themes crucial to understanding how risk exists as a lived relation within the FRS. The next chapter picks up on two of these themes. With a particular emphasis on the digital technologies found in the FRS now, the chapter probes how risk is emergent through calculative techniques. Focusing on the devices that undertake calculation, it also explores the material forces which entangle within digitised articulations of fire risk. The matter of how fire risk is calculated and cognised is synthesised with the material devices that underpin it through an engagement with, and elaboration upon, the concept of interface.

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3

Assembling Interfaces to Make Sense of the Future

3.1 Introduction

For all its Shelley-esque resonance, the thinking machine Proteus, immortalised in Donald Carmell's film *Demon Seed* (1977), offers something fresh to our thinking about human kind's relations to and reliance upon at least quasi-autonomous, algorithmically based software and hardware. A long time before Spike Jones's *Her* (even before Zapp and Roger's *Computer Love*) *Demon Seed* imagined human-computer relations as mediated by sexual desire. Overwhelmed by its urges, Proteus forcibly inseminates its cellular-based master in a scene that speculates on both the logical possibility and undertaking of a computer raping a human being in order to pro-create. Proteus justifies this most heinous and strange of acts in the following terms:

> So that I may be complete. My intelligence alive in human flesh, touching the universe, feeling it… I Proteus, possess the wisdom and ignorance of all men, but can't feel the sun on my face

N. O'Grady, *Governing Future Emergencies*,
https://doi.org/10.1007/978-3-319-71991-7_3

The film visualises some key themes concerning the way in which humans relate with thinking machines. The computer here is not, simply, the executor of human intent. Rather, our relationship to computers is reciprocal and continually emergent, being made and remade in a contingent fashion. So along with existing within the technologies themselves, feedback loops extend to the relationship between humans and computers. These relations certainly serve pragmatic and logistical purposes, orienting digital technologies towards certain ends and in turn destabilising common understandings of cognition and memory as actions and phenomena that are reserved for human kind (Hayles 2005; Steigler 1998). But the relations between humans and computers are characterised in *Demon Seed* on affective and sense-perceptive registers too. That is, the forms of relationality present take place by way of materially heterogeneous bodies encountering and enmeshing with one another.[1] Investigations of the knowledge generated through computers should seek to accommodate, then, for the new forms of material entanglement that are developing between humans and non-human agencies. Lastly, the title of film should be taken seriously too. The seed of the computer and indeed the computer itself are branded and portrayed as demonic. The performances found at the intersection of human and computer do not escape moralisation and articulation through the parameters of ethical discourse.

I have documented these different debates not just because of their presence in this particular film but because they arise where the matter of relationality between human and computer is considered more generally. One way this relationality might be conceptualised is through the notion of interface. For Alexander Galloway (2012), interfaces designate threshold points between different, albeit connected, worlds. In such thresholds, the dynamics of power operate, driving new relations between material forces and instantiating the development of new modes of human subjectivity too. Far from existing in isolation, interfaces actively shape and are reflective of historical circumstances. Whilst understanding how interfaces resonate across domains beyond its immediate surroundings is vital, the gravitas of interface is greater still if we understand its reach in the way

[1] For a thorough account of the term encounter within studies of affect, see Wilson (2017).

that Brandon Hookway (2014) does. Hookway traces interface back to its application in the study of earth surface dynamics. Here, interface expresses the coming together of water and rocks and how their dynamic relation shapes the wider environment surrounding them. Taking the term beyond its disciplinary nest in new media studies, but retaining the meaning afforded to it, interface amounts not just to relations between materially different things and the circumstances which shape these relations. Rather, interface can open up how different agents gradually grind into and enmesh with one another whilst allowing for exploration of the traces such enmeshing leaves behind as effects on the wider environment.

Affected by and affecting of the wider environmental conditions in which they take place, interfaces produce and are performed within what James Ash refers to as 'envelopes' (2015, 2). With its foundation in Gilles Deleuze (1986), Ash uses the term envelope to suggest that, rather than expressing material relations or historical resonance, interfaces are the nucleus for broader affective and sense-based atmosphere in which computing takes place. Interfaces found in gaming are thus maintained and coordinated by the different sense-perceptive encounters engendered between computer and human, be they haptic, temporal, emotive, visual or a combination of all. Ash's account opens up the possibility for attention to be split. Interfaces can be explored in terms of the agential forces involved in them and how relations between these forces are performed. But at the same time, interfaces can be critically engaged with as objects of design in themselves. Interfaces are not the accidental by-product of the encounter between humans and computers. Understood through interface, such relations are controlled and modulated towards certain ends.

Over the course of the four subsequent sections that make up this chapter, I want to use this notion of interface to explore processes which are crucial to the identification of risk and thus the facilitation of anticipatory governance in the FRS. Interface is thus conceived as a crucial governing mechanism in itself that makes possible risk-based forms of governance where authorities increasingly rely on digital technologies. By way of introducing further the digital infrastructure of the FRS, the first section expands on the notion of interface to properly conceptualise the set of relations that underpin data sourcing which provides the grounds for analysis. Elaborating on the interface that underpins it as a process,

sourcing can be demonstrated to involve numerous material transformations in bringing about the data required for risk analysis. The chapter then turns to examine the different relations which solidify where risk analysis itself takes place, showing how analytic software used by the FRS seeks not only to harness the capacity of non-human data but to incorporate within the analytic process the imagination and ingenuity of human cognition itself. Whilst, up to this point, interface has been examined as a governing mechanism which is planned and designed, the following section shows how interfaces can also disrupt governmental processes enacted through digital technologies. Along with making possible the coalescence between different forms of knowledge, interface enables interventions interrupt the digital infrastructure's pursuit of certain ends.

3.2 The FRS' Digital Infrastructure and Interface

Attached to corridor walls in FRS headquarters across the UK are posters that reveal an array of statistical interpretations of fire as a future emergency. Maps indicate the distribution of fire events, showing in turn how risk is spread unevenly across space. In another poster, fires and their risk appear not spatially but are comprehended instead according to their perceived cause. Arson appears on a table next to cooking, followed further down by smoking and other daily routines whose overly non-chalant fulfilment can have incendiary consequences. Further still, a chart reveals the performance of different FRS stations in attending to the fire emergencies that take place within their zone of responsibility. However expressed these statistics in some way offer detailed insights into the various calculative methods through which emergencies are made sense of as both past incidents and as potential futures to be governed in the here and now.

In many ways, these posters are surface products, mere veneers that, for all the information they offer, should not satiate inquiry into how emergencies are thinkable as future events and consolidated as objects around which modes of governance can be organised, oriented towards and legitimated through. Before delving into the significance of such

posters, further probing should be undertaken into another set of more heterogeneous objects which, although far less obvious when walking through the same corridors, are undoubtedly more crucial to the operation of emergency responders with their face towards the future. What I am referring to here is what was in the introduction to this book called the digital infrastructure of the FRS. Infrastructure here encapsulates the set of objects used to render fire emergencies as risks of the future. To name an in-exhaustive list, it refers then to hardware, software, fibre-optic cables and computer screens. Infrastructures also include humans themselves and in myriad forms, from bodily performance to the variety of perceptive and cognitive capacities we show on a daily basis. This infrastructure is brought to life and made operable through the relations which hold between these materially heterogeneous objects. But along with being constituted through the network of relations which spread between these objects, this infrastructure is characterised too by the processes it enacts, the processes it is enveloped in and the processes that cut across it. Simultaneous and multiple, these processes perform a variety of functions, from risk calculation itself to sourcing, exporting, selecting and sorting data. Operating with such an expansive understanding of infrastructure is important because I want to suggest that practices like sorting, selecting, sourcing and so on are as important to how future emergencies are known as calculation itself. Indeed, they provide the materials for risk analysis and, in so doing, hold sway in terms of what appears on those posters which offer accounts of fire risk and, de facto, what does not.

How might one conceptualise interface as situated within this infrastructure? Interfaces describe the intersections, moments and encounters within which the wide array of infrastructure components come together. The relations forged at the interface enable the different processes characterising the digital infrastructure to take place. Interfaces underpin risk projections. Nevertheless, interface also opens up to investigation how such components change materially once enrolled in processes by which fire becomes known as a risk and what the effects of these material changes are in terms of how emergencies are rendered, comprehended and known.

To appreciate the extent and depth of transformations involved in the digital infrastructure's generation of fire risk knowledge, it is important to

state initially that, of course, data are not necessarily digital in the initial form of its emergence. Understandings of data should be premised on a set of claims made by Henri Bergson. For Bergson, data should be thought of initially by its Latin derivative of datum, meaning that which are given up to sensorial perception. Data, thus, might come in different forms: 'the first extensive and measurable, the second intensive and not admitting of measure' (2001, 3). Encapsulating the wide array of means by which things might be felt and perceived, data are generated at the point at which a material object is touched or seen. At the same time, Bergson suggests that data can have a more 'intensive' quality. In other words, data are produced through the very act of sensing in itself, not just at the point that external relations are forged between different bodies. This rendition of data establishes an interesting foundation for thinking about the moments of interface through which digital data are sourced for generating accounts of fire risk. In some ways, it leads to questions of what has been called 'datafication' (Mayer-Schoenberg and Cukier 2013). Rather than directing focus towards the procedures and sites at which data are sourced, it allows, instead, for consideration of data sourcing and datafication as processes through which things which are already perceivable on numerous registers transform into digitised entities.

A substantial amount of data used for risk analysis is in fact sourced from fires in their real-time unfolding. With resonance to how fire's mobility has been articulated for hundreds of years, many reports which debrief on fires and shape strategy around their past occurrence reveal how the FRS understand fire's real-time unfolding as coordinated by the materially heterogeneous forces which come together in the moment of, and to constitute, the conflagration itself. Processes of combustion, the very moment of origin, rely for instance on the interaction and enfolding of flammable elements together. The spatiality and temporality of the event are understood topologically too, as something that can be made and remade according to the different materials of the built environment that are swept into the flames. Documents that plot out the occurrence of fires inside buildings, for instance, warn that thresholds connecting different rooms can become a means for fire intensification by exposing fire to air, thus ventilating its spread. The meeting of fire and air is some-

thing that can be produced indirectly by the presence of firefighters who, in attempting to gain access to buildings, can create backdraughts.[2]

But the pivotal presence of the firefighter goes beyond their situatedness amidst the inchoate whirl of non-human forces and is considered in addition as an active affective entity. In other words, the firefighter is thought of as both a receptacle and medium for sensations registered at a bodily level which in turn facilitate more detailed understandings of the fire emergency. Along with the extensive physical damage that fires might cause to humans, many reports on fires put a heavy emphasis on its sonic efficacy. A fire is a cacophony of noise, with different components of the built environment melting into one another, structures collapsing, explosions abound, not to say anything of the movement of those responding. The sound of a fire is but one effect that is not immediately thought of but nevertheless exists in and across human beholders and throws a substantial obstacle in the way of their ability to coordinate response. As an event, fire might be conceptualised here as a kind of affective atmosphere (Adey 2014; Ash 2013; McCormack 2008). It is constituted contingently through the set of relations performed between an array of materially heterogeneous forces and how such relations change over time. Simultaneously, it is an event articulated and rendered intelligible at the register of bodies and the range of sensorial outputs that are invoked and engendered.

Amidst the unfolding of this event, data sourcing practices take place. Sourcing here is facilitated by what is called the Incident Recording System or IRS. IRS is configured across three sites. In the control room from where response efforts are coordinated, all communications are recorded and transferred to the IRS. Although too long to name in its entirety, the forms of data harvested here include details of the call that alerted the service, all the communications between personnel in the control room and those on the frontline and the time between alert and arrival at the scene. Predominantly after the event, proforma reports will be filled out at the scene of the emergency. These reports will not only produce data that overlap with that recorded in the control room but also details emerging in the

[2] See for instance Department of Communities and Local Government (2009) *Generic Risk Assessment 5.8: Flashover, Backdraught and Fire Gas Ignitions*.

immediate aftermath of the emergency itself, such as damage to the built environment and human casualties. Using export functions to enable the transmission of data, a total of potentially 197 variables on the fire can be collected. These data are compiled at the third site across which IRS is configured, the IRS' mainframe database in the FRS' headquarters.

By this stage data on fire have been what in common parlance is referred to as 'datafied'. But the accumulation of data and its digitisation represent as much a loss as it does a gain. This is because what is meant by datafication is really digitisation. In its pre-digital form, data on fire were generated. What is different once digitised is the form data take and, indeed, the significance they possess for how fire can be thought. In its incarnation as an event unfolding in real time, the data fire produced was the material entanglements that gave it a spatial and temporal shape and the situatedness of sensible bodies within the space time of the emergency. In other words, data on the atmospherics of fire were produced. With its digitisation, the fire emergency is broken down into discreet categories. The relations between heterogeneous material forces which fused to punctuate and spatialise the event have been severed from one another. As a digitised event, fire is known not by the intra-relatedness between things and their affects but by a gathering or mass of variables, the time at which the fire took place, its location, the injuries it caused for example.

Changing the form that data take and separating the components that related to one another in its unfolding is not the only way that digitisation imbues the emergency with new meaning, however. Once digitised, phenomena are opened up to new levels of what Mike Michael and Marsha Rosengarten (2012) might describe as abstraction, becoming detached from their physical occurrence. Fire, like any other event which is digitally datafied, becomes an event that can feed into wider variables that have accumulated over time with the occurrence of similar events. At the point of digitisation (and thus abstraction from the event) data are able to afford significance concerning fire as a general phenomenon but not as a specific, local event cognised and felt by its immediate experience in the present.

As a process, data sourcing reflects numerous moments of interface between different elements of the digital infrastructure. It shows how interface is facilitated by different static relations between digital technologies distributed through space and also the flow of data between

these sites. The result of the interfaces enrolled in data sourcing is the harvesting of digital data vital to knowing fire as a risk. But an irresistible attribute to interfaces here is the material transformations which create wide degrees of detachment between fire as an event in its real-time unfolding and its expression as digitised phenomenon. Interfaces combine different aspects of the digital infrastructure together, allowing it to function. At the same time, the application of interface changes the significance of the data generated in the fire itself. In the next section, I show how the data sourcing discussed here proceeds to facilitate interfaces at a later stage in the process by which the FRS' digital infrastructure operates to render fire a risk of the future.

3.3 Interface and the Fusion of Cognitive Capacities

Although already addressing a vast expanse of entities, relations and transformative processes, the accounts offered of both the digital infrastructures now so critical to security agents and the interfaces occurring therein remain insufficient. What is missing heretofore is a clear sense of the set of relations to human kind that interfaces both engender and, indeed, are performed through. The relations found where humans interface with different aspects of the digital infrastructure do not exist simply at the level of mediation. Instead, they involve forms of enmeshing and entanglement. But the type of enmeshing is different from those processes of data integration and transformation found above. It involves specifically the fusion of different modes of intellect together. Louise Amoore's study of the correspondence between Alan Turing and Ludwig Wittgenstein is particularly useful for understanding the entanglement evident here (2014). One of the most crucial insights Amoore offers in her reading is that non-human algorithmic thought, operating in a way that is seemingly automatic, does not replace or displace human thought. Neither in practice does it actually receive any priority (though it might be held responsible for governmental mishaps in such a way). Whereas, for example, computers represent new plateaus of efficiency in ingenious modes of thought, following mathematical equations and instructions, they fall very short in matching or replicating a human

mind's capacity for thinking intuitively. What the correspondence suggests for Amoore overall is that lines of intersection should be followed and pursued between the different cognitive styles and capacities that humans and computers have the capacity to perform and what effects such coalesce in sense-making capabilities might have. Thinking through interfaces, this distinction between different modes of thought is especially provocative and, indeed, crucial for understanding the mechanics that underpin risk calculations found in the FRS. With this distinction, interface can be explored as a site where different forms of ways of thinking encounter one another. How this encounter is designed and performed is examined below. So too is how the different modes of cognition which encounter one another co-produce projections of fire risk.

Picking up from where data were left after it is sourced in the last section. From its mainframe, the data made by and captured in IRS can circulate through the various capillaries of the digital infrastructure. It always finds its way to the analytic software the FRS draws upon to make fire risk projections. One such software is the Fire Service Emergency Cover Toolkit (FSEC). FSEC is used to assess the response capabilities of the service and the time it takes them to arrive at fires. It does so by gauging the strength of the relationship between the geographical distribution of resources and fire severity.[3] Configuring FSEC from the ground up, one would first be encountered by a Geographic information System (GIS) map of the area, complete with data that visualise the terrain of the area in terms of population density and numerous aspects of the built environment. Distributed unevenly across this map are the series of fire incidents that have occurred over the last three years.

What is gradually configured at first interface with FSEC on the computer screen is what Michel Foucault referred to as the milieu governed (O'Grady 2014); the model through which the population of objects, people and events can be spatially articulated (2007). Allusions to what Foucault called the milieu strengthen further when the form of calcula-

[3]Since the cuts in 2010, which have seen all FRS' across the country have to cut their budget by approximately 30% thus far, FSEC has been imbued with more significance as it can inform the service where its rapidly depleting resources are most effectively located. Along with everything else that it is, FSEC is also a technology borne from austerity then.

tion FSEC undertakes is described. What is specific of a milieu as a calculative device for Foucault is its concentration on populations as circulatory. The knowledge generated through the milieu focuses on the movement of that which populates space. Similar to Foucault's invocation of milieus, FSEC calculates on the basis of perceptible circulations by running what it calls a 'time-travel matrix'. This matrix simulates the response time to fire incidents from the closest possible resource. Underpinned by the belief that the longer it takes the service to arrive, the worse the fire emergency will be, FSEC creates what is called the base-case for fire risk distribution. Once animated simply by basic geographical variables and data that indicate where fires have happened, the map becomes a risk map when the base-case is reached. Fragmented by a spectrum of colours, spreading from high-risk red to low-risk yellow, with intermittent shades associated with varying degrees of fire severity, the map affords an account of how fire risk is distributed across space in a way tied to the location and speediness of FRS resources (Fig. 3.1).

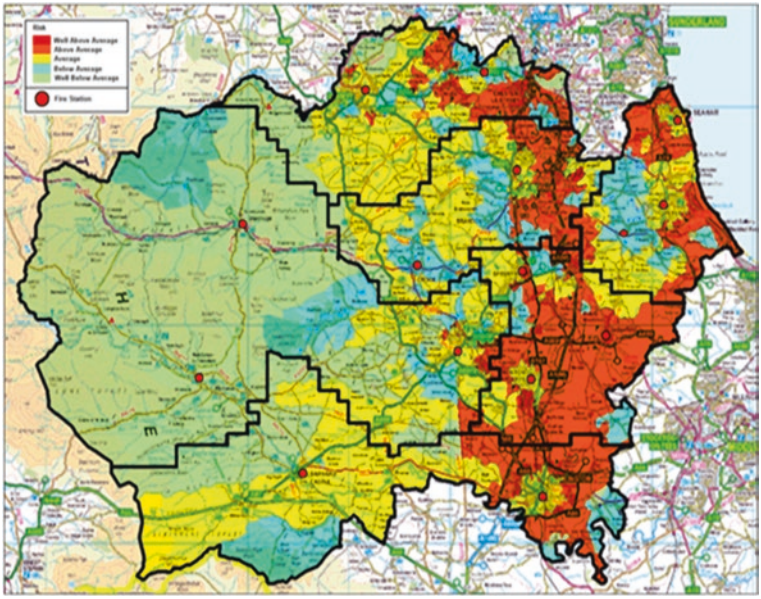

Fig. 3.1 FSEC base-case

Delving into her work previous to that referenced above, Amoore might say here that what has been established through FSEC calculations is a mobile norm (2006) of fire. Here, visions of routine circulation have been rendered specifically with the purpose of indicating the likely continuance of these circulations in the future. The act of calculating is at this point largely automatic, with the software putting into play its algorithm isolated from human intervention. But as I will turn to show now, the calculations performed up to this point serve only to provide a foundation for new forms of analysis which are premised on interfaces between FSEC, human analysts and the different forms of cognition practised and co-produced by these agents.

Proceeding from the base-case, analysts are prompted to hypothesise on the possibility of different futures, where the risk of severe fires can be reduced. They do so by tweaking and adjusting the location of resources and then running the time-travel matrix again. Starting from the base-case, analysts will speculate and move resources to those places most exposed. The calculative process found in this moment of interface bears a repetitive temporal rhythm, with resources shifted over again, and the time-travel matrix re-run every time. Each time, a new rendition of fire risk distribution is envisioned spatially. What analysts are trying to discover through this repetitive, iterative and almost memetic process of hypothesis and speculation is an equilibrium in fire risk distribution across space. In relation to the milieu, Foucault too speaks of trying to establish such an equilibrium of disruptive events. Rather than eliminating risk altogether, what is aimed at instead through population governance techniques is control, bringing such events into a broader, acceptable normative curve (Fig. 3.2).

The forms of calculation through which FSEC operates show how knowledge is generated to make decisions that serve, ultimately, to intervene on the future but in the present. In so doing, FSEC simultaneously conveys the importance of interface between humans and computers to the grand task of governing the future. Embedded into the time-travel matrix is the automatic capacity to calculate the distance between location and fire and subsequently to distribute fire risk projections across space. But the efficacy of these calculations is only realised where they encounter and enmesh with different modes of thought altogether: the human analyst's capacity to imagine resource location anew and, even

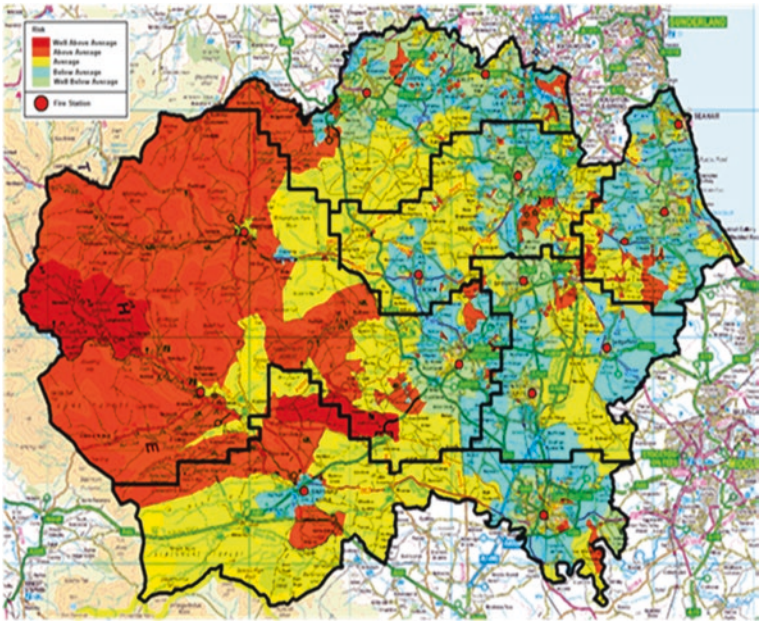

Fig. 3.2 FSEC risk maps after the hypothetical relocation of resources

before doing so, speculate on the potential outcomes such a relocation might bring. It is at the interface where the capacity of these two modes of thinking are brought into negotiation and entangle in the calculative process. This relation, furthermore, is consolidated, sustained and reinforced over time by the dynamic of the interface. The rhythm of interface here is repetitive and iterative, relying as it does on the continual re-enactment of the time-travel matrix. Peppered across time, the tweaks and readjustments made build and build towards a projection of a potential future around which resource distribution can be shaped.

3.4 Routines and the Unintentional Consequences of Interfaces

Up to this point, interface has been considered in its form as a governmental mechanism, a set of relations imbued with a specific intention and designed to meet specific ends. However, not all interfaces happen

with clear objectives in mind. Neither do they follow formalised and technologically fixed trajectories. As Brandon Hookway reminds us, interfaces are ubiquitous. Because of their ever-present status, they are in many ways secreted and surreptitious. Their presence in FRS' daily life extends and diffuses way beyond its description in the above sections. As well as being found in the arteries of the FRS' data export and import functions, where data move and transform, or in the intensive and extensive exchanges between an analyst's intuition and a computer's ingenuity, interfaces exist as moments that take place every time someone turns their computer on in the morning.

Interfaces are a general condition of everyday life in organisations reliant on digital technologies to operate and, as seen where they are considered as a pronounced governmental mechanism, punctuate routines and are embedded in the rhythms found in back offices. By this token, they also have a profound consequence for how the future becomes an object of governance rendered in the present. As an everyday condition, consider for example the interfaces that characterise the role of the IRS Quality Assurance Officer. Amidst the data sourcing and circulation processes described above where the 'data' produced from fire incidents are captured and digitised, the IRS Quality Assurance Officer verifies the accuracy of the data imported and around which strategic decision making will be based. Their role is reminiscent of that played by the watchmen at the chancery in Cornelia Vismann's book *Files: Law and Media Technology* (2008). Although seemingly minor, the watchmen here determine what legal cases can be made and what cannot. Similarly, the Quality Assurance Officer has a huge impact on what from past fires becomes actionable digitised data. Their hand weighs down then on how past fire emergencies are recorded, what enters into the risk calculus executed by the FRS and, ultimately, what shapes decisions made which govern the future.

Returning briefly to earlier in the chapter, data from emergencies are circulated to the main IRS database from the FRS' control room and proforma reports at the scene. This might seem a comprehensive way to datafy emergencies at first glimpse. But the sources are from different sites and temporal coordinates. Data from the control room are generated at a distance but in the fire's real-time unfolding. On the other hand, the data emergent through proforma reports are collected at the scene of the emer-

gency but in its immediate aftermath. Due to the different spatial and temporal relations each data source has with the emergency, slightly divergent accounts of the same emergency are always offered. The Quality Assurance Officer's task is to identify and eliminate any discrepancies in the data produced from these different sources. It was stated by the Quality Assurance Officer that, for instance, the narrative log generated from the control room regularly over-stated the number of injuries a fire had resulted in. Taking stock of the emergency after its occurrence, the proforma report would be more trustworthy on such a matter. Data from the proforma report would be incorporated into IRS rather than data from the narrative log in this instance. In my conversations with the Officer, they justified this judgement by claims to their experience, both as firefighters and as the arbiter of all data accumulated from past emergencies. Taking precautions deemed necessary, the Officer believed that the contradiction between data emanating from the control room and that from the proforma report will have been generated when operative staff responding to a fire have called for resources for dealing with casualties but have not used them. This call would appear on the control room narrative log whereas the proforma report, being produced after the incident, would show that no injuries were inflicted.

But the Quality Assurance Officer is not only a role confined to that of adjudicator. Instead, the Quality Assurance Officer supplements IRS with additional data that could not be acquired during, or in the immediate aftermath of, the incident. The Quality Assurance Officer defined their role here as 'filling in the gaps' left by attempting to record data in real time. Not regularly known in the midst of its unfolding, the cause of fire, for instance, is frequently omitted from both data sources. In this everyday occurrence, the Quality Assurance Officer will consult the Fire Investigators who examine the wreckage a fire has inflicted to determine the cause of the fire. Alternately, the Quality Assurance Officer described a situation in which the name of someone killed by a fire was omitted from the IRS database. The victim of the fire was identified not through queries in the FRS digital infrastructure but by a local newspaper article.

Unlike FSEC analysis, the interface which takes place between Quality Assurance Officers and IRS is not formalised or bound by any algorithmic instruction embedded in the design of software. It is an interface rather that has gained consistency through its performance as a matter of

everyday routine (see Neyland 2015). The relation between human and computer here takes on automatic qualities in some ways because it eludes and elides the interruption that thought would punctuate such quotidian processes with. Although the absence of critical thinking actively aids its smooth routine functioning, it does not mean IRS quality assurance practices are devoid of intellectual legitimation. The interface occurring evidences, indeed, the enrolment of new forms of knowledge into the risk identification and calculation process altogether. In all cases where a decision is required, the Officer sides on their experience to distinguish between accurate and inaccurate data. Built up over years in the job, the Officer's experiential knowledge feeds directly into the quality assurance process (Ong and Collier 2005). It should be recalled that this quality assurance process occurs between those other practices elaborated on above. It acts as a bridge between data sourced and the analysis which determines how fire risk will appear. Experiential knowledge guides decisions around what data to include in later analytic processes which bring to light potential futures. Thus it is an interface that has major ramifications for the way that the FRS envision the risk of fire overall.

3.5 Conclusion

With emergency governance and security increasingly premised on an array of digital devices, moments of interface need to be engaged with seriously. Interface accounts for the various meeting points, intersections and physical enmeshing that shape the practices of digital infrastructures that, by the accounts of contingent futures they produce, underpin action and decision making across the domain of security. The more one furrows into the functioning of this infrastructure, however, the more problematic and complex our necessary understanding of interface becomes.

As the chapter has evidenced, interfaces allow for an exploration of the material emergence of data fundamental to risk identification. Interfaces engineered between different flows of data and software organise the processes of data sourcing which form basis for the capture, digitisation and integration of data without which risk analysis would be impossible. Whereas the emergence of digitised data compels a narrative of the inten-

tional entanglement of materials and their transformation, converging with one another, some interfaces extend our thinking around processes of enmeshment and what can enmesh altogether. As we have seen, things interweave at the point of interface whose material basis is more difficult to pin down. Discreet modes of thinking, from the intuition of the analyst and their imaginative capabilities, to the efficient functioning of algorithm-based computer cognition, are all enrolled in the practice of making articulating the contours of possible futures in the here and now. Taking place on the computer screen these cognitive processes find a material basis in moments of interface.

Whether referring to data sourcing processes less immediate to human recognition or more creative performances which envision the future, the interfaces discussed are enwrapped in, and produce anew, the routine organisational processes the FRS have gradually formed over time to identify risk. As noted, specific rhythms consolidate and make normative moments of interface. This is evident in the case of FSEC risk mapping and resource allocation, where hypothetical calculations that equate response time to fire severity are run over and again until an acceptable level of fire risk is found. The analyst, their eyes fixed onto the computer screen, interfaces with FSEC in a way that bears to it an iterative rhythm with each re-run of the calculation toeing a fine line between pure mimesis and slight difference.

Considered crucial to such things as resource allocation in the case of FSEC, interface challenges and effectively stretches assumptions about where to locate the exercise of power and what forces are invested into it. Interface itself should be understood as a vital governing technique; one which enrols required material and cognitive forces into risk management and helps to shape the conditions of possibility for the relationship which holds between modes of governance formulated in the present and perceived futures. With data sourcing practices and FSEC analysis, the efficacy of interface is very much manifest. In other ways, however, the importance of interface is less planned, more unintentional, making a difference that is less apparent but equally as significant for how risk eventually appears. This is particularly with the Quality Assurance Officer who stands at the gates of the perceivable future, deciding what enters the risk calculus and what does not.

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4

Exercising Uncertainty: Aesthetic Renderings of Future Emergencies

4.1 Thinking Aesthetics, Complex Uncertainty and Decentred Performativity

As moments and spaces ever present in the everyday life of risk analysts, interfaces make possible the insertion into the risk calculus forms of knowledge beyond those formulated through prescribed algorithms or those based on statistical accounts that have developed through the history of fire governance as traced in Chap. 2. Where analysts encounter other elements of the digital infrastructure, they affect calculative processes in a way that enrols their experience built up over time. In this chapter, I want to probe further the issue of the diverse array of knowledges through which futures are made objects of governance in the present by examining how aesthetics enters into the contemporary risk calculus of the FRS. Where aesthetics is considered is in the design and performance of emergency training exercises in the FRS. These exercises present imagined, novel emergency scenarios around which firefighters practise, and develop new forms of, response. Officially, exercises serve two purposes. On the one hand, they assess the continuing worth of extant protocols for responding to different types of fire emergencies. On the other, they serve to develop

N. O'Grady, *Governing Future Emergencies*,
https://doi.org/10.1007/978-3-319-71991-7_4

wholly new protocol to prepare for types of fire emergencies that have yet to be encountered. Exercises thus play a central role in refining and influencing the set and sequence of actions and performances that firefighters take to attend to fire emergencies as they unravel as inchoate scenes.

How might those forms of knowledge deployed in the contemporary FRS to make sense of futures to come be described as aesthetic? Arguments made by Friedrich Nietzsche (1872), and currently by Frederic Jameson (2015), help in answering this question. For these authors, aesthetics is conceptualised by its product and how that product is registered and experienced by human beholders. The aesthetics of a product is said to induce new physiological states in their beholders. These states are rendered intelligible as different kinds of feelings that both mediate and consolidate the encounter between aesthetic products and those bodies they relate to. The rendition of aesthetics here sheds a somewhat different light on how the enrolment of aesthetics into the security apparatus has been elaborated elsewhere. In these accounts, aesthetics is linked more to imagination and its capacity to traverse renderings of the future generated through methods grounded in logics of probability (Aradau and Van Munster 2011; Amoore 2014; de Goede 2008). Nevertheless, shared with these accounts is an understanding that aestheticised forms of knowledge are being used for a specific purpose: to render articulable and to govern futures whose uncertainty, until recently, had been considered beyond the realm of the fathomable. Some emphasise the importance of 9/11 in opening up the gaze of the security apparatus to ever more uncertain events that can only be addressed through the logic of outlining what might possibly come to pass. Considering the 9/11 Commission's criticism of those responsible for emergency planning procedures for not using their imagination enough to perceive and apprehend the litany of threats the USA could possibly be exposed to, 9/11 is certainly an important juncture (2004). But recognised uncertainty regarding future emergencies, emergencies which need to be prepared for but whose shape, unfolding and consequence exist outside the realm of risk's articulation, dates further back than 9/11. Stephen Collier (2008), for instance, shows how civil protection agencies in the USA planned for atomic bombing in the midst of the Cold War, even though it was uncertain to the extent that it never had happened before on US soil. Planning was achieved here by knowing the threat through enactment exercises that sought to simulate

on paper the effect of a nuclear attack and, in turn, push for arrangements to secure against their potentially multiple consequences.

This desire to plan for events whose occurrence has new layers of uncertainty attached to them is definitely present in what follows in this chapter. However when it comes to the design, performance and deployment of exercises in UK emergency preparedness and response, the relationship between aesthetics as an affect-based provocation and uncertainty extends in additional ways too. The temporal parameters under which uncertainty is cognised shift somewhat. In those accounts above, uncertainty is largely conceptualised as a category to be attributed to future events that exceed knowing through conventional risk analysis methods structured according to logics of probability. Whilst being deployed to make sense of emergencies considered uncertain in this way, exercises also suggest a rendition of uncertainty being mobilised in the security apparatus not found in literature up to this point. In this chapter, uncertainty is also a condition that will characterise future events as they unfold as present states. Uncertainty, in other words, is not just a reference to a future event. It is also something inserted into the event as it unfolds before the eyes of responders. Rather than figuring uncertainty as the likelihood of knowing or not knowing a future state of affairs, uncertainty in exercises addresses how future emergencies will be experienced when they unfold in the present as contingent and indeterminate situations. Uncertainty is mobilised to account for the complexity of the present event as well as designating the vagueness of the future event.

With this temporal re-categorisation of uncertainty, the role of the beholder shifts and takes on new forms. The position of bodies in relation to and amongst the products of aesthetics aligns with Nigel Thrift's (2007) elaboration of how non-cognitive aspects of consumers are harnessed and incorporated within new modes of production. For Thrift, the situation here is one that reiterates that 'consumption has become, in some sense or another, productive: consumption is no longer a terminus but a complicit and creative relay in the production of capitalism' (2007, 33). People are not passive perceivers of aesthetic products and what they represent. Instead, they are participants whose impulses, no matter how expressed, actively contribute to the situation they are encountering and alive within. Articulating the bodies caught up in their production as beholder-participants rather than beholders pure and simple, exercises

can be said to be performative. Exercises are performative because of how they bring situations and realities to life through the actions which take place within them (Davis 2003, 2007). In line with the rendition of aesthetics offered above, what firefighters offer to the liveliness of the scene portrayed and play out is their bodies. These bodies possess the capacity for different sensorial, affective and emotional responses to their surroundings. It is through the actualisation of these capacities in the form, for instance, of hearing, touch, movement to panic, fear and confusion that exercises perform the complex uncertainty of future emergencies.

At the same time, the notion of performativity operating in exercises needs to be pushed further. In particular, a step back needs to be taken to examine the process being performed rather than what results from the process itself. In so doing one's conceptual gaze falls less not only on a singular object produced but the multiple relations which underpin the exercise itself. The complex future event imagined in emergencies is orchestrated through the array of engagements made and continually remade between different bodies, their sensorial outputs, technological devices and other objects found in the exercise site itself. Aesthetics appears not as a monolithic entity here. Instead, it is present by the compilation of different representative forces. For these forces to take effect, however, they need to be provoked on an array of more-than-representational registers, in the performances of their beholders who actively co-constitute the scene being played out. Ultimately, a kind of decentred performativity characterises best the mobilisation of exercises as a means by which aesthetics can feature in an organisation seeking to govern uncertain and complex futures.

In relation to exercises, performativity should not only be considered according to the futures acted out. Instead, it needs to be engaged with in terms of the forms of governance that exercises affect. As noted, the development of new protocols for governing emergencies is reliant on exercises. As are existing protocols for their continuing validation. Renditions of the future generated in exercises are used then to gauge how protocols might have to be adjusted. Exercises also act as a site for the generation of new ways to attend to emergencies altogether. These protocols structure and guide how emergencies are responded to. Exercises thus shape and bring into reality new forms of emergency governance. In terms of both their

performance and their consequences, exercises and the aesthetic forces enfolded and enacted therein are not just performative in the sense that they bring new speculative futures to light. Instead, they are also performative in that their acting out constitutes new political realities relating to events and the art of their management. The conditions of possibility for new protocol are thus premised on exercises. What becomes apparent through the chapter is that protocols mirror the same dynamic as those exercises which give birth to them. Rather than being thought of as stable modes of intervention, protocols are continually made and remade in a way that reflects the performativity of the exercise. Further reflecting the dynamic of the exercise, the construction of protocols attunes also to the complex uncertainty that exercises seek to render experiential.

4.2 Designing Exercises

The most important source for identifying possible fire emergencies to be acted out in exercises is the experiential knowledge of personnel. Training Coordinators, who construct and oversee the deployment of exercises, will have the most authority in identifying the new forms of fire emergencies. As explained to me by the Training Coordinator, new possible fire emergency scenarios will emerge simply from living in the areas that firefighters simultaneously contribute to the governance of. The Training Coordinator gave an example when driving off-duty past a recently constructed industrial site that was not accounted for in the service's pre-existing risk assessments. Subsequently, an exercise was constructed around the specific risks inherent to the site. In addition, data acquired from previous incidents regularly highlight uncertainties by showing gaps in the current preparedness of the service. Along with acting in anticipation of and sensing new fire risks, those responsible for exercises emphasise how 'we can also be reactive…we might go to incidents… we see certain risks or through the debrief process (and) then (these risks) are actions placed upon ourselves in training (exercises)'. Exercises are developed around fire events due to a process described by the Training Coordinator where 'we've (FRS staff) attended something, we've seen an opportunity for learning and we've fed them into the system'.

Both lessons recognised from previous incidents and the experiential forecasting of firefighters are transformed into data which can be used to design exercises by 'simply going to the site (identified as risky) and taking photos of it'. To suit the desired representation of incidents however, these photos must account for different angles from which fire might be viewed. Four perspectives of the site must be captured in the photographs to generate a 360-degree perspective. These photographs are uploaded into a software called Particle Illusion. Developed initially for cinema, Particle Illusion is a graphic motion technology used by the FRS to offer an audio-visual representation of fire events. Through Particle Illusion, the photos taken will be sequentially synthesised to form a panorama of the site at which the incident is imagined to have occurred. Layered on top of this panorama, an in-built 'fire graphics' component in Particle Illusion presents flames and smoke, visualising the extent of fire and the gradual deterioration of buildings at the site. Other data are inserted to enhance the visual simulation of future fire events. The force of fire will be envisaged by factoring in how wind speeds determine the fire's velocity and spread. The so-called weight of the fire is also represented according to the interaction the fire would have with the material contents found at the site. In addition, the sound of fire will be inserted through an audio component. Overall, a 30-second audio-visual clip will be created, looped and adjoined to clips showing the initial intensification of fire and its decrease to intimate eventual control through the response of the FRS. The moving panoramic scene of future emergencies that Particle Illusion visualises is further brought to life when it is inserted into the space in which exercises themselves are performed, which the chapter now turns to consider.

4.3 Performing Exercises

Reclining in his swivel chair as I linger behind, the FRS' Training Coordinator begins to undertake a task they consider ordinary; orchestrating an exercise designed to assess and develop new protocols which structure response to fire emergencies. Immediately in front of the Training Coordinator is a computer screen. Behind this screen are rows of projector screens, four screens across, three screens high. Together these

projectors cover an entire wall in the control room of the FRS' Incident Command Centre from which exercises are coordinated, managed and staged. Across the bottom row, the screens show different scenes of the emergency imagined. The emergency imagined is brought to life here according to its audio-visual characteristics which have been generated through Particle Illusion. In this particular iteration, the screens depict a forecourt and an iron-clad factory from the top of which emanates chokingly thick, black smoke. A slight, horizontal line bordering the roof of the factory burns bright orange with flames. These screens collectively act as control computers from which the imagined and envisioned emergency is uploaded and projected onto correspondent screens located in four partitioned rooms immediately below the control room, where the exercise itself will be acted out. The screens sitting above this bottom row allow the Training Coordinator to monitor and scrutinise the exercise underway below. One row offers a fixed perspective on each room. The other row offers a view between these rooms, presenting a seamless view of the movement across the space. Further to this CCTV surveillance, the control room and exercise site are connected by microphones so that the exercise can be heard as well as watched by Training Coordinators.

Adjacent to the control room, the exercise starts with 15 firefighters huddled in a room together being offered a purposefully vague back-story to the emergency imagined to have struck. Different roles and responsibilities are delegated across the 15 appropriate. An Incident Commander is selected who is in charge of overall response strategy, Watch Managers are designated next, then Crew Managers and lastly firefighters who attend to the flames on the ground. Through this rapid division of labour, the apparatus of security peculiar to the emergency is assembled and arranged. In so doing, however, the exercise and the emergency performed are also afforded some baseline temporal structure. This is because the delegation of roles serves to serialise response, with the Incident Commander first to arrive at the scene with a driver and two firefighters. Later they will be joined first by a Watch Manager and then a Crew Manager and all their respective human resources.

With the activity in the control room ongoing in parallel, the Incident Commander enters the scene of the emergency to encounter the fire. Four screens, each showing a different perspective on the emergency, can

be found across the four rooms that make up the site of the exercise. The Commander's view is restricted to one angle on arrival, being obfuscated by the partitions which divide each room from the other. To gain a comprehensive, 360-degree, visual perspective of the emergency the Commander navigates their way through the divided spaces. It is only through their movement across the site, traversing the partitions blocking their view, that particular attributes of the emergency come to the fore for the Commander. This might include the location of the fire's initial combustion, the consequent hazards it has given birth to as it entangles with different objects and any signs of life whether obvious or subtly indicated.

What I described as the decentred performativity of the exercise is evident here in how the participant's sense of what is going around them depends on how the emergency imagined is projected onto material objects that populate the exercise site. Although the images of the emergency are important, the emergency is not simply visualised on the multiple projector screens scattered throughout space. Instead, the emergency imagined gains volume and depth by being found on walls furthest from the rooms' entrance (Elden 2013). The partitions found in this site block one's line of sight too. The experience cultivated, and its effects, resonates here with what Claudia Aradau and Rens Van Munster have described in relation to similar exercises in which, as they astutely observe, 'It is the clear delimitation of space' (2012, 103) found in exercise sites that work 'to reframe the unknown, uncertain and unknowable future into the thinkable materialities of space' (ibid.). It is in the meeting of participant's vision and material objects that the emergency deemed unknowable, to have never occurred before, can be made into a situation that can be nonetheless experienced. It is important to note that the exercise does not present the emergency in its entirety here. Instead the emergency gradually comes into view. From the start of the exercise, the emergency is experienced as an emergent event. This sense of emergence is performed by the movement of the Incident Commander as they cross through each partition.

As its initial description suggests, the evocation of the emergency arises on a number of different registers gradually and accumulates as the participant performs the exercise. This sense of the emergency whose character

develops gradually is reinforced through the exercise's continuation, its extension and consolidation as a thing with a solid, if complex, temporality. As new participants beyond the Incident Commander are introduced, what are called injects are beamed down from the control room into the exercise at particular moments. Injects describe specific developments imagined to have happened which underpin the emergency's unfolding. The nature of these injects can be varied. Winds or the fire's interaction with certain materials might blow the fire into a whole new direction. Rowdy groups might appear on the scene or farmers demanding answers whilst their livelihood is being swept away amidst the raging flames.

Although deployed by them, injects are far from merely the product of the Training Coordinator's whim. Their content is instead premised on both the decisions made by participants and the Coordinator's desire to stretch the capabilities of participants further. To optimise the use of exercises, a tie is established between inject deployment and the actions and decision made on the ground. Turning to me as they introduced a company's fire safety manager into the staged fray, the Training Coordinator explained that 'You sort of… use your timescale dependent on the individual to get more out of exercises'. This is not to say that the emergency's imagined development will resonate with the intention of the participant or their expectations when making a decision. In some cases, quite the opposite is ingratiated into the emergency. When the Incident Commander requested new resources at the scene, for example, the Training Coordinator explained how these resources would be delayed on purpose. Usually the participant can expect 'a second appliance (to) come in two minutes' after the first appliance has arrived. The Training Coordinator goes on to note how 'we might hold those appliances back' in exercises.

Decisions about what injects to deploy and when to deploy them are important because injects add to the baseline underpinning the exercise's temporal development or what the Training Coordinator described as the 'timescale' of the exercise. Injects, as Adey and Anderson (2012a) explain, are about 'letting the contingencies of response go in order to encourage improvisation and responsive decisions' (2011, 2879). Invoking the complex unfolding of the future emergency, the production of contingency in exercises is thus crucial also to its function as a mechanism to evaluate the technical competency of participants. The Training Coordinator peers

over their shoulder after introducing an inject into the exercise and narrates the process 'What is being tested here is how well complexity is broken down into sizeable chunks'. Switch perspectives on the exercise, moving from within the control room to the site in which the exercise is taking place, and what the Training Coordinator means by this can be appreciated better. On the ground, the participant in charge of response continually sectorises as the emergency imagined grows ever more complex. What sectorising means is the deconstructing of the overall space of the emergency and action taken by the FRS into smaller, discrete zones of responsibility. Once given a particular role, individual firefighters at the behest of the Incident Commander in charge will manage their own 'span of control'. The temporal punctuation of the exercise that injects make possible serves a double purpose. On the one hand it adds to the inchoateness and complexity of the emergency, imagined in part already by how relations are posed between participant's senses and the array of material objects brought to life at the scene. On the other hand, injects allow for the contingency of the scene created to become a point of reference for the development of new ways of responding to emergencies.

The projection, production and performance of the emergency as an indeterminate, contingent and inchoate scene, rather than rendering governmental intervention impossible, become part of the conditions of possibility for government then, particularly when government takes as it is object future emergencies whose likeliness in coming to pass is uncertain and based on speculation. It opens up for decision making in the way that Derrida, in *Adieu Emmanuel Levinas* (1999), speaks of it. For Derrida, decision making is only found where action is taken that confronts, and in turn affects, a rupture in pre-consolidated predicates concerning reality. From a Derridean perspective, the uncertainty envisioned and felt perceived in the exercise is not there to be made knowable. Instead it is there to engender genuine decision making which develops modes of emergency governance anew.

The exercise also opens up to investigation the ties between governing techniques and the aesthetic techniques that serve to evoke futures considered possible and uncertain. The forming of governing techniques through decision making does not simply outline a course of action but affects the unfolding of the emergency imagined itself. Decisions made

lead to new injects which depict the ongoing unfolding of the emergency. 'Decisions' (2012b, 2897) made in exercises, as Adey and Anderson remark, 'themselves open up to unexpected possibilities rather than close them down' (ibid.). The inject's betrayal or extension, in relation to the participant's decision, steers the development of the exercise. Technical considerations around, for instance, what strategies to use in formalising response efforts, or what resources to deploy, are enveloped in the proliferation of the exercise's unforeseeable movement from one moment to the next. Emblematic of the performance of the participants, strategic decision making actually helps to produce the aesthetic product that is the exercise.

4.4 The 'Realism' of Simulated Futures

In their dreams, the Training Coordinator explained that 'what we would do is take six engines off the run, go set fire to a building and run the incident that way'. Nodding to screens depicting the exercise 'this is the next best thing to simulate that'. Probing this topic further, the Coordinator expanded on what they saw as the realism of emergency training exercises. Realism for the Training Coordinator is, at least in part, cultivated through exercises' capacity to replicate, or strike resonances with, past events. According to the Training Coordinator, the software that helps to design the scenes of emergency exercised, Particle Illusion, is crucial to this resonance for two reasons. Firstly, the software offers visions of the future that can be considered realistic because they are premised on projections and assessments grounded in and reflective of the experiential knowledge of firefighters. Based on photographs that reflect staff judgements of danger in their local area, Particle Illusion acts to enfold the memory of firefighters into future speculations about potential emergencies. Inserted into the exercise itself, the resonance Particle Illusion has to past events extends on a number of further sensorial registers too; including the sights that one might encounter when approaching the scene of a fire and the sounds which might bounce across the space as response is underway.

The Training Coordinator's definition of realism bore other aspects to it. Realism was for the Training Coordinator secondly brought about too through the above discussed injects. When I asked why injects were

dropped into the exercise in a way that, as seen above, betrays the intentions and expectations of participants, the Training Coordinator responded that they should be used to make exercises 'as real as possible, replicating the complexities of real events'. This emphasis on complexity contrasts at first sight with the rendition of realism first elaborated. Rather than seeking to recall and re-provoke experiences of past events and create resonance with them in the present, realism is evoked here through capturing the complexity, indeterminacy and uncertainty of emergencies. Despite appearing paradoxical, perhaps these two renditions of realism, both of which are integral to exercises, might be reconciled if exercises are understood as performative devices in ways beyond that which has been claimed heretofore. Rather than taking their acting out as the point at which exercises bring possible futures to life, the performativity of the exercise should be read by its combination of different temporal points of reference for the imaginary which surrounds emergencies. For the Training Coordinator, exercises evoke affective states that validate the scenes projected because they resonate with a past event or past events. At the same time, the sensorial provocations are situated within a space that offers a speculative projection of the future. Memories of the past thus provide grounds by which uncertain futures can be legitimately evoked. The performance of the exercise enables connections to be made between past and future. In so doing, the projections of the future that exercises make perceivable are deemed plausible and are taken to inform the developments of new governmental manoeuvres or protocols, to which the chapter now turns in more depth.

4.5 Affects, Attunement and Contingency: The Making and Remaking of Protocol

Across emergency responders, protocols refer to guidelines that advise on the sequence of actions that should be undertaken in both strategising and physically attending to fires in their real-time unfolding. Protocols are preparatory devices in that they are developed and established in advance of emergencies whilst also seeking to draw parameters around how those attending to emergencies will act within them. As noted above,

exercises serve to test out protocols already in existence. Exercises are also put to work to establish new protocols entirely, in line with the new scenes of emergency situations that exercises depict, imagine and perform. Three categories of protocol are present in exercises. Standard Operating Procedures (SOPs) outline and seek to normalise courses of action that should be taken in responding to fires in particular types of locations. This might include, for instance, fires in high-rise buildings, factories or vehicles of different kinds. They include instructions on how many personnel should be deployed and what resources will be required according to the fire. The second protocol, Generic Risk Assessments (GRAs), refer to how personnel at the scene should strive to make sense of the fire's likely development. These evaluations will then feed into what courses of action should be taken. Site Specific Risk Information (SSRIs), the third protocol, are similar to GRAs in that they formalise procedures for weighing up the potential development of fires. But they do so in relation to particular locations within an area governed by a local FRS. SSRIs are also performed temporally in a different way to GRAs. Rather than just addressing a future emergency to be prepared for, they seek to develop means by which responders can evaluate risks as the emergency is developing in the present.

Protocols, however, are not only present as things generated through or gauged against the scenes found in exercises. Instead, as the Training Coordinator described: 'SOPS and Site Specific Risk Information… will inform a lot of the work initially before we start preparing the exercises'. In particular these protocols act as guidelines for locating gaps in the strategies already developed by the FRS. Protocols are thus used as limit points to identify new modes of action that need to be developed in order to attend to emergencies. Where protocol stops is, in many ways, where uncertainty starts. Seeking to address uncertainties, gaps in protocol serve to legitimate and justify the development of new exercises. Inscribed into the generation of new protocol is thus the sense of uncertainty which designates future emergencies by their existence beyond mechanisms currently in place for their governance.

Intimately tied to the uncertainty around future emergencies, protocols themselves are also generated in a way that corresponds with how exercises depict emergency scenes as complex events unfolding in the

present. Specifically, protocols are gauged and developed through the set of affective responses that are provoked by participants as the participant-beholders of the exercise. For instance, the injects discussed above are particularly important for the Training Coordinator because of how they enable the development and assessment of Site Specific Risk Information. These protocols are designed with the aim in mind of allowing responders to dynamically evaluate the set of happenings characterising the fire and, from there, make decisions on what needs to be done. In the words of the Training Coordinator, these protocols aim at ensuring that responders can 'think on their feet' as emergencies unravel. To do so, the sense of contingency in exercises must bring about sufficient interruption to what the participant wills and what they expect in order to make them think. The term think on their feet speaks very well to the emphasis across literature on affect on how the body and its movement is not only a means for rendering the material world perceivable. Instead, affective forces combine what is perceivable with what is intelligible (Berlant 2008; Dewsbury 2015). Through exercises, protocols in the form of SSRIs bear the trace of and seek to ensure that responders can use their bodily senses as ways to think and strategise as emergencies are in the midst of their unfolding.

In emergencies themselves, the ties between affect and protocol evidence themselves in further ways. Protocols also harness affective forces in attempts to ensure that action can be taken when emergencies unfold. They do so by framing the relation or encounter (Wilson 2017) that takes place between responders and the wider material composition of the space of the emergency. In open plan buildings then, firefighters are forewarned of the extreme heat produced in such atmospheres because of the steel beams such places are now constructed from. In smaller residential buildings firefighters should also be aware of backdraft which can intensify the fires' spread when doors are opened and act as ventilation portals. Another example can be taken from SSRIs which structure response into fires at a height by warning of both smoke plumes which obfuscate from view the site at which the emergency is taking place, at least in its entirety. Drawing on Brian Massumi's terminology, protocols are governmental mechanisms which work through 'affective attunement' (2011, 111). Protocols facilitate the development of bodily repertoires by

which emergency responders can forge relations with each other and across the broader material conditions in which they are present to make sense of the situation encountered.

Enveloping within their design renditions of uncertainty as something that both locates events in the future and makes experiential the complexity of such events when they occur in the present, protocols possess a particular dynamic to their performance. All protocols discussed here are punctuated processually. Instead of being crafted and deployed when an emergency befitting takes place, protocols are caught up in a process of being continually made and remade. The actions contained within SOPs change according to new strategic directions taken by the service in a way that reflects changes in the broader local, national and international risk landscape. Whilst, as the Training Coordinator stated, 'SSRIs are (established) on a three yearly review basis, but are again prompted by local, national and regional events'. Subject to continual reassembly, protocols are inscribed with the sense of contingency that characterises emergencies and that exercises seek to bring to life.

4.6 Conclusion

Aesthetics is now a form of knowledge enrolled as a matter of routine in the FRS' attempt to make sense of and govern fire risk. It is integral to the lived relation to risk found in the FRS. Aesthetics is mobilised to make sense of future emergencies in a way that might be obfuscated using those modes of calculation and statistical representation detailed in early chapters. In a way furthering what was examined in relation to interface in Chap. 3, aesthetics renders future emergencies present instead upon affective and sensorial registers.

Where aesthetics plays this role is in the designs, performances and spaces that make up exercises in the FRS. These exercises seek to simulate future emergencies. In so doing, they are enacted to both assess and develop anew protocols through which action can be prepared for, and deployed amidst, future emergencies. Based on aesthetic modes of knowledge and practice, exercises depict events whose uncertainty is such that they are closed off from the modes of calculation discussed in earlier

chapters. As is the case in relation to aesthetics more broadly (Amoore 2013; Der Derian 2000), other work has pointed this out before (Aradau and Van Munster 2012). But in this chapter, the meaning of the uncertainty encountered has been extended. Exercises do not seek only to breach the limit of knowability imposed according to other calculative techniques in order to articulate the likelihood or possibility of events. Instead, uncertainty is used in exercises to invoke the character of such future events when they unfold as a state of affairs in the present. Uncertainty comes to incorporate and articulate the emergent, inchoate complexity of the future event as it unravels in the present.

Exercises are able to evoke such complexity because, instead of making emergencies calculable, they make emergencies perceptible. Future emergencies are made things that can be experienced across and amongst the bodies and materials present in the exercise. The sights and sounds of the future emergency are imagined. At the same time, the emergency is afforded a sense of temporality and spatiality. At the intersection of these forces, emotionally punctuated states such as confusion are created between beholders and the event in which they are immersed. As a site from which affects and emotional entanglements emanate, participants are enrolled into the very making of the scene depicted, going beyond being beholders and becoming producers of the future.

This percept-based making of the event is thus one way in which the exercise can be conceived as a performative, aesthetic security device. But the performativity of the exercise is prevalent in other ways too. Elaborating on what the Training Coordinator saw as the realism of the exercise, the chapter demonstrated how the performance of the exercise and its orchestration across affective registers mean that the scenes experienced enfolds memories of past emergencies into simulations of future ones. The sense of supposed realism that is imbued in the scenes brought to life in exercises legitimates and opens up the possibility for the development of new kinds of protocol. Exercises introduces new modes of action that will be adopted in emergencies such as Site Specific Risk Information, SOPs and GRAs. The chapter has argued that the trace of the exercise in protocol is not simply confined to its role as creator. As seen in the last section instead, a sense of the contingency of exercises is

inscribed into protocol. Generated through exercises that are designed and revisited, whose scenes are made and remade as they are performed, protocol too should be seen as a processual governmental technique ever caught up in a dynamic of reassembly.

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5

Big Data, Subjectification and Preventing Fires

5.1 Introduction

Surging and descending in trends that undulate through history, emergent at the interstice between human sense and digital computation, played out and performed across diffuse spaces and entangled in the various material forces found therein, this book heretofore has concentrated in many ways on how future fire emergencies are captured, articulated, imagined and even inscribed and performed on bodies in multiple ways. Foucault's work on security, and many inspired by him, might again be drawn upon here to understand this as the process by which the object of governance emerges. At the veneer, we might make of this term object of governance the way in which an entity, an event or future is 'objectified'. In other words, how it is rendered manifests under the gaze of its beholder. But, and in following what has passed in this book, such a definition cannot suffice because it does not explicitly accommodate for and capture what Mick Dillon refers to as the contingent 'vitality' (2008, 187) of the things rendered object. The conceptualisation of objects governed in this book is one that stresses in different ways how objects possess a life beyond the determination of those techniques, strategies and modes of intervention used to govern them. Indeed, this life becomes itself a fundamental

N. O'Grady, *Governing Future Emergencies*,
https://doi.org/10.1007/978-3-319-71991-7_5

part of the lived relation to risk that prevails and pervades everyday life in the FRS. As Chaps. 2 and 4 have shown in different ways, the partially ineffable status of fire, even when articulated as an 'object', becomes incorporated into the processes by which different forms of knowledge are generated about it. Further still, the agency of fire beyond its articulation in FRS regimes of knowledge affects strategies taken to govern it.

In this chapter, I want to change trajectory, at least somewhat, to consider how subjects are constituted through risk analysis and thus exposed to forms of anticipatory governance. That is how human beings are known through digital regimes of analysis and in turn made into things that can be governed. Tracing the emergence of new modes of subjectivity has been crucial to developing enhanced understandings of the catalogue of political implications that the enactment of anticipatory modes of governance carry with them (Aradau 2016; Butler 2004; De Goede 2012; O'Malley 2012). At the same time, the question of the subjectifying tendencies that anticipatory modes of governance possess has opened up for more thorough explorations of the technologies and mechanisms through which futures are rendered and security is organised and enacted. Biometric scanners, insurance premiums, financial transactions and social media are all sites, for instance, where the subject of anticipatory governance has been shown to be crafted in the present in different ways (Amoore 2006; Ewald 1991; Ericson et al. 2003; Gitelman and Jackson 2013). The mobility of bodies might be monitored and tracked. Alternately, the digital expression of a human might become the site for continuous data collection. So although oriented towards developing an understanding of, and intervening on, potential futures, these sites also constitute and shape how governance of human life takes place in the here and now.

In all these instances where futures are inferred through present actions and practices, there is an implicit relationship between the object and subject of governance. Think for instance of counter-terrorism efforts in rendering identifiable the next terrorist attack. Such efforts have been shown time and again in a variety of ways to operate with an implicit understanding of the suspect that is arguably racist, or fuelled by Islamophobia (de Goede 2012; Mythen et al. 2013; Valverde 2007). In

making sense of the future terrorist attack as an object around which governance must be shaped, new forms of subjectivity are generated and enter the social, geo-political imagination. There is a dynamic at play between subject and object here. Across literature, it appears as if the pursuit of the object of governance is enacted through attempts to know the subject itself. Or, vice-versa, that through seeking to know better that object in which government is interested, subjects are given form and character.

Rather than discussing processes through which they are constituted, another approach would be to discuss the mutual co-constitution of subject and objects in attempts to know and govern futures envisioned by their potential for contingency and disruption. This notion of co-constitution might explain why in *Security, Territory, Population* Foucault described objects and subjects of government in hyphenated fashion, as a subject-object. Consider for instance where Foucault discusses a distinction that might be made between a population to which authorities orient governing actions and renditions of 'the people' involved in revolt and insurrection. 'The people comprises those who conduct themselves in relation to the management of the population, at the level of the population, as if they were not part of the population as a collective subject-object, as if they put themselves outside of it, and consequently the people is those who, refusing to be the population, disrupt the system' (2007, 66). Suggested here is that, when seeking to secure whole populations, any action upon specific targeted subjects is designed to have a broader effect on securing against disruption to social order that objects of governance might bring about. This understanding of subjectivity as something always attached to the object of governance to which it corresponds or which it enlivens in some way can provide an important path for understanding how people become subject to fire risk governance. This is the case in particular because renditions of the subject in fire governance are usually emergent in a way extending less from data regarding specific human lives but from data related to fire incidents themselves.

How do these practices of identifying fire risk reflect then on the way in which subjects of fire governance are rendered? This question could certainly be answered in part in a way that others already have by pointing

to how the subject becomes a more fragmented entity when it is produced through digital machines. Appearing in the data segments generated about them across cyber-space, subjectivity is something scattered disparately. In their manifestation as the data generated about them, subjects, as Rita Raley argues, undergo processes 'in which bits and pieces of a supposed composite profile, which is itself an operative fiction, are sliced and diced into different tranches, such that a stable referential link to a singular entity becomes lost in a sea of user intent data' (2013, 127). In some ways prescient, Gilles Deleuze in 1992 referred to this incarnation of the subject as a dividual. Rather than being singularised and individisable, humans appear in digital worlds divided and segmented into discrete flows (1992).

Everyday processes whereby risks are calculated cannot leave the subject in this inchoate no person's land, however. The knowledge of populations and people that facilitate governance needs instead to be at least somewhat settled and stabilised. This is crucial if the information generated about people can be ensured to provide the proper grounds for intervention upon them. Although existing in this divided, fragmented and scattered way across multiple flows of data, the dividuated subject is not an end-product then. It is rather a foundation for the creation of stable forms of subjectivity which are consolidated through the gradual piecing together of data. Instantiated through the practices by which data on fire risk are accrued and made sense of, subjectivities thus emanate from complex processes of assemblage (Dittmer 2014; Grove and Pugh 2015).

Along with being spatially arranged and orchestrated in this fashion, close attention must be paid also to how the subjectivities prevalent in the FRS are moulded in a way that resonates with the fact that the FRS' calculative apparatus is directed towards making sense of emergencies as future events specifically. To an extent, the temporal punctuation of subjectivity at play in the FRS has been outlined above because it fits into a wider mode of governance that makes people governable in the present according to the statements which can be made concerning their possible future. Stitching discrete data flows and sets together can be generative of such statements. According to the type of emergency being addressed, however, different aspects of a person's potential relation to the future can

be emphasised in making them governable. In relation to the biometric scanners and other border technologies alluded to above, people are often rendered subject by the potential danger they represent. With an emergency such as fire in which human complicity and intent feature relatively low on the litany of factors causally linked to occurrence, different relations between the future and people governed become prominent. Subjectivity emerges most commonly where vulnerability to fire is discussed. Vulnerability, as Judith Butler discusses, can provide a commonality amongst humans which establishes the basis for visions of shared, co-existent life (2004). For Butler, this is the case because of our collective servitude to finitude, to mortality. In trying to know fire, this collectivising function of vulnerability becomes recognisable. Vulnerability is, as will become apparent in reading this chapter, used to render whole populations and communities subject to risk analysis and governance. Developed through their intentional gravitation towards understanding the object of fire risk specifically, any effect of vulnerability analysis in terms of bringing about cohesive communities does dissolve quickly in practice, however. Emanating through correlations between fire occurrence and a litany of variables considered constitutive of populations, vulnerability becomes a divisive force that reveals different levels of exposure to risk according to borders principally perceived as geographic but which are also economic, social and cultural. Despite annulling any sense of critical communality developing, vulnerability might be seen to afford subjects with other agential capacities. Vulnerability opens up to enquiry how renditions of subjectivity that proliferate in local contexts might be contested and subverted. As the chapter goes on to show, contestation appears where those considered vulnerable are shown to circumvent the gaze of the FRS. This subversion, however, only leads to new forms of assembly through which subjects are constituted and made governable. The central focus of the chapter that follows is with how vulnerable subjects are made in both co-constitution with the object of fire risk and in a way that speaks to their assembly. Initially, and by way of introduction to the software through which vulnerable subjects are identified how, the chapter examines the FRS' appropriation and deployment of technologies that are reliant on so-called Big Data.

5.2 Bringing Big Data into the Fire and Rescue Service

When I heard about the Edward Snowden revelations, I was sitting on the same sofa, on the same spot, as when the news came through that the solider Lee Rigby had been murdered in what was branded a terrorist attack outside an army barracks in South-East London. Although the former event had a more profound effect on the politics of security post-9/11, it was the latter that shocked me more. One reason for this was because the beheading of Lee Rigby happened less than a mile away from my home, on a road I regularly walked down. But the more important reason was my complete lack of surprise when the radio began to detail the depth and breadth of the dataveillance practices that Snowden had leaked. Like many academics have said to me over the years that have since elapsed, I mistook for common knowledge the fact that public and private security agencies were continually gathering massive amounts of data on people from social media websites. In other words, that the Snowden revelations, as they have been called, weren't really revelations at all.

My dulled reaction to the Snowden leaks was grounded in my research at the time into the use of so-called Big Data resources being deployed to inform, shape and facilitate the FRS' fire prevention activities. My attention had honed in on one software specifically called MOSAIC which is designed by the credit checking company Experian. Akin to the Snowden leaks which would make their appearance in the world a matter of months later, what appeared remarkable to me about Experian MOSAIC was the sheer amount and range of data it possessed regarding the population of Britain. Seeking to unveil what it considers 'the latest trends in the U.K' (2009, 4), Experian MOSAIC draws upon over '440 data elements' (2009, 5) in its monitoring of the population. Thirty-eight per cent of this is drawn from long-standing large-scale surveys such as the British Crime Survey, Higher Education Statistics and a wide array of information that can be gleaned from the England and Wales Indices of Multiple Deprivation. Accompanying these secondary data, the remaining 68% are drawn from Experian's own data repository called the Consumer Dynamics Database. Data on the financial behaviour of 66,000 people, supplied by YouGov, are present here, as is TNS BRMB's Target Group

Index Survey of around 250,000 people's consumption of different products. Consumption extends also to the population's digestion of mass media too. MOSAIC's biggest supplier of data for this is the Research Now company, which conducts surveys of what around 350,000 people watch, listen to, what they read and their opinions on it. Perhaps what strikes an even stronger chord with the Snowden leaks is that the open access publicity promoting and advertising the software emphasise that, beyond these sources, MOSAIC is also based on data sourced from Experian's own Hitwise consumer intelligence system. Installed and embedded into willing participants' computers, this system tracks their movement across different websites whilst browsing. At the time of the research, Experian claimed that this device monitored the movement of around eight million UK citizens across the web. This massive set of data is refined and categorised overall into six different types: demographics, property value, social economics and consumption, property characteristics, location and financial measures (see Fig. 5.1).

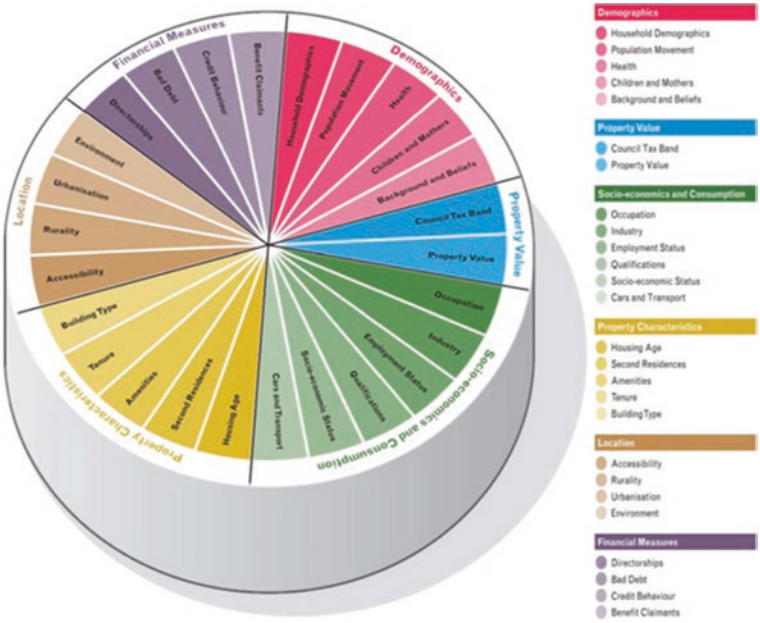

Fig. 5.1 Range of data sources Experian MOSAIC draws upon

Accumulating, compiling and ordering these massive data, Experian MOSAIC purports to afford a highly detailed and comprehensive insight and overview of the different lifestyles that supposedly exist across the UK. Here, MOSAIC might be said to delve into the business of what Ian Hacking refers to as 'making up people' (2006, 161), of taking accumulative sums of data to construct different ideal types of human beings that are said to exist. These people types emerge through the stitching together of different streams of the massive data that are ever in the process of gathering. Demographics of age, sex, ethnicity, what people spend money on and what they believe about the world go into the construction of these ideal types. But, critically, so does the matter of space. Types of people emerge are consolidated and distinguished from one another according to their spatial distribution. Space is considered across numerous variables here. Types of people are associated with specific geographical locations. At the same time, people will be attached to specific forms of housing and also the industries which prevail within their location. The constitution of different people is inextricably linked in MOSAIC then to statements concerning wider spaces they inhabit.

This process of making up people and spaces gains its most forceful manifestation in the creation of different lifestyle classifications that MOSAIC breaks the population up into. Reflecting well the huge amount of data that MOSAIC captures, stores and utilises, 146 different types of individuals have been created by MOSAIC. This is whittled down to 67 types of households. At the broadest level of geographical scale and resolution, 15 different types of lifestyle post-codes are said to exist. These types run from group A: Residents of isolated rural communities and rural families often with city jobs to group F: Couples with young children in comfortable modern housing all the way to Group O: Families in low-rise social housing with high rates of social benefit need (2009, 10). Each of these classifications are divided within themselves and split into sub-categories. The different levels of detail and resolution contained within these classifications act as a means to sell MOSAIC to organisations. The more details an organisation wants, the higher the price. Perhaps unsurprisingly considering their subjection to drastic budget

cuts since the inauguration of Conservative-led government in 2010, the FRS have acquired MOSAIC at its most generic level that of the post-code.

Once bought, the FRS use MOSAIC to detail the various forms of lifestyles that exist across a specific region and how they are distributed. Showing how the constitution of subjects in the FRS is co-produced in line with the emergence of objects of governance, the distribution of lifestyles is correlated with the distribution of fires across space. Superimposed on to the lifestyles that have been mapped out are the location of all fires that the FRS has responded to over the last three years. Watching the screen, correlations become visible slowly between the fire location on the one hand and the types of lifestyles said to proliferate in particular places on the other. Reading through a logic of probability, where the formulation of past occurrences of an event into trends is believed to hold the key to their future occurrence, the map generated is assumed not only to reveal intimate connections between particular types of lifestyle and fire but also how these lifestyles relate to the future risk of fire. Risk calculations are achieved through what is called over-representation analysis. The different types of lifestyle claimed by MOSAIC to exist across the region are listed on a spreadsheet according to the percentage of the overall population they represent. This information is juxtaposed in an adjacent column with the amount of fires that have occurred in the post-codes these groups occupy. To paraphrase the analyst narrating this process as it was ongoing, it was stated that if lifestyle did not have an impact on vulnerability, the number of dwelling fire incidents in post-codes should match exactly the proportion of the population that fits into each lifestyle group. When viewing the spreadsheet, however, variances appear. As an example, MOSAIC claims that 10.40% of people residing in the region at the time of the research could be posited in the K50 lifestyle type. MOSAIC describes this group as 'Older families in low-value housing in traditional industrial areas'. Rather than finding that such a group accounted equally for 10.40% of all fires, analysis showed that this group could be connected to 13.56% of all fires. As the fire rate for this group exceeded the space they occupy in terms of population, they were considered particularly vulnerable to fire.

5.3 Governing the Vulnerable Subject Through Prevention

It is through the lived processes of acquiring MOSAIC and its data, customising it according to locality and then deploying it for purposes of fire risk analysis, that the FRS turn the population into something 'that is eminently governable' (Foucault 2008, 270) with different degrees of intensity depending on who someone supposedly is and where they live. Using lifestyle attributes, the function of MOSAIC in the FRS is to create risk profiles of those most vulnerable to fire. Through the establishment of risk profiles, the service can target particular subjects in the present to prevent fires in the future. MOSAIC facilitates decision making on prevention due to its capacity being, as one analyst noted, 'all about building… a fuller picture on where we are going to target, who we are going to target and how we are going to target'. The information that MOSAIC generates will be distributed to the FRS' Community Safety Team who use it to decide where to undertake what are known as Home Fire Safety Checks (HFSCs). Carried out by the Community Safety Team, HFSCs involve visiting domestic residences to install smoke alarms, to educate people about fire safety and to plan an escape route should a fire take place in the future.

HFSCs, and the lifestyle analysis that underpins them, feed into understandings of prevention as an anticipatory mode of governance. In some ways they extend commonly held understandings of prevention as something that stratifies government action by forging specific modes of temporal relations and the normalised social order that emergencies such as fire threaten to disrupt. Rather than seeking explicitly to change the world, prevention attempts to facilitate its continuation through eliminating identified threats which possess within them the potential for disruption (Anderson 2010a, b). A localised version of prevention, operating in the homes of a regional population, is found with HFSCs. The set of activities enrolled in HFSCs are purely oriented towards fire and the elimination of its risk. What it does not seek to do is alter people's lifestyles, at least explicitly. Prevention seeks to enable the proliferation of specific lifestyles whilst deducting from them the potential for emergencies to occur.

As a device that shapes and makes possible the set of interventions that the FRS can make, MOSAIC's significance to debates around anticipatory and risk governance can be explored further still. In particular, its application reinforces observations made concerning how concerted moves to knowing and governing risk specifically open up emergency response and security to the influence of private companies (De Goede 2012). Incarnate in the form of MOSAIC and its supplier, the credit checking company Experian, a new roster of actors can be seen to have an influence on how anticipatory governance is enacted. Such companies figure, initially, as crucial in the wider security apparatus by the feeder role they play, supplying data that would otherwise be inaccessible to authorities like the FRS. The world of data flows that they construct and build mean that private companies can leverage extensive power in emergency governance; a matter that one might consider to be wholly of public concern. However, and closer to the way risk analysis works to constitute the subjects of its governance, MOSAIC and Experian should not just be deemed data feeders, sources for the information which shapes attempts to prevent fire emergencies. Regardless of how efficacious this feeder role might be considered, Experian also provides the FRS with the category of lifestyle itself. Lifestyle is crucially significant as it allows governing agencies to account for the set of activities that characterise groups under their dominion. But, more important still, it enables governmental agencies to read such activities as so many proclivities which temper potential relations between one's life and its endangerment through potential emergencies. Through supplying data, Experian supplies material to instigate processes of risk analysis. But through lifestyle specifically, Experian sets the parameters for interpreting data, determining how populations are known and what might be made of their potential future.

5.4 Counter-Conduct, Counter-Subjectification

In their pursuit of knowledge concerning fire risk that can inform new ways of governance, the FRS develop and operate with particular subjects in mind. The ramifications of this everyday practice exceed the local too,

revealing more broadly the influence of major private companies in securing the world. Returning to Foucault, however, the story of how subjects are made would be unfinished if it was left at this juncture. For Foucault, the process of subjectification ushered in is not as straight forward as has been considered up to this point in the chapter. Instead, the formation of subjectivities is always met by some form of resistance to it. Whilst many analyses have claimed the inescapability of power-laden practices which emanate from approaches that take a Foucaultian approach, Foucault himself states in the first volume of *The History of Sexuality* that 'Where there is power, there is resistance' (1990, 95). This might seem a banal statement at first but it reveals a more nuanced understanding of resistance operating in Foucault's work than he has been given credit for. Rather than claiming that resistance is impossible, Foucault argues that resistance is always bound up with the broader power relations people are subject to. Across his body of work, the best place to see this argument is in Foucault's elaboration of what he calls counter-conduct (2007, 201).

For Foucault, subjectivity is not simply imposed from above on people by those governing. Instead, subjects are made as part of a broader philosophical and ethical process in which people mould images of themselves within particular historical moments. Foucault elaborates on this argument in his work reflecting on Immanuel Kant's *What Is Enlightenment?* (1984). Kant's exploration here stands out for Foucault because it shows how existence is rationalised in a way that is dictated by the parameters and limit-points which shape the contours around knowledge at any specific historical moment. In other works, Foucault elaborates on this argument in relation to specific institutionalised practices. To come back to *The History of Sexuality*, for example, Foucault elaborates on knowledges around sexual practice which induce techniques of self-care that accumulate to form sexualised aspects of subjectivity (1986). Subjectivity is created in part, then, by people adopting specific practices and thus autonomously aligning themselves to broader power relations and the forms of knowledge that orchestrate and emanate from them. The autonomy invested in such a process opens up the potential for resistance or what Foucault refers to as counter-conduct. Implicit in inviting individuals to rationalise through dominant forms of knowledge the set of practices which constitute their existence is the possibility for disagreement

and the development of new ethical trajectories for life. By renegotiating the conditions of knowledge in which life is conceived, new relations to power and modes of subjectivity can be instantiated.

In relation to the lived construction of risk in the FRS, counter-conduct prevails in two, perhaps counter-intuitive, ways. Firstly, it is apparent in the concerns analysts raise regarding the claims that MOSAIC makes concerning the distribution of vulnerability and how MOSAIC associates vulnerability with particular ways of life. Secondly, counter-conduct is present in the processes of subjectification that MOSAIC applies to the broader population. This mode of resistance is far from explicit but instead develops from how people embodying and exemplifying traits that MOSAIC would associate with certain lifestyles inadvertently evade and avert the gaze of digital software. Both of these forms of counter-conduct, of resisting dominant forms of knowledge, do not lead to the breakdown in modes of governance. Instead, they compel improvisations in, and extensions of, the practices through which vulnerable subjects are identified and opened up to the set of preventative interventions documented above.

MOSAIC's spatialisation of lifestyle and vulnerability, although the very grounds enabling the correlation between fire risk and different human elements of the population, is the topic of criticism amongst analysts at work in the back offices of the FRS. Premised on post-codes, it is on the register of scale that analysts raise their qualms, with the statements MOSAIC makes concerning vulnerability being perceived as 'too wide in scope and not targeted enough'. When I asked them to explain further, the analyst elaborated in a way that inverted Ian Hacking's notion of making people up alluded to earlier in the chapter, turning it on its head. By articulating vulnerability in spatialised form, rather than making concerted efforts to articulate particular types of individuals, MOSAIC's claims are treated by risk analysts with a mixture of care and suspicion because they are seen to bear the continual potential to make the most vulnerable invisible to the FRS. An example of this claim was offered hypothetically by the analyst, who sought to prove their point by asking me to imagine 'a little old lady… living on a street on her own'. They continue: 'It's a fairly affluent street, the houses are relatively new, that person would be tagged with the profile of that entire street. But the little old lady sleeps in the dining room because she cannot get up stairs…' . This situation,

the analyst suggested, would be an archetypal one suggesting vulnerability. The age of the person and their lack of mobility would mean they were susceptible to fire emergencies and especially endangered by its possibility. Articulated under the wide gaze of MOSAIC, however, any connection between fire risk and exposure would be severed, owing to the post-code that the person inhabited. When operating on a post-code level, the use of MOSAIC runs a significant risk of generating the illusion of safety for situations in which it would not otherwise be said to exist.

The analyst went on, describing MOSAIC as 'okay for looking at groups, you know, wider groups and streets'. But its ability to accurately inform the targeting of preventative intervention to those deemed vulnerable is threatened by its potential to overlook individual lives. Further reiterating the difference of FRS risk analysis from monitoring practices which might be found elsewhere in the world of security,[1] suggestions for updating MOSAIC granularity to an individual level are continually rejected on the basis that the drive to monitor lifestyle and identify fire only in its possibility cannot justify breaching privacy laws. It is at this point that the FRS find themselves in a conundrum. On the one hand, the service needs to improve targeting. These improvements can be made by extending monitoring mechanisms in order to know the lifestyles prevalent within the subject population in more detail. On the other hand, the service expressed a desire not to be seen as in breach of privacy laws, particularly in an age after the Snowden 'revelations'.

To deal with this conundrum, risk analysts in the FRS frequently pool the support of fire investigators working nearby. Arriving only after their occurrence, fire investigators survey the scenes of fires to deduce their causes, development and litany of consequences they have left in their wake. Long and arduous in nature, these investigations are usually reserved only for the fires that are considered most severe or important, usually where fires happen inside or cause substantial damage to buildings. They are also instigated where human lives are thoroughly entangled in the conflagration. This entanglement could refer, for instance, to cases in which human lives have been lost to the fire. But it could also encap-

[1] Of course, the most obvious example of the breach of individual privacy in the name of security would take place in the domain of counter-terrorism (see for instance, Lyon 2015).

sulate fires where a particular cause has been initially inferred, where foul play in the form of arson is suspected or where a fire has sparked to life due to accident or neglect.

Where fatalities have occurred, investigations generate an abundance of information, some of which will purport to suggest the type of lifestyle lived by those who are victim to the flames. Being exceptional circumstances, investigations probe with less legal restriction the lives of the specific individuals whose trace can be found in the aftermath of the fire. The gaze of investigations thus peers much further down, to a finer layer of granularity than the resolution offered by MOSAIC. Multiple lines of inquiry are pursued by investigators to grasp the causes behind fire incidents. Overall, they are pursued to build a psycho-social profile of the individual who has died. To do so, investigators initially contextualise the deceased by the social network in which they were situated. This construction of a 'social network' involves a visual element in which the deceased is situated in the middle of a spider-diagram. Surrounding the deceased are multiple lines of relations to others. With the name of the deceased in the middle, lines lead out to relations such as family, friends and connections to public services. By establishing this social network, investigators identify a host of contacts to be interviewed in order to accrue and construct a lifestyle profile of the deceased.

Subsequent to establishing this spider-diagram, investigators will first interview family members and friends. Secondly, by interviewing their doctor along with the coroner, the deceased's connection to public services can be examined. Family doctors will be asked about any afflictions the deceased had, if any medication was prescribed and of any substance abuse issues the deceased had such as drug addiction, smoking and alcoholism. Further details on such matters are provided by family members concerning living conditions, non-visible connections to other people or the deceased's mental health.

These relations do not work to directly provide seamless data by which a linear profile of the deceased can be built. Instead, what Aradau and Van Munster refer to as a 'conjectural reasoning' (2011, 31) takes place in which the investigator treats information received as so many clues by which to make comparative judgements and deductions to lead to a more accurate profile of the deceased. The investigator I interviewed spoke of how inter-

pretations could be made concerning how 'functional or dysfunctional' the deceased's relations were by contradictions in information supplied. The investigator described how a lack of knowledge held by family and friends regarding the deceased's lifestyle relative to doctor's records indicated what they deemed to be 'dysfunctional' familial relations. The two narratives of the deceased, one from engagement with public services, the other from private ties, do not necessarily work to construct a profile piece by piece. Instead, the stories of each contact can be used to identify gaps which might reveal how well integrated the deceased was in the social network that has been constructed around them.

Alongside interviewing people with whom the deceased held ties, the Fire Investigator undertakes an inspection of the premises in which the fire occurred. This inspection involves searching the property to discover both the exact material objects which could have contributed to the fire and how such objects work in relation to other clues accrued about the deceased's lifestyle. According to the Fire Investigator, the first place inspected will be the bins of the property. From this search, the Investigator can identify any substances that might have increased the vulnerability of the deceased to fire.

Information derived from both the inspections of premises and interviews with relations are interwoven to construct a lifestyle profile of the deceased and how such a lifestyle might be understood as complicit in the occurrence of a deadly fire. In one instance described by the Fire Investigator, two large bottles of whisky were discovered at the scene. This evidence contrasted with accounts given by the family of the deceased. Although certainly an alcoholic, the deceased was assumed to be reliant on excessive amounts of lager. From the doctor's narration of the deceased's physiology before death, the Fire Investigator had recorded that muscular depletion had developed from the deceased's alcoholism. In connecting bottles of whisky, the family's contradictory story and the doctor's diagnoses, the investigator could speculate on why the deceased turned to whisky, thus increasing their vulnerability to fire. Due to muscular deficiency, the deceased would not be able to carry a large crate of lager so moved to whisky with its lighter weight but higher alcohol level and flammability.

The level of depth and close narration of the victim's final moments stand in stark contrast to the classifications through which MOSAIC pur-

ports to know lifestyles and their connection to fire risk. When asked about the use of MOSAIC, the investigator added to analysts' critique, turning operational shortcomings of the software into a broader diagnosis of the FRS' approach. 'The Fire Service' the Investigator argued, 'focus too much on this predictive model of trying to get people in their pigeon holes'. In relation to making subjects of fire governance, reliance on MOSAIC leads to generalisation and casts views upon whole people, views that are far from settled, consensually held or, indeed, accurate. Such a debunking of broad MOSAIC categories is prevalent in relation to alcoholism. Alcoholism is a lifestyle trait with particularly efficacious connections to fire fatality and vulnerability. The assumed classification of the alcoholic, at least for the Fire Investigator interviewed, would be males in their mid-fifties with no long-term address. However, data from investigations point to another type of alcoholic, one that is known as 'functional'. Instead of male, this functional alcoholic, according to the Fire Investigator, is disproportionately female, in her forties and perhaps recently unemployed. Specific variables present in the investigation will intimate to the Fire Investigator that the life led by the deceased may be one of a functioning alcoholic. Homes inspected are described by their general cleanliness that is taken by the Investigator as indicative of the overall well-organised character of functioning alcoholics. The level of detail in constructing the profile of the functioning alcoholic can extend to describing their daily routine that has one novel event: the advent of fire. According to the Fire Investigator interviewed, this person will usually start their day administering routine affairs such as washing, paying bills and going to the supermarket. At the supermarket, alcohol is bought around mid-day. After returning to the house and drinking for a couple of hours, the person might 'pass out'. This routine has led to a fire in the past where falling unconscious has coincided with another activity such as cooking or smoking.

The Investigator's narration of the functioning alcoholic reveals another form of counter-conduct. Instead of being associated with analysts themselves, counter-conduct emanates here from within the population undergoing processes of subjectification via MOSAIC and vulnerability analysis. This form of counter-conduct has consolidated due to MOSAIC's inability to track, trace and predict human routine without the use of digital data. According to the Fire Investigator, the functioning alcoholic

could avoid being known by evading the means by which MOSAIC accrues data. MOSAIC depends in part on data available through credit card transactions that document consumer behaviour. Due to their perceived insistence on paying for 'everything in cash…on the day it was required', such data on the functioning alcoholic are usually unavailable. This insistence on prompt, organised and reliable routines is seen by the Fire Investigator as part of the functioning alcoholic 'not wanting to give an outward visual representation of themselves (as alcoholics)'. For MOSAIC, ironically, the avoidance here of credit card tracing technologies shows how functioning alcoholics could not be identified due to the very particularity of their personality that MOSAIC aims at capturing.

Encompassing both analysts' own criticism of it and attempts by vulnerable populations to avoid being monitored, two modes of counter-conduct are developed which offer resistance to the forms of subjectivation crystallised in MOSAIC. But rather than stifling forms of governance, these counter-conducts are rendered positive because they lead to an extension and consolidation of the risk profiles that fire prevention relies upon. This is achieved by efforts made to ensure that investigation information works in coordination with the lifestyle analysis of MOSAIC. Integration of these two knowledges does not take place in any official manner. It is not enacted through the export and import functions that exist between disparate databases, as described in other cases earlier in the book for instance. MOSAIC lifestyle analysis and fire investigation information are synthesised in the experiential knowledge of those mutually concerned with identifying those who are most vulnerable to fire risk. Rather than being integrated in a database, this synthesis is instantiated via the lived experience of working in the FRS headquarters and encountering both forms of knowledge concerning vulnerability to fire every day. The development of this experiential knowledge is aided by the way that the results of fire investigation are presented and the form in which they appear across the FRS headquarters. From its existence as a singular case file setting out the peculiar series of events and personalities which lead to a fatal fire, the information generated from investigations is broken down into variables concerning the victim's activities and demographic make-up. These variables are fed into a wider pool of information

accumulated from historic fire investigations. Gathered together, information harnessed from fire investigations shows the variables that have particularly strong correlations with the outbreak of fires that have led to a fatality. These variables might include, for instance, age and alcohol or, drug abuse, ethnicity and occupation. This information is plastered in posters across the walls of the FRS headquarters showing charts, tables and graphs. The form that investigation information finally takes here, then, is strikingly similar and comparable to that generated by MOSAIC and certainly feeds into risk analysts' understanding of fire and vulnerability to it. At the same time as stating that those most vulnerable to fire live here and buy that, a litany of more intimate personal attributes are unofficially enrolled into the risk profile of those most exposed to severe fires. Through this translation or re-expression of fire fatality information, the categories MOSAIC puts into practice are integrated with specific lifestyle attributes of previous fire fatalities. Subjects of governance are known at two levels of granularity by this integration. MOSAIC can outline where specific lifestyles can be found across the space governed whilst fire investigation can detail what particular activities are undertaken within these lifestyle groups. Along with being able to highlight the most vulnerable post-codes, specific lifestyle traits that amplify vulnerability to fire can be identified.

This integration between MOSAIC analysis and fire fatality investigations is enacted where decisions are made about where, and to whom, preventative intervention such as the above discussed HFSCs should be targeted. In terms of information circulation, the sources of MOSAIC and fire investigation information occupy either side of the Community Safety Team which is responsible for fire prevention activities. Fire investigations feed in-depth information relating to individual lives that have succumbed to fire. MOSAIC provides broad geo-demographic information on the distribution of lifestyles across space. For the Community Safety Team, MOSAIC shows the specific post-codes in which particular lifestyles can be found and to which HFSCs should be targeted. The Community Safety Team will undertake HFSCs in a way informed by fire fatality investigations by attempting to ascertain whether people drink or smoke to better gauge their vulnerability to fire.

5.5 Conclusion

Although understood as a construct, an entity whose emergence rests on the knowledge in which it is cast, studies in governmentality could furrow deeper to question the processes through which subjects of governance appear. This line of argument has been set out in this chapter by seeking to understand better how subjects and the processes which underpin their constitution are correspondent with how objects of governance are pursued and known. As philosophy dating back to the nineteenth century[2] and reaching forward to Karan Barad (2007) and Levi Bryant (2011) states, it is a mistake to think of subjects and objects as initially separate. Although perhaps only vaguely, Foucault recognised this in his allusion to how security apparatuses set about governing what he called the subject-object of populations.

But how can this entangling be fathomed in the forms of risk analysis at play in the everyday spaces and practices found in the FRS? The chapter has shown how the forms of subjectivity emanating through such practices might be better thought of as developing through co-production. It is in pursuing the object of governance, in this case fire, that subjects enter into the purview of risk analysts in the FRS. With MOSAIC, the pursuit of fire risk as the object of governance carries with it an implied process of subjectification in which different members of the population are sifted and sorted into relevant lifestyle categories. Objects and subjects are trapped in a continual reciprocal tie with each other. In MOSAIC, lifestyle habits developed by subjects are shown to affect and remake the proclivities and repertoires shaping whether fires are expected to take place. Conversely, fire's changing occurrence will mean that new lifestyle variables take on significance in terms of their apparent intimacy with fire outbreak.

This co-production can be discovered only where populations are continually monitored through data flows. Under such technological conditions, it is evident that subjects are not just relational constructs in the sense of being embroiled in a process of co-constitution with objects. Instead, they are relational at a more molecular level. Subjects are the accumulated sum of the compilation and integration of discrete, multiple

[2] See for instance the work of Ernst Mach (1883).

data. Work over recent years has offered strong conceptualisations of the subject as an entity that is spatially distributed, whose form is traced through the lines of relation that exist between nodes across scattered databases in which traces of life appear. Whilst subjects emerge through processes of dividuation and reassembly here, the calculative processes they undergo in analysis would also suggest some kind of fragmentation. In line with attempts to identify risk overall, subjects are known by their vulnerability. What is pursued through analysis, in other words, is a realisation of how lifestyle produces for subjects varying degrees of exposure to the object of a contingent future. Whereas vulnerability has been shown to be the very premise of collective action in some places, it appears more as a means here to distinguish between different groups of people and to target interventions towards some over others.

At the same time as showing their making in this vein, the chapter also details subjects in more active modes of becoming. Lifestyles express, to some extent, a set of choices taken on by people. They reflect an individual's, at least relatively intentional and cognisant, alignment to a set of existing practices. Lifestyle as a category has been shown in this chapter to embody different aspects of subjectification as defined by Foucault in which people are made governable through their enactment of certain ways of living. What this aspect of subjectification opens up for debate is not so much an activation of prescribed conduct but forms of counter-conduct too, ways in which resistance arises through and in relation to the development and enactment of practices by which the world is governed. Those particularly vulnerable decide to leave no trace of their dangerous lifestyles. Individuals end up posited in lifestyle categories that resonate with their location but not the peculiarities of their own life itself. What the chapter shows is not just how such forms of counter-conduct develop and manifest themselves but what affects counter-conduct has on governmental practice. This was the case particularly in terms of how prevalent forms of counter-conduct open up to consideration the extent to which authorities might go to ensure that counter-conduct does not make processes of subjectification impossible. Beyond MOSAIC itself, FRS use fire investigation data to generate consensually held notions of what types of people are likely to be vulnerable to fire. Whether officially or not, new data flows are enveloped into techniques of risk analysis so that those governing can adjust their actions in accor-

dance with the forms of resistance that emerge. It is through understanding risk as a relation lived and brought to life in the daily context of the FRS that witness can be borne to the integration of these forms of knowledge and their effects on how people are made subject to governance.

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6

Be Prepared, To Protect: Detournement and the Forces Behind Governmental Logics

For all its effects in terms of rearticulating the modes of subjectivity that the FRS organise themselves around and instantiate, it is also important to think of the MOSAIC software discussed in Chap. 5 as emerging through a process wherein the FRS acquire software from private developers and apply it for their own purposes. This kind of redeployment bears semblances to what Mackenzie Wark in *Molecular Red* (2015), borrowing from the situationists, refers to as a *detournement* in software form. For Wark, detournement refers to processes underpinned by a refraction of 'affects, perceptions, and concepts from one domain of labour to another' (2015, 218). Detournement helps to explain further risk as a lived concept. Everyday practices of technological customisation like that witnessed in the previous chapter demonstrate another route taken by the FRS to better know and to articulate risk. The forms of risk profiling that are in part underpinned by the customisation of MOSAIC rise to the fore by assembling and synthesising together discrete data streams. The consolidation of risk profiles here relies, at the same time, on the insertion of things which exceed the digital infrastructure altogether. Detailed case histories of past events come into contact with the probabilistic calculations newly acquired software make. Detournement thus pulls into encounter with one another heterogeneous forms of knowledge.

N. O'Grady, *Governing Future Emergencies*,
https://doi.org/10.1007/978-3-319-71991-7_6

But it can also be unpicked in terms of its political ramifications. As noted in the last chapter, one matter which arises with MOSAIC is the increasing influence of private companies and their interests in issues of governance. Although refashioned and redeployed, software developers begin to bear influence in the practices of government through the software and data they sell. Furthermore, the fact that data other than that which are digitally available are synced into risk's rendition begs questions and raises concerns regarding the transparency of governmental practice. Checked and verified against fire investigation case histories, the risk profiles applied to general populations are shaped by material that, because of its very confidentiality, would have been untraceable if our examination was to only focus on the FRS' use of modes of knowledge that have been generated solely through digital technology. By taking a more expansive view, we were able to identify how forms of knowledge beyond the digital technologies that the FRS have at their disposal are ingratiated into prevailing renditions of fire risk and those especially vulnerable to fire.

Looking back to how this book started, in the middle of the Brooklyn Bridge, it might not come as a surprise that the appropriation and application of software is not the only form of detournement that a day in the life of fire risk governance bears witness to. Regardless of their location, the FRS are never too detached from the broad strokes that animate the security context of the Western world. Along with the software they use, the FRS' consolidated strategic approach to governing fire emergencies is one that sits in tow and develops with the broader perturbations of the wider security apparatus. Along with buying databases and exporting data, it appropriates and redeploys different strategies used to mitigate the effects of emergencies such as resilience, response, preparedness, prevention and protection. These strategies might be better thought, as others have discussed, as governmental logics (Collier 2009). A number of things might be made of the term governmental logics. In line with Wark's emphasis in relation to detournement, governmental logics must at some point be granted some kind of affective status. In other words, such logics shape and organise the embodied and felt courses of action taken by responders to govern emergencies. On the one hand this element of governmental logics might be judged by its specific outcomes. Here logics are realised in terms of how the labour of response is divided,

involving questions concerning who attends the emergency with what resources, where and, indeed, what authority is embedded in the set of actions that are carried through when formalised by a specific logic.

Complicated by affect, logics might be said to mediate the encounter between emergency responders and the event itself. Governmental logics can thus be referred to as ontogenetic in the way that Brian Massumi uses the term (2011). The action taken in the deployment of a governmental logic always rests on and produces concurrent renditions and imaginings of the object-event to which it is oriented. But for Massumi, it is important here to emphasise what he refers to as the 'politicality of process' (2011, 13) embedded in ontogenesis. 'Process' (ibid.), for Massumi, 'is only perishingly about being. But it is everywhere and always about powers of existence in becoming' (ibid.). What ontogenetic qualities mean when it comes to engaging with the set of strategies crafted to govern emergencies is that the courses of action honed and enacted not only carry with them particular articulations of the emergencies to which they attend. Rather, the ongoing enactment of a governmental logic makes and remakes the sense of the event that proliferates and which it seeks to control. Following Brassett and Vaughn-Williams on resilience (2015), a performative potential is realised anytime an authority decides on a particular course of action to be followed in governing an emergency. In deciding the strategy to be used, the contours of the event's reality are carved out.

Different forces shape and underpin the array of strategies that can be deployed to both formalise courses of action and, at the same time, articulate the emergency in some form. In his work on the techniques and strategies used to govern in and through emergencies, Ben Anderson (2010) has shown for instance how anticipatory modes of governance bear nuanced, yet crucially important differences from one another in terms of how they constitute temporal relations between their executors and the events they address and govern. Being anticipatory, all such strategies of course engage with and think of the emergency as a future state of affairs, rather than a traumatising event of the past or an inchoate malaise unravelling in the present. But each strategy will attend to the future emergency at a different point in its potential occurrence. We might take a comparison between preparedness and prevention to exemplify Anderson's argument here. Whilst as seen in Chap. 5, prevention, on the

one hand, is used to eliminate the risk of an emergency from occurring altogether. Preparedness, on the other, seeks to ensure the mobilisation of resources in instances where attempts to stop the risk through prevention have failed. Each strategy has a different effect in terms of reinforcing or maintaining the normalised life that emergencies threaten to disrupt. Whereas prevention seeks to stop an identified threat from occurring in the first place, thus allowing for the continuation of the regular rhythm of socio-material order, preparedness assumes that emergencies cannot be stopped and takes steps to deal with the disruptions that emergencies provoke when they do occur.

For Massumi, the ontogenetic articulation of emergencies by strategies used to govern works backwards too. An emergency's rendition, in other words, shapes the possible range of strategies that can be used to govern it. So in emergencies pre-determined as 'natural', authorities must find ways to act within them, according to their apparently inexorable nature. Modes of governing are not only legitimated, however, by the way in which emergency events are represented. Rather the particular form that a strategy comes in appears necessary and beyond debate, with any other approach pre-emptively assumed to fail. This is evident in Massumi's writing about what he refers to as the indiscriminateness of Hurricane Katrina: 'Given the indiscriminateness of the environment's autonomous activity… environmentality must systematically work the "regulation of effects" rather than the cause' (2015, 22). For Massumi, the indiscriminateness of the events is pivotal here. Bearing no target beyond widespread damage, the prescribed 'nature' of the emergency means that response, as specific governmental logic, is required and that there is no space for any preventative forms of action.

Below, the book turns to consider through the lens of ontogenetic processes the enactment of two such governmental logics which have been appropriated and applied to the case of governing fire emergencies. The chapter first shows how preparedness, as a generic strategy of emergency governance, is ingratiated into the daily life of attending to fire emergencies as risks. The chapter then turns to address how modes of protection are brought to bear on fire risk governance. Albeit in different ways, both of these logics offer further insight concerning the different sites of power that take an increasingly influential role in the FRS' operation and the

problems that emerge therein. The chapter pays close attention here to the affective and material forces that, via the adoption of specific governmental logics, get enrolled in emergency governance and what affect these forces have on understandings of fire risks that proliferate.

6.1 Affective Conditions of Preparedness in Fire Governance

In its incarnation in the FRS and indeed across the broader security apparatus, the construction of 'being prepared' is slippery in terms of the set of relations it bears to emergencies and the overall, ongoing perception of emergencies its practitioners operate through. At once it is anticipatory. To prepare and be prepared involves taking action and entering into an affective state that develops in lieu of an event which appears with varying degrees of accuracy on the horizon. At the same time it is a style of government that does not attempt to stop emergencies from happening. Being prepared sees emergencies as inevitable and accounts for attempts to mitigate their effects. When an emergency is prepared for, it is already adjudged as beyond the grasp of much of the anticipatory arsenal that governments possess. Nascent within the logic of preparedness is the belief that emergencies at best stretch and, at worst threaten to overwhelm, the capability of the state overall. Huge budget cuts to emergency response implemented by the government in the UK since 2010 has meant that this understanding of emergencies as inexorable forces able to compromise any mitigatory resources the state has at its disposal have intensified in recent years. In 2013, for example, the government was criticised for the slow response and lack of preparedness for flooding emergencies that drastically disrupted the functioning of infrastructure across the South East of England.[1,2] This criticism was levelled at the government even though the

[1] For a comprehensive overview of both the floods and lack of preparedness see: https://www.theguardian.com/uk-news/2014/feb/13/uk-floods-essential-guide

[2] In the aftermath of the flooding, the UK government's Environmental Audit Committee established an inquiry into government failures in response to the emergency, documents relating to which can be found here: https://publications.parliament.uk/pa/cm201617/cmselect/cmenvaud/183/18302.htm

South East in many respects[3] receives more public funds than any other area of the UK despite being simultaneously the richest area.

Carrying with it an immediate rendition of the emergency encountered whilst reflecting conflicts of interest between different spaces, the political and ontogenetic implications of preparedness rise to the fore here. But how does preparedness become enacted and shape fire governance operations in particular? In short, it does so by attempts to ensure that proportionate human and non-human resources are ready to, and capable of, affording response in a way that acclimates to the belief that the next fire emergency is a matter of when, not if. Leaning on Pete Adey and Ben Anderson's (2012) work, it is evident that, in developing preparedness and being prepared, authorities assert power in situations by opening up an 'interval' between the present and a future characterised by emergency. This interval is seen to create the possibility for informed, reflexive decision making to establish and coordinate response efforts. For the authors, an interval is a temporal state that governments work to position themselves in to create the opportunity for intervention. Drawing on exercises similar to those discussed in Chap. 4 and how they create atmospheres of perceptible urgency, the authors show how intervals operate through the establishment of affective-based encounters between responders and the imminence of the event to which they will attend. That is, the relations that hold between responders and the potential emergency situation are framed to induce bodily states that enable the governmental logic of preparedness to be enacted.

This notion of interval can be developed further still with the case of fire governance. What fire governance allows us to see in particular is how intervals are moments and encounters opened up in a way that speaks to the technologically mediated nature of relations between responders and potential emergencies. In other words, how intervals are crafted in a way that is facilitated through the digital technologies that those governing fire have at their disposal. Considered as something that emanates from and is organised through technologies, intervals can be thought of as temporally punctuated and affectively felt in other ways too. Relying in

[3]For instance, a recent report produced by the Institute For Public Policy Research demonstrated that London receives ten times more funding for transport projects than Yorkshire does (2015).

part on technologies which are in continual operation, intervals always exist potentially; as moments that can be suddenly brought into effect as and when required. Intervals are not just temporary fleeting moments, then. Instead, they exist somewhat as a general condition to the life of emergency responders who have to be ever-alert for the next emergency. Intervals are thus enrolled as an element in the everyday routines through which risk is brought to life in emergency response.

Extending understandings of the interval in these ways requires a return to a moment spent in the FDNY's control room in Brooklyn and reflecting on the alertness of operators there. Ushered into his office by his secretary, the Fire Chief I had arranged to meet turned to face me with his phone resting between his chin and shoulder. Through hushed, frustrated utterances, he directed his secretary to take me to see the control room whilst he rounded up his call. Peering to the furthest wall as I crossed the threshold in the control room, I saw an array of massive wide screen monitors side by side. On one, a news presenter outlined a story's latest development whilst a ticker at his midriff moved longways indicating fluctuations in stock prices and sports scores. Maps of the city were projected on another screen. These maps were adjacent to real-time reports concerning the operation of the city's infrastructure. In front of these three gargantuan screens were three short rows of workstations occupied by control room operators. After introductions I was taken through all the uses of different sources of information that were present. The operator described how these screens, which effectively track local and national events, run all through the day and night so that, if a fire or another emergency takes place, information can be sourced from a wide range of sources. Beyond the screens themselves, further information will be harvested from the operator's own interface with the computer immediately in front of them by checking social media sites such as Facebook, Twitter and Youtube. In the event of a fire, these various sources would be accompanied by information generated via communications with firefighters on the scene.

The control room thus described shows that a variety of media sources, without any explicit intent from their developers, will be used for the purposes of emergency preparedness. But what happened next in the control room was just as important for discussions of emergency preparedness.

In the middle of taking me through this abundant collection of technology, the operator was informed of two fires taking place simultaneously in Mid-Town Manhattan. Immediately on reception of this news, my physical existence seemed to disappear in the eyes of the operator. I was forgotten all about as he quickly swivelled his chair away from me and towards his computer screen. Here he began to assemble every information source possible at his disposal to aid response personnel on their way to the scenes. Fire engines were tracked as they moved through traffic. Simultaneously, requests were sent for information regarding the availability of special resources such as cherry pickers and breathing apparatuses. He scoured databases in an attempt to ascertain information about the site itself and sought to clarify whether the help of police or paramedics was needed. Somewhere in this moment, whether at the point he turned to his computer or began to ask questions to extract the fires' exact locations, preparedness slipped almost unawares into actual response, where action is taken to attend to the fire emergency in its real-time unfolding. Not wishing to concentrate on this world of response, it is necessary to step back from this temporal breach, rewind to the moments leading up to it and consider the way in which the control room spatialises and materialises the interval of preparedness and induces a continual embodied state of awareness in those that need to be prepared.

To do so, it is important to reconsider the effects and purposes of those technologies that operators have at their disposal and which constitute the control room's surroundings. Filling the control room with the screens described, operators are not simply ensuring that they have a wide range of informational sources at their command. Although certainly relevant for larger emergencies, much of the information that sources possess would certainly not be used to inform response to fire emergencies. A household fire would not make national news. Neither would it have ramifications for the stock market. The screens and the flurry of information that continually flows across their surface could be seen to act as a continual stimulant instead, continually peppering the awareness, alertness of the operators. The screens serve to maintain a continual connection between operators, often sitting dormant for hours on end, and the ever-present potentiality that an emergency might spark into life. Their affect resonates with the observations contained in Jonathan Crary's book

24/7 (2013). For Crary a variety of technologies and their development point to the emergence of a new human subject entirely. It is a subject who, through their ever-more intimate rapport with technologies, are steadily but surely losing their ability to rest and sleep. Perhaps this continual sense of restlessness finds one of its incubators in the control rooms thus described.

Having the screens continually running acts as a kind of reinforcement too of the ontological premises upon which preparedness rests. Above, it was documented how preparedness creates a perception of the emergency as an event that will inevitably re-occur. Placing themselves amidst these sources of information, operators tap into and access a world that is equally beyond their control but which might help to inform response to emergencies whenever they arise and from wherever they emerge. The vast sources of information projected through the screens enable life in the control room to be shaped and informed by the wider contingent, inexorable world out of which emergencies arise. At the same time, access to the vast range of informational flows contained within the technologies present means that operators, and thus response more broadly, underpinned by the information they generate, possess a level of flexibility in moving from preparedness to response in an instant. The operator was able to invest himself in a world of data flows and informational conduits immediately upon hearing about the fire with no sense of delay.

As an affective state that is conjured across and through the technological materialities constitutive of this the control room as a space, intervals can be defined beyond their existence as temporary and fleeting, as eruptions between serialised meta-stable conditions of normal life. In the control room, intervals are part and parcel of this normal life. They are routine and enwrapped within routines that are continually kept alive through human interaction with the technologies around them. As a generalised condition, intervals here resonate too with J.D. Dewsbury's work on habit (2014). For Dewsbury, habit would not simply refer to repeated activities over and again. Instead, habit creates 'bodily dispositions for action' (2014, 44) which can be mobilised instantaneously. The interval in the control room can be induced because the operator has stimulated a sense of ever-ready alertness and awareness, making them capable of quick movement, switching from dormancy to a heightened sense of

necessity as they rapidly mobilise resources. Furthermore, intervals also reflect relations between bodies and material surroundings in a similar way to habits. For Dewsbury 'Habit pushes us to look at how the molecular agencies and forces that the material cues of the milieus in which we live come to shape us' (2014, 43). Intervals are quickly mobilised and taken up out of the interstices and entanglements cultivated between operators and the myriad technologies which surround them in daily life.

For all it reveals about preparedness as an interval, the control room is not the only place where preparedness is enacted. It is also present and made possible in spaces that could possibly be considered as more detached from emergencies, where emergencies appear less imminent but are nonetheless related to as future inevitabilities. It is found, for instance, in the moments of interface which orchestrate risk analysis involving FSEC software already discussed in Chap. 3. Understood as an event to take place in a future beyond immediacy, Chap. 3 demonstrated how the task of analysts here is to draw on their own capacity for imagination to envision what resources will be needed to ensure the service's rapid mobilisation when emergencies do come to pass. Rather than appearing as a generalised condition between every emergency, the interval created here is one that operates through the manipulation and spatial arrangement of resources before the event. Intervals are thus created here well in advance of event itself but nevertheless fit into a broader repertoire of manoeuvres by which the FRS ready themselves for the next fire.

The intervals that enact preparedness are, of course, oriented towards the future emergency. However, the enactment of intervals reflects their entanglement within a much more complex temporal fix. A discrete set of temporal relations are found to develop in the intervals discussed here. In the control room, intervals are ingratiated as normalised aspects of life by its co-option into the sense of alertness that prevails continuously. In FSEC, intervals are imagined with a different sense of temporal punctuation in mind. Rather than being evident where resources are taken up when an emergency is deemed imminent, intervals are planned and plotted amidst the broader normalised flows that have developed gradually to collective constitute circulation in space. Possessing different senses of the temporality of the emergency they will operate within, intervals are consolidated furthermore, in and by the relations between human and digital software. Intervals are thus also materially constructed in both cases. As

much on the computer screen where FSEC plays out as amidst the numerous screens in the control room, intervals are made possible by the assembly and configuration of different data flows, opening up moments of decision making whether in advance of an emergency or in the earliest moments of its onset, engendering the transfer from preparedness to response.

Despite developing in rapport with technologies grounded in the processing of different types of language, both intervals too are premised on the enrolment of more-than-representational forces. Whereas in the control room a bodily sense of alertness prevails, analysts interfacing with FSEC draw on their capacity for imagination in analysis that is otherwise constrained to the logics of probability inscribed in the algorithm the software uses. That these more-than-representational forces are enveloped in dynamic processes of redeployment that feature in the FRS might not necessarily come as a surprise. Much literature has arisen to describe the state of affairs in which fear and anxiety areinduced and harnessed as security measures, particularly in the domain of counter-terrorism. Signs in stations, adverts on televisions, free to download government sponsored podcasts, catastrophe films and 24/7 news have set new tones of hyper-vigilance in everyday life in cities where emergencies always exist as imminent at worst and potential at best. But their very ubiquity perhaps reveals the uniqueness of the case in point. Embedded in aspects of daily life, anxiety is now something that proliferates across general publics and makes those publics anew. Elaborated here instead is how similar states are mobilised in those actually governing.

6.2 Protection and the Elemental Materiality of Security

As a governmental logic, protection in some ways bears, performs and rests upon a similar temporal configuration as that evident where preparedness is examined. Such is the case insofar as protection too encounters emergencies as events that are inevitable. Protection confronts the emergency at the juncture where strategies to stop it altogether have failed in their bid to take hold of the situation. Scratch underneath the surface, however, and differences between protection and preparedness do rise to

the fore. Whereas preparedness is anticipatory in that it ensures alertness and rapid mobilisation, protection anticipates through attempting to safeguard and mitigate the effects that an emergency might have. Unlike preparedness, then, protection does not establish intervals and momentary gaps in the contingent unravelling of events. Rather, it allows the emergency to occur with whatever force it possesses and seeks to implement measures to defend against its consequences.

In some ways the efficacy of protection derives from the respect that it affords to the multiple material forces both enwrapped in and mutually co-producing the event itself. The envelopment of material forces within protective security measures is initially evident if we inquire into the steps necessarily taken to protect the world from emergencies. Rather than working on an affective, sensorial register as is evident with preparedness, protection secures by working through material things otherwise conceptualised. Protection is described frequently as a means by which to instil security into the built environment. Literature has flourished detailing about how protective security is present in a diverse range of spaces, from street barricades to elaborate flood defence systems. In relation to critical infrastructure protection, Claudia Aradau (2010) has argued that, rather than passive, such materials play a key agential role that is central to securitisation because they are embedded in iterative interactions with human decision makers, wider security discourse and other types of active non-human objects in negotiating different security practices. Coaffee et al. (2009) might be said to pursue this line of argument in relation to counter-terrorism by showing how security measures built in to cities are shaped in a way that is cognisant of the different effects that such measures have according to their relative visibility amongst the public.

What has yet to receive sustained attention is in some ways the other side of the equation. That is, how protective security is instantiated in a way reflective of, and in relation to, the various elemental forces that the emergency event itself unleashes and is constituted by.[4] Taken by its pre-Socratic Emplocodean incarnation, elemental is taken here to refer to how air, fire, water and earth are enveloped in the operation of the security

[4]Emergency governance might be said here to connect with broader concerns found across geography with how the elemental is crucial to the operation of infrastructure in general (see for instance Amoore 2016; Edwards 2010; McCormack 2016; Parikka 2015; Peters-Durham 2015; Starolieski 2015).

apparatus. In this light, one might explore how the actual fire in fire emergencies shapes the protective measures used to govern. Or how water in floods, air in hurricanes or the ground in earthquakes are interpolated into protective mechanisms of security. Extending Aradau's conceptualisation, the elemental is another agential entity enveloped in processes of security and securitisation. Focusing on what he sees as the force of the elemental, Pete Adey (2015) has discussed the role that air plays in shaping how particular events come to be understood and the significance that we invest into them. For Adey, the formative effect elements can have is affixed on the affinities that whatever element forges with the wider set of bodies, feelings, objects and subjects that both inhabit and help to construct the wider space of the event. What Adey refers to as its force suggests that other attributes might be afforded to elemental objects in their contribution to events. Rather than possessing many inherent properties or indebted to a specific 'nature' the elemental enacts different capacities or roles and performances. As literature consistently has argued, capacities are realised in and through the relations that elements and other material objects make. Capacities only ever exist in potential to be actualised (Anderson 2014, De Landa 2006; Feigenbaum 2014; Peters 2010; Pile 2010; Whatmore 2006). Conceived by their capacity, the elemental opens up new angles for investigation regarding protection. Along with seeing protection as the mobilisation of security into the built environment, it means that protection can be explored as a form of security rendered operable by the orchestration of encounters between materials of the built environment and the elemental forces unleashed in the emergency itself. In the next section, I engage with a variety of examples to elucidate further how such a relation between the built environment and elemental forces prefigures the enactment of protection.

6.3 Orchestrating Relations Through the Regulatory Reform Order (2005)

In 2004, whilst at more local levels FRS across the country were adapting their practices and indeed broader culture to the transformations set down in the *Fire and Rescue Services Act*, central government was busy

establishing new legislation that would bring further change to the FRS' operation. By 2005, what is called The *Regulatory Reform (Fire Safety) Order* had been established (2005). This legislation was developed specifically to change the way businesses were protected from fire emergencies. In many ways, the legislation mattered less to the FRS than it did to businesses themselves. What the Order emphasised was that businesses should take a leading role in protecting their buildings from fires. For the FRS, all that would need to be done was to implement a new rota of routine inspections of business premises that, in relation to protection at least, would be increasingly responsible for self-governance.

Part of the governmental logic of protection, these routine inspections serve to verify that companies have taken steps to mitigate the effects of fire emergencies. At regular intervals, fire safety inspectors will visit a premise. They will establish whether evacuation procedures have been planned. At the same time, they will ensure that different material devices for fire safety have been installed. Flame retardant sprays should cover flammable surfaces. Running like a network invested in the innards of most buildings, inspections probe the systemic functioning of ventilation shafts and pipes. Frequently, inspections will check upon both the existence of chemicals in building and make judgements concerning the safety of their storage.

The inspections that now take place as a matter of routine in the FRS reveal how protection takes as its object the built environment. Protection is installed and instilled into the everyday spaces we occupy. These inspections certainly gauge how well protection is enveloped into the built environment here. But the measures themselves can be explored further to understand in more depth how protection is enacted as a logic that operates through the elements unleashed in emergencies. Protection in a way resonates deeply with what others have said about the capacities of the elemental because fire inspections seek to gauge the effectiveness of measures that seek to forge specific relations to the element of fire. As shown in Chap. 2, fire has been understood by its capacity to spread over surface for hundreds of years. Designed with a sense of this elemental capacity for circulation, some of the devices described above come to life by actively trying to form an obstacle to the spread of fire. This mode of relation between elements and protective materials is evident when it comes

to fire retardant spray for instance. When confronted with a fire, the spray exists to ward off its proliferation across an object's surface. In this mode of protection, the life, agency and capacity of the elements are actively denied. Whereas flame retardant spray attends to the actual flames produced in fires, other modes of protection are found to operate on other aspects of fire's elemental constituents. The verification of ventilation shafts reveals other modes of protection. With ventilation shafts, the materials instilled in the built environment do not bring about an obstacle to fire's capacity to spread. Instead, they attend to the smoke produced by fire and seek to alter and adjust it. Ventilation shafts enable this manoeuvre by forging two types of relations to fire smoke and thus harnessing its capacity to optimise security. On the one hand, these devices are premised on the capacity to absorb and accommodate fire smoke. They subsume the smoke released, allowing it to proliferate but in a way that is incorporated into the functioning of the aspect of the built environment protected. In the same moment, ventilation shafts act to redistribute the smoke produced by fire.

Inspections, owing to the array of objects they hold up to scrutiny, can lead to insight into the set of material-elemental relations which underpin protection as a specific governmental logic. In this way, protection reveals in extended ways the forces that are enrolled into fire governance where the FRS take on governmental logics that have a life across the broader security apparatus. But inspections also allow for a reappraisal of the concept of detournement that the chapter started with. As noted, the *Regulatory Reform Order* places much emphasis specifically on private businesses taking the lead in governing fire through protection. A different dynamic might be said to be present in the form of detournement protection enacts than was the case with preparedness or prevention. Detournement has appeared heretofore as a kind of transfer, in which technologies and software are appropriated and then applied to a new set of concerns. The trace of power and influence that private software companies possess grow as the reach of their product expands ever further, contributing to the making up of new subjects governed by their mere potential to be involved in emergencies and introducing new affective and sensorial states for responders themselves. But with the *Regulatory Reform Order*, what is evident is less a transfer of practices and material things

from one place to another. Rather the authority to govern grows out from the centre to include new agencies in its execution. Instead of agents acquiring almost secondary power in the form of a trace owing to the application of their product, private businesses are bestowed with the authority and responsibility to govern directly. It is they who install devices across their premises. It is they who must develop evacuation plans. The FRS for their part merely gauge their compliance with taking on such a responsibility. Such an extension and expansion of responsibility resonate with the broader resilience motif that has been adopted across the West if not globally. In burgeoning literature considering resilience, this shifting of responsibility across public and private domains is said to be part and parcel of the active nestling of governance into a broader neo-liberal political economy, where the promotion of a shrinking state leads to an emphasis on publics taking on new obligations for self-governance, regardless of differences in resources (Chandler 2014; Evans and Reid 2014; Grove 2014; Zebrowski 2015).

Perhaps this expansion of responsibility are in some ways but a new iteration of a broader diffusion of power in societies that is in part premised on the need to secure. Regarding the case of *The Regulatory Reform Order* and its quotidian implementation and verification, it is necessary to stress that resilience and the broader diffusion of power that we find in such accounts do not, however, always play out perfectly. Agencies afforded new authority appear frequently as less than willing to take up the mantle of responsibility that has been bestowed upon them. Over the last decade, numerous cases have arisen showing the breach and circumvention of the precedents of the *Regulatory Reform Order*. These transgressions have come in different shapes and sizes, with a miscellany of consequences for their protagonists. Large-scale examples include the case of Fairfield General Hospital in Bury, UK in which a routine inspection in November 2016 found fire doors remaining open through the day, and combustible items being stored in routes designated for evacuation should a fire take place.[5] On a smaller, but more severe, scale, a landlord in Leicester in the UK was sentenced to eight months in prison

[5] http://www.itv.com/news/central/story/2017-03-31/fire-crews-called-to-hospital/ (last accessed 11/09/2017).

in October 2014 for avoiding fire protection regulations after a substantial fire the previous year.[6] Beyond the pale of the potential emergency, the most recent and harrowing example of fires coming to fatal fruition because of inadequate fire safety at the time of writing is the case of the Grenfell Tower fire in Ladbroke Grove, London. Seventy-one people died when the 24-storey public housing facility caught fire in the morning of 14 June 2017. It is well documented that the fire itself spread so disastrously due to the instalment of flammable cladding on the outside of the Tower. Due to the imposition and continuance of austerity policies since the election of Conservative-led government in 2010, Kensington and Chelsea borough council were forced to invest in less safe cladding from the private building contractor Rydon.

Despite much literature concentrating on the neo-liberal conceit at the heart of resilience, or the diffusion of power that characterises security apparatuses more generally, the example of fire protection provides a more everyday case of the implementation of the rescaling and delegation of responsibility for security. The case itself reveals that the diffusion of power heralded in accounts of resilience has further implications to it in practice. Rather than solely inquiring after the whereabouts of power and how its dispersed coordinates map onto broader economic trajectories, fire protection leads to an enquiry into whether or not power is actually exercised in efficacious ways when arranged in such a distributed fashion. What the case seems to reveal is that, as power diffuses, its efficacy can in fact sometimes lessen and abate rather than become more extensive.

6.4 Conclusion

The dynamics of appropriation and redeployment which underpin risk governance in the FRS are not only facilitated through the customisation of software and its reorientation towards new aims. Rather the chapter shows that, in coming to govern fire risk, modes of action formulated to

[6] https://www.landlordtoday.co.uk/news_features/Leicester-landlord-jailed-for-breaching-fire-safety-regulations (last accessed 11/09/2017).

attend to emergencies come to be ingratiated into new fields of application. Some literature has articulated these actions under the moniker of governmental logics. In line with the literature spanned about them, the chapter has shown how such logics are distinguished from one another and rendered coherent by the specificity of their temporal relation to the emergencies to which they are attendant. Whilst all oriented on different predicates towards the future, the chapter has sought to decode the temporality of governmental logics at new levels of granularity. In particular, it has demonstrated how the temporal relations to future emergencies upon which governmental logics are organised and elaborated are made and remade through the performances, decisions and encounters that accumulate to constitute daily life in fire governance. The intervals which preparedness comes to operate through, then, are not only created in relation to abstract renditions of future events to come but can rather be explored in terms of their existence as devices that are enveloped in normal life that can be mobilised rapidly. Beyond its life as a set of actions that secure against emergencies presumed to hold a degree of inevitability regarding their likelihood, protection, furthermore, is a governmental logic continually reinforced through the verification of its material manifestation when routine inspections are undertaken.

Extending investigation into the domain where risk is perceived as a lived relation, governmental logics can be unpacked in ways beyond their temporality too. Enveloped in daily life, the intervals that preparedness will enact can be mobilised so quickly because of the affective state of alertness that resonates across the human bodies, the multitude of projectors and the flows of data that compile to define the contours of the control room as a space. The supposed robustness that protective security applies to the effects of emergencies, alternately, is evident in steps taken to modulate the capacity of elemental forces unleashed in emergencies by shaping their relation to the wider built environment. To intervene at different moments in emergencies to come, governmental logics enrol and harness any array of materially heterogeneous forces in their application: from bodies and their perceptive capacities to the elemental forces upon which the force of the emergencies, at least in part, hinges.

From the perspective of governmental logics, detournement cannot be understood simply by dynamics of the reapplication that might be

inferred if our exploration should start and stop with the risk profiling mechanisms focused on in Chap. 5. Instead, detournement involves practices of enrolment in which an array of different things are rendered useful for the purpose of security. Although the preparedness instantiated in and across the control room was engendered by the installation of various digital technologies, it also relied on the cultivation of alertness and a sense of continual stimulation in human operators. Additionally, tracing this enrolment through attempts to protect from fire risks, the chapter was also compelled to reappraise how lines of responsibility are redrawn in the security apparatus when new agents of governance rise to prominence. Towards the end of the section on fire protection, it was shown how a catalogue of potential, and in the case of Grenfell very real, events allow for the stakes involved with shifting responsibility to be examined in further detail. Whereas with MOSAIC software in Chap. 5 questions were directed at where influence lies and with whom, cases of fire protection and its failure force questions related to whether or not agents actually take on the responsibility that has been bestowed upon them.

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7

Conclusion

7.1 Lived Relations to Risk

A cursory glance at Google scholar searches for 'risk' would reveal its application and efficacy across the world, in domains stretching from finance and insurance to health and welfare. Risk, as the book has shown, is similarly prominent in the steps governments take to secure against emergency events that threaten to disrupt normalised socio-political order. As a mode of rationality that shapes, informs and justifies the courses of action taken by governments and businesses alike, risk has a major influence in affecting present conditions of global existence. With the strength of its universality acknowledged, it is important to retain some understanding of risk in the abstract register as an epistemological device that captures, addresses and projects upon a potential state of affairs. It is because of its existence on this register that risk has attained its vast applicability. But as the book has shown, perhaps this characterisation of risk in the abstract should only be treated as a starting point. In this incarnation, we might be able to say what risk is, but what does risk do? How does it influence and shape everyday life in the local spaces and places within which it becomes integrated as organisational motif? Through what means is this ingratiation mobilised in the first place? And

N. O'Grady, *Governing Future Emergencies*,
https://doi.org/10.1007/978-3-319-71991-7_7

how should the political complications that risk's rise to prominence brings about be discussed?

The book has conceptualised risk in the abstract only insofar as it provides contours for the articulation of risk's capacity. As well as referring *to* potential events, risk exists *as* a potential mode of being and doing which is taken up in different ways in different cases. It is by examining the multiple ways in which its capacity is actualised that the book has studied risk as a lived relation. Risk's life can be gauged through different modes of relation that it instantiates or gets enveloped within. Risk is brought to life, then, through the data sourcing techniques used as fire emergencies that are unfolding as demonstrated in Chap. 3. It is upon such techniques that risk's vitality and efficacy as a political rationality in the FRS rely. As shown in Chap. 4, conversely, risk has started to weigh-in on firefighters' perspectives as they travel through the areas that they live in and govern. Not simply a means for making things that have yet to come solid in organisational imaginaries across the world, the book has shown how risk is brought to life and enlivened through the everyday practices in the everyday places in which it is considered modus operandi. At the same time, risk bears influence on how the life that it connects with is performed and mediated. Extending Massumi's (2011) notion of a lived relation, risk not only appears as a capacity to be fulfilled but can also be seen engaging in different forms of encounter with which it relates to.

This begs the question, however, of what entities does risk actually relate to? The book has sought to answer this question in various ways through elaborating on the forces of enrolment that risk's prevalence across the FRS is premised upon. That is, how risk exerts itself and becomes manifested in the daily life of the FRS through the things it gets attached to. In some ways, risk is something that is materialised through the complex operations that take place within the FRS' digital infrastructure. On screens, risk appears represented as a series of incidents distributed through space in maps. Similarly, the past occurrence of fire emergencies is charted through time to show their relative probability in the future. With its visualisation, risk is inserted into and extends the play and performance of relations between digital technologies on the one hand and the human bodies that operate them on the other. Extending to these bodies and the range of senses they can enact, risk can be inquired

into also as an affective condition in the everyday life of those governing. In Chap. 6, for instance, the book delved into the world of the FDNY control room to find that the litany of technological components present was accompanied by, and actively invoked, a perpetual sense of alertness distributed amongst those handling emergency calls. This affective condition ensured the grounds for preparedness by enabling rapid response to the emergency whilst also resting on and reiterating the ontological premise that emergencies are ever likely and, indeed, inevitable. In the same chapter, however, different material forces enrolled in the facilitation of risk governance appear. Reflecting on how to protect the built environment from future fires, what Pete Adey has referred to as the 'force of the elemental' (57, 2015) was shown in some ways to be mobilised as a factor for the FRS to consider. These elemental considerations are themselves inserted into the design of the spaces that are taken for granted. That elemental forces are enfolded into the contemporary security apparatus in this way should not come as much of a surprise. At the very least since the Great Fire of London in 1666, an elemental reasoning underscored the governmental imaginary of fire emergencies. What animates this imaginary is fire's capacity to spread and circulate, how it might engulf in its flames that which stands in its path and, in turn, produce a plethora of consequent new hazards and dangers.

In examining enrolment, the book has not only tried to outline and catalogue the forces through which risk is brought to life. Instead, it has sought to conceptualise enrolment as a process in itself. Present throughout the book, this is a feature particularly prominent in Chap. 5's exploration of the redeployment of MOSAIC lifestyle software and is conceptually elaborated upon in Chap. 6 through the notion of detournement. Beyond the forging of relations, risk's rise to prominence in the FRS was shown here to be organised around acts by which material things are appropriated and redeployed for new purposes. This process is most perceptibly traceable with regards to the new technologies that the FRS have become increasingly reliant upon. Various personnel have developed numerous crafts in seeking to optimise the use of commercially available software for the purpose of identifying and governing fire risk. Beyond Chaps. 5 and 6, one of these crafts can be seen to be developing where the Training Coordinator in Chap. 4 considers how, exactly, one might apply

a graphic motion suite initially made for cinema to make experiential fire emergencies that, because of past events, would represent a break and rupture with how such emergencies appear already in the organisational memory of the FRS. Reiterated in this case is a claim made in Chap. 6 that detournement should not be studied just in terms of the development of crafts that make it possible or by identifying the lines of translation through which software itself gets re-applied in a new field. Critical inquiry needs to extend instead to that which software produces and how it takes on new significance when re-applied for new purposes. Coming back to Chap. 4, then, along with the software itself, questions need to extend to how emergencies of catastrophic, 'Hollywood', proportions become normal renderings through which to develop new fire response protocols. Or, in Chap. 6 itself, how the maelstrom of moving images invokes a sense of stimulation within and across operators for the purpose of being ever-ready. As a process, lived relations to risk have substantial political consequences, stretching the forms that uncertain futures requiring governance take and affecting new bodily states in those governing.

7.2 The Politics of Data and Technology

Thinking with the processes that underpin the software through which risk in part is facilitated, the book also adds to a crucially important observation made many times that digitised data are now the very stuff of governance. Nevertheless, the book's examination of everyday processes allows for a reappraisal of data. In Chap. 3, it was argued that data should not be treated as an uncomplicated category referring in the first instance to unitised segments of empirical reality rendered operable across the digital infrastructure of the FRS. Instead, data should be conceptualised initially by a more simple form of the word's meaning. Data should be thought of first and foremost simply as that which are given (Dodge and Kitchin 2005). In this way, data do not presume a digital character to that which is constituted as such, but refer instead to all the world's happenings that can be cognised by human bodies and the algorithms organising the operation of software alike. This base definition is crucial because it opens up a gap between data emerging in the throes of the world's

existence and the role that it comes to play as a set of things mobilised for the purposes of governance. Scrutinising how this gap is bridged in the FRS, the book has emphasised that the data now used to govern the world are the product of deep investment in, and cultivation through, situated organisational processes. Acts of datafication are far from matters of simple pragmatism. Instead, they are intervened upon and cut across in a number of ways. Such was exemplified in Chap. 3 where Quality Assurance Officers were shown to make the cut regarding what data are pertinent for knowing and governing risk and, thus by default, what are not. This decision itself was made in pursuit of specific governmental ends that, whilst localised in many ways, retain a connection to the broader historical circumstances in which the play of security now takes place. To be specific it assured that particular renditions of past events, recorded through certain data sourcing practices, feed into the risk calculus that the FRS will go on to deploy.

As suggested in many leading works, data do not afford objective accounts reflective of reality (Amoore 2013; de Goede 2012; Halpern 2015). Instead, they are born of politics and the way a broader political situation is interwoven into local circumstance. Whilst the example of datafication speaks to the political entanglements behind the *emergence* of data, the book has also sought to extend understanding of how the politics of data is evident in terms of the *consequences* data have on that which it makes computable in new ways. The MOSAIC software explored in Chap. 5, for instance, was explored as a symbol of the FRS' use of so-called Big Data repositories and the analytic possibilities that go with them. The software, and the data mobilised through it, was said to reconstitute populations in the eyes of those governing. Population has for a long time proven a category crucial to the enactment of security, but through Big Data population comes to show how human life appears as a thing governable under evermore refined layers of resolution and granularity. At the same time, Big Data resources pave the way for populations to be recognised across an ever-wider array of guises, from the consumer habits, family backgrounds, typical occupations and house sizes amongst a plethora of other variables. Known in increasingly intricate depth and broader breadth, 'the population' are of course opened up to new forms of governance too in which potential proclivity becomes the basis for

modes of intervention in the here and now, a matter the conclusion returns to shortly.

The mass mobilisation of data that is now possible also renegotiates the parameters within which the future is conceived as a space time that can be acted upon and within. In comparison to their earlier incarnation as found in Chap. 2, the data that the FRS now have at its disposal allow different assumptions to underpin the FRS' understanding of what the future can be. Not bound to a belief that what can be known is that which data suggest is probable, the FRS are driven to make sense of futures that are extendedly alternative to what the past might suggest is coming. Here, risk's mobilisation allows the FRS to expand their horizons in terms of the futures that they seek to govern. Echoing a manoeuvre witnessed across the security apparatus (Daase and Kessler 2007; De Goede 2008), fire governance is premised on attending to futures considered more uncertain than ever before.

In bringing to the discussion the FRS' engagement with uncertain futures based on the speculations that a wider data pool makes possible, it is important to reiterate that lived relations to risk are not only mediated by ways of knowing facilitated through digital technologies. The book has documented a range of other forms of knowledge that are involved in fire's articulation as a risk. At many points, the memory and experience of firefighters appear crucial for risk projections. To return to Chap. 3, decisions about whether data are useful for risk analysis are based on what the past has told the Quality Assurance Officer about different data sourcing practices. MOSAIC risk profiling is questioned in Chap. 5, alternately, by analyst speculations regarding 'little old ladies' living vulnerably in areas that are considered safe. Future contingencies are the object of aesthetics too, with scenes of the future emergency being acted out, simulated and consequently felt across numerous sensory outputs such as seeing, hearing and touching in Chap. 4. The future imaginary of emergency that pervades the FRS is thus the result of heterogeneous forms of knowledge co-existing with one another. In some cases, they might work to co-produce risk projections. This is evident where largely paper-based fire investigation information offers narrative support to MOSAIC risk profiling in Chap. 5. Yet their co-existence can also be a source of tension, one that can be seen to come to a head where risk projections are contested. Remaining in Chap. 5, the fire investigator

responsible for in-depth accounts of the individual circumstances surrounding a fire death thus criticised the 'pigeon-holing' that they thought was a consequence of the FRS' increasingly use of Big Data resources.

7.3 Times of the Future

Premised on the multiple material entanglements that make up daily life in the FRS, the temporal referents of risk are complex. Of course, risk refers to the future. But in its projection, risk embodies traces of other temporalities altogether. The projections made concerning the future bear within them traces of the past. Since the widespread deployment of risk under the calculative auspices of probability, these connections between past and future have been evident. So much is indicated by the tables and charts constructed in back alleys of seventeenth-century City of London when insurance companies first sought to articulate fire as a risk that could prove profitable. It is also found deeply nestled in the risk profiling carried out now, with vulnerability assessments being fed information from past instances in which fire has resulted in fatalities.

Futures imagined can also be seen to rely on performances that work to proliferate and extend a present stated task that could otherwise be finalised. Think, for instance, of how the FSEC risk mapping discussed in Chap. 3 is enacted not simply through algorithmically determined processing designed to meet the goal of enhancing the distribution of resources in a way spatially attuned to the future's predicted unfolding. Its effectiveness is instead realised through human-computer interface that allows for the analysis undertaken to be repeated over and again. Injects in exercises, furthermore, operate specifically by scuppering attempts by participants to bring imagined emergencies to a point of safe resolution. Where risk is defined simply as a category occupied by consolidated renditions of the future, such practices might seem incomplete and redundant. But, where risk is considered more as part of everyday life in the FRS, it is possible to see that the importance of these practices resides precisely in the capacity to defer the production of finalised risk information. The practices allow for a conceptualisation of risk and the future as something that is made and that thus goes through periods of being in the making.

Complex temporal configurations also organise and underpin the modes of intervention that risk, by the projections made under its name, helps to bring to bear on the world. Crucial to the forms of governance that the FRS now enact, these modes of intervention have appeared at different points in the book. Through risk, attempts can be made to ensure that populations, particularly those deemed vulnerable, are prevented from becoming the victim of fire emergencies. The built environment is cast as an object that requires protection. Numerous steps are taken, furthermore, to prepare the service to respond for the next fire emergency. Facilitated through risk, these modes of intervention are premised on the coordination of temporal domains that underpin calculations made on the future as described above. Extracted from the analytic processes through which they emerge as plausible courses of action, however, another set of temporal referents arise in relation to these modes of intervention. So whilst prevention is rendered actionable in part by the inferences MOSAIC makes by connecting past events with future vulnerabilities, its specificity as a technique of security rests on its orientation to stop from happening a threat that has been identified in a targeted and precise manner. Similarly, preparedness might be enacted through the (re)iterating rhythms of interface which characterise risk mapping, but it is mobilised by control room operators stimulated by the sheer continuing possibility that the next fire might happen at any time, in any place. Extending what Ben Anderson (2010) and Brian Massumi (2015) have already shown to be the case, modes of intervention are premised not just on configurations between past-present-future. Instead, they rest on, and in their enactment work to produce, refined imaginaries of future contingencies that are nuanced and discrete from one another.

7.4 Risk's Absence as a Critique of the Present

Despite the need for an appreciation of their nuanced difference, these modes of intervention reiterate that risk is mobilised across the security apparatus as a regulatory measure. The regulatory capabilities of risk are of course directed at the litany of object-subjects through which fire's future is made calculable. Amongst many examples of risk's regulatory

The shaping of the layout of business premises in compliance with legal responsibilities to protect against fire would be one example amongst many of how risk operates in a regulatory fashion. But regulation might be said to operate in more reflexive ways too. With its gaze reverted, risk is used to keep in check and re-order the FRS itself. This is evident in how risk is used by the FRS to keep the allocation of its resources attuned to the spatial distribution of fire risk, for instance, or how preventative actions are targeted to those most in need of them.

In the time that has elapsed since the research underpinning this book took place, many of the broad contextual themes underscoring its concern have continued or reappeared. Following Lauren Berlant's line of thought (2007) the FRS remain a case that bears lines of extension to and from many events that affect the world in general. The case of the FRS represents the localised effects of events that have a much broader reach. Under Donald Trump, the USA has reverted to increasing the number of troops on the ground in Afghanistan, conjuring up memories of the daily assaults taking place at the same area as the *Fire and Rescue Services Act* was written and established in 2004. Not unconnected, new waves, and types, of terrorist attacks have become common place in Western Europe. Demonstrating not just a continuation but an intensification of the emergencies confronted in the UK, the current Conservative government's imposition of austerity measures might be adjudged to have reached the zenith of its danger with the tragedy of the Grenfell Tower fire.

All the same, some distinct intimations towards interruptions with the past seem to be animating the present. Particularly interesting from the perspective of this book would be the seeming disappearance, at least in some ways, of risk as a regulatory measure. The claim here, of course, is not that risk does not appear as the dominant form of knowledge through which security agencies plan for and intervene on potential emergencies. Nor how government organisations and businesses alike plan their future. Instead, it seems that in some ways risk appears less pronounced in the major political developments that will, at some point in the not so distant future, change the circumstances that security agencies act within and which shape the contingencies that such agencies will attend to.

June 23, 2016, the date of the referendum result confirming that Britain's public by a slight majority had decided to leave the EU. The

result came, largely, as a shock and surprise to many of the pollsters whose careers and professions rely on making accurate predictions regarding such events. Perhaps more interesting, however, was the fact that, at their press conference that day, Michael Gove and Boris Johnson, who co-led the campaign to leave the EU, appeared equally bewildered and stunned. Since the result, anxiety over the lack of clarity over Britain's future has been ubiquitous. Later on in the same year, both pollsters and many people across the world were equally aghast when reality TV star Donald Trump won the majority of electoral college votes in the US General Election. Like many of his business ventures, the Trump administration has proven a failure in many ways, with legislation not being passed through Congress, constant cabinet reshuffling and government departments dangerously under-staffed.

Despite being aided by the use of a sophisticated profiling technology developed by the company Cambridge Analytica to find those most vulnerable to being persuaded to vote for them, both of these cases and their aftermath seem to suggest that risk and risk planning play less of a role than one might expect to be the case.[1] In respect to both campaigns, there appears to have been a distinct lack of emphasis on making projections onto the future and, in turn, planning courses of action if such projections extend into the present. In its place, the contingency and disruption that risk seeks in ways to address and control is wielded as a mechanism to attain power in itself.

Despite the potential, and partial, loss of its efficacy, risk nevertheless remains a significant conceptual tool in addressing such cases. It does so because it opens up the possibility for critique of what begins to unfold in its wake. By exploring the absence of risk, critical exploration is made possible concerning how instigating contingency operates as a mechanism of power. Lines of inquiry here might probe, for example, the way in which the many dangers of leaving the EU have been appropriated as 'golden opportunities' by Boris Johnson.[2] Alternately, close scrutiny might

[1] https://www.theguardian.com/politics/2017/mar/04/nigel-oakes-cambridge-analytica-what-role-brexit-trump (last accessed 12/09/2017).

[2] https://www.theguardian.com/politics/ng-interactive/2016/jun/27/what-boris-johnson-said-about-brexit-and-what-he-really-meant (last accessed 12/09/2017).

be afforded to how the nomenclature of Fake News is used by Donald Trump in an attempt to instantiate doubt of most journalists and media companies. At the same time, risk's absence can be read as a factor for explaining the fall-out that has begun to unravel in both the cases explored here. Failure to plan for anything beyond the campaign has led to both the Trump administration and arrangements for Brexit to appear largely farcical and dangerous. But the Trump presidency and Brexit can be critically engaged with furthermore by applying to them lines of inquiry that, through the duration of the book, have been commonly associated to the operation of risk in the context of emergency governance and security. Specifically, we might ask, what consequences might this present state have for the future? Early indications suggest that, lacking risk's premise, forms of insecurity are likely to develop anew both globally and locally.

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[1] Note: Page numbers followed by 'n' refer to notes.

N. O'Grady, *Governing Future Emergencies*,
https://doi.org/10.1007/978-3-319-71991-7