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Simon Beer

'The Trajectories of Industrial Change: Disrupting, Managing and Assembling Futures in Teesside'

Ph.D. Thesis

Abstract

In 2010 the steelworks in Teesside were 'mothballed' meaning that the works were shut down yet kept in a state that they could potentially be restarted in the foreseeable future. This had a number of implications for a variety of different orientations towards the future across Teesside. For the steelworkers of Teesside this mothballing rendered many futures of a pension entitlement and continued employment uncertain. The management of the steelworks sought to hold a future of continued steelmaking in Teesside together through retaining skills and the steelmaking workforce. Furthermore, in the wake of the mothballing, local economic governance sought to enact a new orientation towards the future for the local economy of Teesside which was less reliant upon heavy industry. Futures are therefore a key aspect of how industrial change comes to be enacted and lived. Yet, whilst there have been numerous engagements with industrial change, living through such change and an emerging academic engagement with futures, there remains little in the way of attention towards how orientations towards the future can be theorised and researched. This is the goal of this thesis; to develop and establish a conceptual framework for engaging with orientations towards the future within research that can attend to the multiplicity, complexity, inherent change and mobile boundaries of these orientations. To do this the thesis has developed the concept of 'trajectories.' A trajectory is means of conceptualising an orientation towards the future as a homeomorphic assemblage, whereby change is inherent to the assemblage but must remain within certain mobile boundaries or 'thresholds' otherwise the assemblage loses its homeomorphism and undergoes a 'transition' to a different object. This thesis uses this conceptual framework to explore the trajectories enacted through the mothballing of the steelworks in Teesside as a means to explore the futures of industrial change.

The Trajectories of Industrial Change:
Disrupting, Managing and Assembling
Futures in Teesside

Simon Beer

Ph.D. Thesis

Department of Geography

Durham University

2015

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List of abbreviations

AVC	-	Additional Voluntary Contributions
BOS	-	Basic Oxygen Route of Steelmaking
BSC	-	British Steel Corporation
CONCAST	-	Continuous Casting
CURS	-	Changing Urban and Regional Systems
ICI	-	Imperial Chemicals Industries
MOU	-	Memorandum of Understanding
ONE	-	One North East
PCI	-	Pulverised Coal Injection
RCBC	-	Redcar and Cleveland Borough Council
RM	-	Regeneration Masterplan
SOA	-	Statement of Ambition
SSI	-	Sahaviriya Steel Industries
TCP	-	Teesside Cast Products
TDC	-	Teesside Development Corporation
TUPE	-	Transfer of Undertakings (Protection of Employment)
TVU	-	Tees Valley Unlimited

Statement of copyright

The copyright of this thesis rests with the author. No quotation from it should be published without the author's prior written consent and information derived from it should be acknowledged.

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For Hannah.

We did it together.

1. Turning to Futures

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“Steel production at the Corus plant on Teesside will cease within a week, workers have been told. The mothballing of the Teesside Cast Products (TCP) blast furnace at Redcar, where about 1,600 jobs are due to be lost, will begin on Friday.” (BBC 2010a)

•

Under overcast skies at 4pm on the 19th February 2010 the last raw materials were poured into the Redcar blast furnace, marking the beginning of the mothballing of Teesside Cast Products (TCP), the last iron and steelmaking company in Teesside. Steelworkers, their families, union members and friends gathered at the gates of the works where a brass band played the last post and the 150 year history of steelmaking on the banks of the Tees was mourned. Inside the blast furnace these last raw materials were heated and slowly converted into liquid iron and liquid slag, the former of which was then removed and taken by train to the BOS plant¹ to be turned into steel and then to the Concast² to be cast into steel slabs. Holes were then drilled into the bottom of the blast furnace to remove the residual molten iron and thus leaving the furnace empty and ready to be mothballed. Over the following weeks the various plants of the steelworks which were to be mothballed were slowly taken apart or placed in a state of indefinite preservation. Parts were dismantled, labelled and placed in buckets of oil; machinery was moved into storage; computer systems were mapped and shut down. The previously busy, noisy and constantly in motion site, rapidly transformed into one of emptiness, silence and stillness. What is more, the workforce were also ‘mothballed’ in their own right, with some opting to take

¹ Basic Oxygen Steelmaking (BOS) plant.

² Continuous Casting (Concast) plant.

early retirement, and others being kept on either in jobs at the plants within the steelworks that were to remain open for the time being or within training schemes. But on the day of the final cast (documented within a DVD entitled 'The Last Cast' which was distributed to steelworks workforce), the future of the steelworks, the steelworkers and the communities which steelmaking supported appeared highly uncertain.

But what exactly does it mean to say that a future is, or has been made, uncertain? Surely, outside of believing in some form of destiny or teleology, all futures are in some way uncertain or unknowable given their inherent contingency and constant becoming. Yet there was something qualitatively different in the form or degree of uncertainty facing the futures of Teesside's steel industry, its steelworkers and the wider Teesside region following the mothballing of the steelworks, beyond this seemingly inherent uncertainty of futurity. Furthermore, upon even a cursory inspection, what becomes readily apparent within a situation such as that facing Teesside in 2010 is that there were multiple futures being enacted here rather than one uncertain future. From the futures of planning and investments articulated by the steelworks management, to the futures of the individual steelworkers, and the futures of growth and local economic planning articulated by local government bodies, there are a range of different futures which are all composed of multiple heterogeneous components enacted through this process of mothballing. Closer inquiry reveals the extent of the range and heterogeneity of these components assembled within their respective different futures: pensions, savings, blast furnaces, economic predictions, international markets, skills, birthdays, public sector funding cuts, private sector investment, sounds, emotions, loss, coke, plans and much more are all assembled within different futures through the mothballing. Futures are therefore ubiquitous across

how industrial change such as the mothballing of TCP, and indeed everyday life, is enacted and experienced.



“The decision to partially mothball TCP follows strenuous efforts by Corus over the past eight months to secure a long-term future for the plant after the failure of four international slab buyers to fulfil their obligations under a 10-year contract that they signed with Corus in 2004. This contract committed the consortium to buying about 80% of the plant’s production for ten years.” (Tata Steel Europe 2009)



At this point the complexity of these futures appears to outstrip the vocabulary we have to describe them. When talking about futures, are we referring to multiple separate futures, or the future as a form of temporal realm of the yet-to-occur? This reflects a wider issue with engagements with futurity both within geographic research and also within how we might commonly think about and represent futures; namely that we possess a very limited conceptual apparatus for approaching futures outside of a linear past-present-future. Developing a set of conceptual tools for addressing futures outside of this linear representation is the goal of this thesis. Indeed, through an engagement with the various futures enacted by and through the mothballing of Teesside Cast Products this thesis sets out to achieve three key objectives:

1. To explore the role of futures in industrial change particularly in relation to the mothballing of the steelworks in Teesside and the industrial and local economic change that it brought about;
2. To develop a conceptual apparatus to approach and research different orientations towards the future;

3. To apply this conceptual approach to a range of futures enacted within Teesside following the mothballing of the steelworks.

This thesis therefore seeks to address the ways in which futures are imagined, practiced and related to and how such futures come to shape how the world is experienced, lived and acted into. Although situated within the empirical site of industrial change within Teesside, I intend that the conceptual apparatus that emerges from the second research objective can be adopted and developed across different empirical sites as a means of researching orientations towards the future. The aim here is not to generalise across different analyses of futures in terms of defining a structure or form *a priori* of research, but rather to provide the means by which particular futures and sets of futures can be researched. The application of this set of concepts to the mothballing in Teesside through the third research objective also provides an opportunity to assess the utility of such an approach and what researching futures in this way can add to how industrial change is understood and represented within geographical research.



“I’ve been here since I was 16 years old. I’ve worked here 31 years and I’ve done nothing else. It hasn’t really hit me yet and I haven’t really thought about what I’ll do next. Hopefully, we’ve got a future and it will be my job to put this furnace back on.” (Former Steelworker in Evening Gazette 2010)



Throughout the mothballing of the Teesside steelworks futures are assembled, enacted and experienced by a range of different actors such as people, companies, organisations and others, and these experiences are heterogeneous and complex. Thus, rather than referring to *the* Future as a temporal realm, the focus here is perhaps better represented as

multiple different orientations towards the future, or what I later come to conceptualise and refer to as 'trajectories.' Such trajectories are homeomorphic assemblages which function as particular orientations towards the future enacted and experienced by various different forms of actors. They are distinct from 'the future' as a singular reference to a realm of temporality in that a trajectory refers to a particular orientation towards the future enacted by an individual, company, organisation or other actor as a means of positioning themselves towards the future. This thesis argues that the concept of assemblage is best placed to underpin a theorisation of such orientations towards the future given its focus upon both (a.) the becoming and deterritorialising aspects of assemblages and also (b.) their territorialisation and stratification. Otherwise put, such a focus upon these two aspects is, at its simplest, an attention to the tension between making and unmaking within which all assemblages exist. Thus assemblage in this sense is concerned with the interplay between how things are held together and how things change. In terms of the mothballing of TCP, such an approach therefore allows for questions of how futures are assembled, enacted and held together in the face of change to be placed at the centre of research, thus making assemblage a key means of underpinning the concept of trajectories.

Trajectories, in the sense that I use the term have three central aspects. Firstly, they are heterogeneous and multiple in that they can consist of a range of different components such as plans, actions, understanding, knowledge, documents, emotions, practices, people, places and so on and that the specific assembling of components differs between trajectories. Secondly, they are becoming and contingent in that they are held in tension between being made and unmade through their constant enactment. Thirdly, trajectories are homeomorphic whereby, following the work of John Law (2002), whilst change is

inherent to trajectories through their becoming nature, such change must remain within particular mobile thresholds. If the trajectory's change exceeds these thresholds then it undergoes a transition and becomes a different trajectory as it has changed to such an extent that it can no longer remain the same object. Such a conceptualisation thus allows for an attention towards how particular trajectories are composed of heterogeneous components assembled in multiple ways by different actors, and how they are constantly changing through their enactment however such change must remain within particular thresholds for a trajectory to be held together. Thus, approaching futures in this way allows for specific orientations towards the future to be explored explicitly, which therefore addresses the first and third research objectives outline on pages 3-4, whilst also providing a theoretically detailed conceptual apparatus for their research, and hence attends to the second research objective.

The implications of approaching the mothballing of TCP as a process of industrial change in this manner are twofold. Firstly, utilising the concept of trajectories as a means of understanding industrial change opens up new ambivalences, complexities and heterogeneous components that have often been overlooked in previous representations of industrial change and plant closures. Secondly, this project also highlights how futures themselves are a key means through which the world is experienced, lived and acted into. In short, a focus upon the futurity of industrial change opens up the breadth of actors included within how such change is understood, and also emphasises the roles played by specific futures. Thus, what becomes readily apparent here is that an instance of industrial change such as the mothballing of a steelworks does not consist of one trajectory, one future, but rather there are multiple different trajectories being enacted throughout this industrial change. The mothballing of the steelworks was more than solely the loss of a

future of steelmaking but a multiplicity of different trajectories, and therefore rather than trying to develop one particular narrative of the mothballing, this project attempts to explore these multiple different orientations towards the future. Hence, rather than focussing on one group of actors and concentrating in great depth upon their experience of the mothballing, I chose instead to focus upon a range of different actors within the research. Whilst the research can be broadly grouped into sections focussing upon the steelworkers of TCP, the steelworks management and local governance, what will become apparent throughout this thesis is that within these groupings multiple different trajectories will also be found.

•

“It’s all we are, just one big family.” (Steelworker in *The Last Cast* 2010)

•

To achieve the three key aims set out on pages 3-4, this project attempts to explore a range of different futures enacted within Teesside during, and in the wake of, the 2010 mothballing of the steelworks. A steelworks is composed of a vast multitude of different components and actors and sits within a highly complex assemblage of relations with a multiplicity of other assemblages and actors, such as global economic flows and finance, national government regulation and local government planning for economic regeneration. The futures enacted through a steelworks are multiple and varied and this project therefore seeks to explore a range of such futures to highlight the complex orientations towards the future affected by industrial change. The thesis thus focusses upon the orientations towards the future enacted by the steelworkers affected by the mothballing, the management of the steelworks during this period, and the planning for economic growth by a local authority (Redcar and Cleveland Borough Council) and a Local Enterprise

Partnership (Tees Valley Unlimited). The decision to focus upon this range of actors (individual workers, company management, local government) was taken to allow a range of differing orientations towards the future to be explored and to highlight the roles that futures play across these differing sites of industrial change.

This project sits between three key bodies of literatures. Firstly it seeks to add to a broad literature dealing with industrial change, which has long been a focus of geographical research, but reached a new impetus in the early 1980s following the work of scholars such as Harrison and Bluestone (1982) and Doreen Massey (1984). This marked the beginning of a new round of engagements with contemporary industrial change attending to the local specificities of such change. This was closely followed by research dealing with flexible accumulation (Harvey 1987a; Pollert 1988; Allen J. Scott 1988; Allen J. Scott and Storper 1986a), particularly as derived from the French regulation school (Aglietta 1982; Lipietz 1987). Further work on flexibility within industrial change also sought to emphasise flexibility in the competition between cities and places (Harvey 1990; Lipietz 1993), within labour practice (Garrahan and Stewart 1992) and the implications for gendered divisions of labour (Linda McDowell 1991). This more 'traditional' body of industrial change literature therefore informs this project in regards to both an empirical context of previous industrial change within the UK, Western Europe and the USA and also in how such industrial change has been theorised and understood within geographical research. Yet this thesis also seeks to speak to this body of work by bringing such accounts of industrial change into relation with an explicit engagement with futures. The aforementioned literature on industrial change assumes a particular futurity through the implied impacts of industrial change upon current and future industrial practice. Change itself is a particular relation to the future through emergence and contingency, however futures are largely only ever implied within

this industrial change literature, playing the role of a background of temporality to industrial change rather than featuring as the subject of discussion in their own right. This thesis will argue that attending to the futures of industrial change opens up new ways of thinking and researching industrial change.

Secondly, this thesis sits in relation to a rather diffuse literature addressing the lived experiences of industrial change through a number of different engagements. The lived experience of industrial change in terms of how communities come to cope and adjust to such change is presented in work such as that of Walkerdine (2010), Bennett (2009) and Stenning (2000). Here the focus is placed upon how various uncertain futures are lived within these communities, and again in a similar fashion as the literature dealing with more traditional engagements with industrial change a particular relation to futurity is assumed within this body of work. Yet there are two further engagements with the lived experience of industrial change which engage more explicitly with futures. Firstly there is that of precarity, which approaches industrial change through the lens of employment being rendered increasingly unstable and temporary (Ettlinger 2007a; Gill and Pratt 2008; Waite 2008; Warren 2014) (and which could also be claimed to have roots within literatures dealing with flexibility). Whilst not engaging explicitly with futurity, the concept of precarity hinges upon how particular futures of employment are made uncertain. However, as we shall see in Chapter 2, whilst precarity may be a relatively new concept within geography, uncertain futures have a long history within Teesside. Secondly, there is a literature regarding the 'haunting' of past sites of industry and former employment. Work by authors such as Edensor (2005a; 2005b; 2008), Meier (2012) and Swanton (2012) has highlighted the continuing presence of the past in relating to industrial change. Here former workers at closed or restructured sites of industry are 'haunted' by memories and pasts of their past

industrial practice. However this is also an implicit relation towards the future here, which remains largely in the background of these accounts, in that whilst these former workers continue to relate to their industrial pasts the process of haunting takes place through the relationship of these pasts with a future of absence of these industries. Thus, whilst this literature has focussed primarily on the role of relating to pasts of industrial practice, relating to such pasts also implies relating to futures. Futures are therefore key to how industrial change is lived and experienced and this thesis seeks to add to this varied literature on the lived experience of industrial change by bringing these futures to the fore of addressing industrial change as a means of broadening how we understand such change to be lived.

Finally, this thesis also seeks to position itself in relation to a small but growing literature within contemporary geographical debate concerning futures and futurity. Here I argue that there are two distinct engagements with futures within this literature. The first relates to that which provides an empirical engagement with a specific future or sets of specific futures and how these come to be enacted and practiced. Whether through the empirical sites of computing (Kinsley 2012; 2011; 2010), food safety inspections (Bingham and Lavau 2012), sea level rise (Fincher et al. 2014), government discourse (Brown et al. 2012) or otherwise, these contributions offer detailed examples of the role of futures within varying different empirical situations. However such contributions focus less upon a substantial engagement with how such futures can be conceptualised within research and thus whilst their empirical discussion is highly detailed, their use of futures remains rather vague conceptually. The second engagement with futures within this literature however is one which explicitly seeks to theorise futures within research. Work by Adam and Groves (2007), Anderson (2010), Holloway (2015), Opitz and Tellman (2015), Hardgrove, Rootham

and McDowell (2015) and Worth (2009) approaches how we might conceptualise futures and how different futures are anticipated, created and articulated. Yet whilst these engagements offer some reflection on how to conceptualise futures, they stop short of providing a full conceptual apparatus that can be applied to futures across different empirical sites and which can attend to the multiplicity, change and holding together of futures through their enactment. Thus, this thesis seeks to draw from these two different engagements with futures and to speak to this literature through providing a conceptual apparatus - that of trajectories - with which to research and conceptualise futures that is both theoretically detailed and can extend beyond a single empirical site.

Overall then, this thesis seeks to achieve the three key objectives as laid out on pages 3-4 to explore the role of futures in industrial change, to develop a conceptual approach to researching futures and to use this approach to explore the various different futures enacted through the mothballing of TCP. In doing so the thesis is situated in relation to three key literatures including; industrial geography accounts of industrial change, lived experience of such change, and a growing literature on futures and futurity. The thesis aims to add to each of these literatures through its research objectives by making explicit the role and importance of futures in understanding industrial change and how it is experienced, by providing a set of defined conceptual tools for approaching and researching futures, and through exploring the difference that such an approach can make to researching industrial change.

•

“There is a need for more diversity in our economy to offset the current dominance of production industries and the public sector, which contribute half of the area’s

growth and employment, and which have become vulnerable in the recent economic climate.” (Tees Valley Unlimited 2012, 21)



To achieve the objectives laid out on pages 3-4, Chapter 2 begins by providing a historical and contextual account of steelmaking in Teesside alongside positioning industrial change since the 1970s onwards in the context of contemporary industrial change literature. Here the role of futures and uncertainty within Teesside’s steelmaking industry are brought to the fore through its various periods of industrial change since its inception as an industrial region in the 1840s. Chapter 3 progresses from this to further situate the thesis in relation to the lived experience of industrial change and futures literatures, particularly in regard to how these literatures imply a particular form of future yet leave this relatively unattended within this body of work. Chapter 4 then progresses from this point to develop a conceptual apparatus for attending to futures by engaging with the concept of assemblage following Deleuze and Guattari, and John Law’s deployment of the concept of homeomorphism. This conceptual approach to futures I call the concept of trajectories, and as such it speaks directly to the second research objective. Chapter 5 addresses the methodological implications of utilising such a concept in research. Here the key principles of the concept of trajectories are translated into the methodological practice of researching futures. Chapter 6 begins the empirical discussion of the thesis with a discussion of the steelworkers’ experiences of the mothballing of TCP through their particular trajectories, specifically in relation to how particular futures of closure come to be rendered present within trajectories, how relations to problematic futures are maintained through industrial change and what is lost through such change. Chapter 7 broadens the scope of this discussion by attending to the management of the steelworks throughout the mothballing period, and thus asks how can a particular trajectory, in this case one of restarting

steelmaking, be held together within the transition of industrial change. Chapter 8 extends the discussion of trajectories beyond the steelworks itself to further explore how trajectories that in turn influence and are influenced by Teesside's steel industry and the 2010 mothballing are also being enacted through Teesside's local and regional governance. Through an engagement with the economic regeneration planning of a Local Authority within which much of the steelworks are located and a Local Enterprise Partnership this chapter explores how the assembly and enactment of a new trajectory of economic growth is being attempted. Thus the three empirical chapters of the thesis respectively address how transitions within trajectories are lived and experienced, how particular trajectories can be held together, and how the creation of new trajectories is attempted. The thesis concludes in Chapter 9 which draws together the key points of the thesis and poses some tentative questions for future research.

•

“As soon as you walk through the gate, and back to our cabin where we get changed all the lads are there and that’s when it felt like, just good feeling to get back there and again [...] it was depressing walking out but going back it wasn’t, it was a different feeling altogether, even though it was all quiet and people milling about, but with smiles on their faces” (Participant 20 ‘Acklam’)

•

On February 24th 2011, one year and four days since the beginning of the mothballing, a Thai firm named Sahaviriya Steel Industries (SSI) signed a deal to purchase TCP and on 15th April 2012 the blast furnace was relit, signalling the end of the mothballing. However, whilst the mothballing may have formally ended, the significance of its impact upon the many varied relationships with futures taking place within and through the steelworks of

Teesside continues to remain. Even the purchase of the company and restarting of the steelworks left some steelworkers in a position whereby even though they never lost their job through the mothballing period, they ended up losing their pension entitlements through the purchase and transfer of TCP to SSI's ownership. Thus, even after the end of the mothballing, the impact upon the multiple and heterogeneous relationships with the future being enacted within Teesside continues to be felt. I argue that this is in part what makes focussing upon the mothballing of Teesside a key means to understanding the role of futures within industrial change, as arguably the mothballing itself was a process of bringing the importance of futures into sharp relief. Whether in terms of planning or anticipating a financially secure retirement supported by a pension thirty years in the making, holding a future of a business together through a period of transition, assembling new futures of economic regeneration or otherwise, futures and our relationships with them are vastly important ways through which we experience, order and act within the world. It is these futures and relationships that therefore form the focus of this thesis.

2. “We were referred to as the Jewel in the Crown at one point”: A History of Teesside’s

Steel Industry

“When I was at school, we did careers.. I remember everybody being sat in the classroom and er, nearly everybody was, I wouldn’t say directed to but there was certainly a sense that you were either at ICI or British Steel and I remember one lad actually turning round saying ‘I wanna be I want to film nature er for the BBC’ and he [the careers tutor] said ‘Don’t be stupid son, let’s get realistic, you’ll be much better off, more realistic, if you get yourself an application form down at the local industry’” (Participant 5 ‘Marton’)

Journey on the train between Redcar and Middlesbrough and you cannot help but be struck with awe at the sights of the immense magnitude of the industries that made Teesside what it is today. Indeed, this railway line travels straight through the heart of the steelmaking complex on the banks of the Tees. Against the backdrop of the blast furnace on the skyline towards the coast, you pass the huge ‘BOS’ plant at Lackenby on one side and then the decaying cathedral-like coke ovens at South Bank on the other. Time it just right and you can see the vast ladles of molten iron being poured out at the former, and the fire and clouds of smoke rising from the newly produced coke at the latter. Yet if you look at the other passengers on these old ‘Pacer’ trains (themselves testament to a lack of investment in Teesside’s public transport infrastructure), it is likely that you will find these passengers to be rather indifferent to these almost apocalyptic scenes³. Heavy industry, iron and steelmaking included, is such a part of everyday life within Teesside that travelling and commuting through the clouds of sulphur-smelling smoke and the sight of molten metal and red-hot flaming coke can almost be considered normality. This is the outcome of

³ The dystopian opening scenes of Ridley Scott’s ‘Blade Runner’ were said to be based upon Teesside’s industrial landscape at night.

over a century and a half of iron and steelmaking within Teesside, and this chapter aims to provide an overview of the history of these industries within the region so as to offer some insight into how this region came to be one of the foremost sites of steelmaking in the world.

2.1. Iron Origins and the Rise of Steel

The history of Teesside has always been one of uncertain futures. Although having a long history prior to its industrialisation, the development of Teesside into one of the major conurbations of the North East and one of the UK's industrial heartlands began in earnest in the mid-19th century. In 1831 the physical landscape would have been almost unrecognisable to current inhabitants: Middlesbrough was but a small hamlet of 154 people and much of what is now the site of heavy industry on the banks of the Tees remained estuary wetlands. However with the advent of iron making in the region on an industrial scale⁴, Middlesbrough's population began a rapid increase reaching over 5000 people in 1841, 55,000 by 1881 and over 90,000 by 1901 (Beynon, Sadler, and Hudson 1994; Bullock 1974).

Whilst Teesside would rise to become Britain's leading producer of iron and steel, the iron making industry started from rather inauspicious beginnings. The first foundry constructed in Teesside in 1841, built by Bolckow Vaughan⁵, was dependent upon importing pig iron from Scotland, as well as supplies of coal from Durham and limestone from Weardale. The need to transport vital iron ores from such a distance added a significant cost to the

⁴ Small amounts of iron had been produced in the area at least since the Roman occupation of Britain, however it was not until the mid-19th century that it was produced on any scale of note.

⁵ The first iron making company in Teesside, founded by Henry Bolckow and John Vaughan.

production of iron in Teesside and it was not until 1850 that a future of iron and later steel production upon Teesside would be guaranteed. It was in this year that significant deposits of iron ore were found within the Eston Hills, otherwise known as the Cleveland Main Seam. Such a discovery had been sought by the ironmasters⁶ of the North East for a number of years, as such a deposit of reliable and relatively rich iron ore in proximity to the coal fields of Durham would make for near ideal conditions for iron production. Indeed, the significance of this discovery is described by Bullock:

“The northern coalfield lacked the substantial resources of blackband and clayband ores found in other British coal-producing districts, and the difficulty of obtaining ore in sufficient quantity and at a reasonable cost had long been a severe restraint on iron manufacturing in North-East England. After 1850, however, the situation was very different, on Teesside most of all.” (Bullock 1974, 83)

Hence, with a reliable supply of local iron ore from the Cleveland Hills, coking coal from the Durham coalfield and transport links via the Tees estuary, Teesside was ideally located for the rapid development and expansion of a vast iron making infrastructure. Land was reclaimed from the Tees estuary to allow for this development and by 1871 some 90 blast furnaces, owned by numerous iron producing companies, were in operation on the banks of the river, turning the locally mined iron ore (and some imported ores) into iron (Beynon, Sadler, and Hudson 1994). It is interesting to note that this expansion took place in the context of depressed pig iron prices and low profits within the iron making industry (Bullock 1974). The continued investment within Teesside in this early period is perhaps testament not only to the relatively low cost and proximity of the Cleveland ore, but also to its proximity to the Durham coalfield and the advantage offered by a coastal location (ibid.). Thus, even in the early stages of its development as a site for iron production,

⁶ A term denoting an owner of a forge or blast furnace in the industrial revolution.

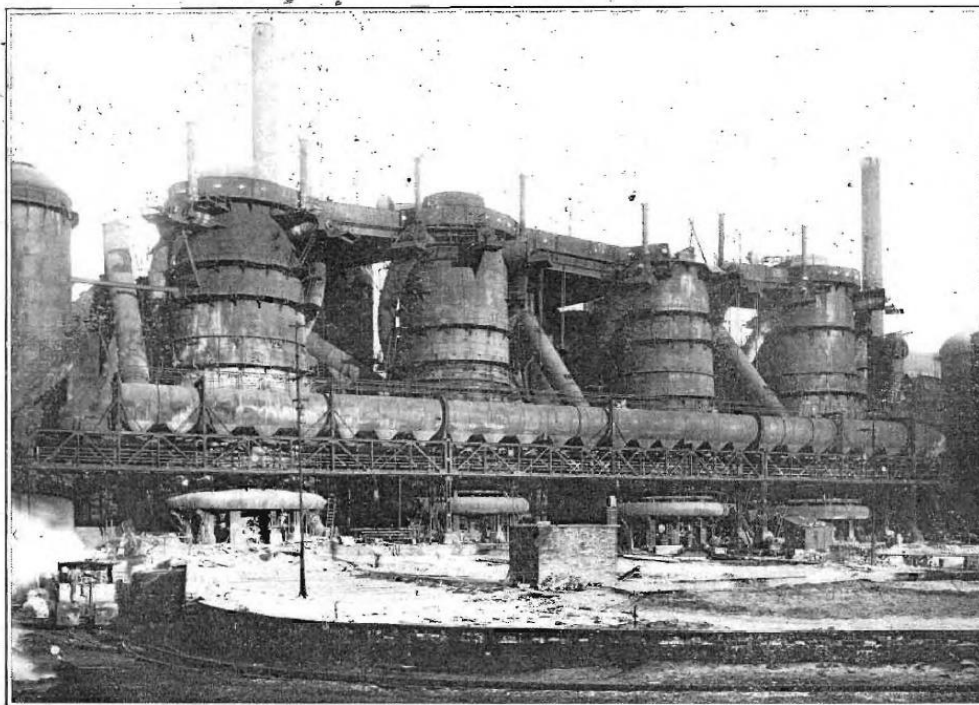
investment within Teesside was predicated upon a particular orientation towards the future of the assembling of various raw materials, capital investment, labour power and a future of profitability in producing iron in Teesside even in the face of depressed iron prices.

Up until the late 1870s, steel production had been minimal upon Teesside, with wrought iron remaining the focus of industrial development in the area. Indeed:

“Ever since the introduction of the Bessemer converter in 1856, wrought iron had had a rival and potential successor in mild steel. It had been protected, though the ironmasters were not fully appreciative of the situation, by a fortuitous and essentially transient combination of circumstances: a scarcity of ore suitable for conversion by the Bessemer process, technical problems in steel manufacture, ignorance and distrust of the qualities of mild steel, and the seemingly unlimited demand for ferrous metals of all descriptions.” (Bullock 1974, 90)

Despite this however, and with technological advances such as the development of the Bessemer process and the Siemens-Martin open hearth furnace, the first steel was produced in the mid-1870s by Bolckow Vaughan. At this point the ore for this process of steelmaking had to be imported from Spain due to the Cleveland ore containing too great a number of impurities for use within these new steel production methods. However, by 1879 the Teesside ironmasters had discovered that the inclusion of dolomite within the iron smelting process allowed for these impurities to be removed. Hence, local iron ore could now be used for steel production, permitting the enactment of a future of rapid expansion of steelmaking within Teesside to begin (Beynon, Sadler, and Hudson 1994).

Up until the turn of the century, iron and steel production within Teesside had taken place through a large number of different companies, with almost 20 owning blast furnaces in 1881. However, a number of mergers and acquisitions within the local iron and steel industry meant that by the beginning of the 20th century iron and steel making in Teesside was dominated by three large companies: Bolckow and Vaughan, Dorman Long, and South Durham Steel and Iron. In 1929 Bolckow and Vaughan would be acquired by Dorman Long, in the last major rearrangement of the corporate ownership of the iron and steelmaking industry in Teesside prior to the nationalisation of the industry in 1967 (Beynon, Sadler, and Hudson 1994).



Dorman, Long & Co. Ltd.

ACKLAM IRONWORKS, MIDDLESBROUGH.

Middlesbrough.

Image 1: Photograph showing the Acklam Ironworks, owned by Dorman Long, in 1924.⁷

⁷ Image source: <http://www.hidden-teesside.co.uk/wp-content/uploads/2013/01/Acklam-Ironworks.jpg> Accessed: 13/05/15

Despite what can only be described as the meteoric rise of Teesside as a leading producer of iron and steel, for those employed within these industries working conditions and wages were poor and often unreliable during this period. Wages were largely based upon a sliding scale system whereby the rates paid to workers were determined in relation to the iron and steel markets (Beynon, Sadler, and Hudson 1994). When coupled with the fact that most employment in the iron and steel industry was also paid on a basis of tonnage worked, and that demand could often fluctuate, this could mean that the weekly income of iron and steel workers would often be highly unpredictable and precarious. Indeed, Hall's historical analysis of wages in Teesside up to 1914 has shown that over the course of a year between 1913 and 1914, average weekly wages varied between 18 and 37 shillings⁸ a week for a sample of 400 workers (A. A. Hall 1981). Hence, throughout its development, working life in the iron and steel industry was often characterised by uncertainty towards the future for the metalworkers of Teesside. Indeed:

"Short-term changes in income, of the magnitude suggested by the surviving wage books, compelled the extensive use of savings, insurance and adjustments to weekly budgets, and necessitated a degree of planning ahead and provision for the future that may not have been entirely easy for working-class families of the period." (A. A. Hall 1981, 211)

For those working within Teesside's iron and steelmaking industry, life was a practice of the management of futures through things such as planning ahead and making provisions for when wages might be lower or work could not be found (ibid.). For these iron and steelworkers then, Teesside's steel and iron making industries have long incorporated insecurity and uncertainty within their role as major local employers. Furthermore, such variability in the short term was also matched by longer term uncertainty in regards to

⁸ 37 shillings being roughly equivalent to just over £80 in modern money.

wages and employment. Real earnings in the iron and steel industry were subject to large variations from one year to the next (A. A. Hall 1981). When coupled with the often poor quality of housing that had been built by the ironmasters to house their workforces, and which were often in varying stages of neglect due to a lack of maintenance and investment, the working and living conditions of the iron and steel makers of Teesside remained of a poor standard in the period up until the mid-20th century. Thus, and in line with recent discussion within geography (Waite 2008; Neilson and Rossiter 2008), precarity and uncertainty within capitalist labour are not the preserve of late or post-Fordist capitalism, but rather have always been a prominent feature of capitalist accumulation, with Teesside being no exception.

Economically, the period following the First World War was one characterised by hardship, particularly upon Teesside. Shrinking demand for iron and steel, coupled with unfavourable exchange rates in the international market, were to contribute to problems of overcapacity within the Teesside iron and steel industry; a problem that would come to haunt the area again in the 21st century. Having built large new steel making facilities during the First World War to meet wartime demand, Bolckow Vaughan was hit hard by such overcapacity and in 1929, following a struggling financial performance, was bought out by Dorman Long. Through the depression of the 1930s, which caused many smaller iron and steel making companies to close, Dorman Long became the dominant iron and steel company within Teesside, rivalled only by South Durham Steel and Iron (Beynon, Sadler, and Hudson 1994). In this period, the supplies of iron ore from the Cleveland Main Seam were nearing exhaustion and were also becoming increasingly insufficient for production of higher grades of steel due to their impurities. However, due to Teesside's coastal location and deep water estuary it could maintain its continued development through the importing of

ores, continuing the assembling of raw materials essential to the continued enactment of a future for Teesside as a site of iron and steelmaking. The last Cleveland iron ore mine closed in 1964. In the present day the half hidden and overgrown ruins of these ex-iron mines can still be found, now little more than stone foundations and bricked up drift entrances: the traces of Teesside's industrial development. In places like the Eston hills and Errington woods, it is possible to stand on the sites of these old mines - the redundant foundations to a future of iron making for Teesside - and through the trees and foliage of the Cleveland hills look out across the iron and steelmaking complex at Redcar and Lackenby and watch the steam and smoke rise from the chimneys.



Image 2: The ruins of a former ironstone mine in the Cleveland Hills⁹.

⁹ Image source: <http://www.gazettelive.co.uk/news/donations-pour-ambitious-scheme-buy-6197123> Accessed: 13/05/15

Teesside and the Chemicals Industry

The end of the First World War saw a further new industrial development within Teesside: the development and growth of the chemicals industry. Following government fears concerning threats to Britain's ammonia imports, development of a large chemicals works in Teesside had been planned during the war, and was completed after 1918 by Brunner-Mond. In 1926 Brunner-Mond merged with three other chemical producers to form Imperial Chemical Industries (ICI). The business strategy of ICI in this period was to rapidly expand its sites at both Billingham (which it had developed from a small hamlet into a company town) and later at Wilton, to take advantage of the overseas markets offered by the British Empire for its chemical products (Beynon, Sadler, and Hudson 1994). Expansion at these two sites continued, reaching and retaining an employment level of around 13,000 throughout the late 1940s and 1950s. However, by the 1960s international competition dictated that investment in technological upgrades to the production process had to take place. Such investment meant the loss of several thousand jobs within the chemical industry in Teesside.

Following the Second World War, the continued development of the iron and steel industry in Teesside was beset by a period of particular uncertainty. The nationalisation and then reprivatisation of this industry within the year of 1951 delayed further investment until the mid-1950s and 1960s. This new investment, including two batteries of coke ovens and three new blast furnaces and rolling mills, was to replace older facilities that were being brought offline. Despite this refitting and investment in new manufacturing infrastructure within the Teesside iron and steelmaking industry, by the mid-1960s profits within the industry had fallen below the national average. The two main iron and steel producers, Dorman Long and South Durham Steel and Iron, agreed to merge in order to alleviate some

of the economic pressures facing both companies. However, before this could take place, the 14 largest steel producers in the UK were nationalised to form the British Steel Corporation (BSC) in 1967. This nationalisation of the steel industry ushered in a new era for the steel industry in Teesside, and with it a new orientation towards the future.

2.2. Forging British Steel

The 1960s saw a shift in the iron and steel making industries of Britain. The rise of Teesside as a location for the production of iron and steel on an industrial scale can largely be attributed to its proximity to local iron ore and coking coal. However from the 1960s onwards, the advantage offered by local raw materials was to be overshadowed by that afforded by transport links. In the words of Beynon, Hudson and Sadler:

“By the 1960s, however, a new set of locational influences and competitive pressures had developed. These derived from the growing availability of, initially, low-cost high-grade iron ore and then, later, coking coal on a world market, coupled with innovations in maritime technology which made it possible to transport these raw materials cheaply over vast distances. In many developed countries this meant that a coastal location, not necessarily endowed with its own natural resources, was more cost-effective than an inland one.” (Beynon, Sadler, and Hudson 1994, 74)

Hence this meant that whilst Teesside had in the past relied upon its proximity to natural resources, its coastal location now came to the fore as a major reason for further investment in steel production capacities. Following nationalisation in 1967, BSC implemented its new investment plan, the ‘Ten Year Development Strategy’, which sought to invest heavily within the steel industry based upon a prediction of growth in global steel

demand of 4-5% annually up to 1980 (Beynon, Sadler, and Hudson 1994; Sadler 2001; Sadler 1990a). Such development was to see £3000 million invested in the five 'heritage sites' of Llanwern, Port Talbot, Scunthorpe, Ravenscraig and South Teesside, reiterating the importance of a coastal location. Crucially for Teesside, this new investment was to mean the expansion of Basic Oxygen Steel (BOS) plant capacity at Lackenby, and the building of a series of three giant blast furnaces at Redcar to replace the now ageing and outdated Clay Lane furnaces, which by this point were the only remaining blast furnaces in Teesside. Thus following nationalisation, BSC within Teesside adopted an orientation towards the future based upon particular predictions of growth in the global steel market and of exploiting this rise through a ten year investment and development plan. However, these predictions of growth were to prove to be less than the certainties previously imagined within the planning of this ten year strategy of investment, and as such were to have serious and lasting consequences for the steelmaking industry of Teesside.



Image 3: The Clay Lane furnaces. Unknown date.¹⁰

¹⁰ Image source: <http://www.image-archive.org.uk/?cat=12&paged=17> Accessed: 13/05/15

The first stage of this development strategy was completed in 1979 with the 'blowing in' of the Redcar Number One Blast Furnace, the first of the three planned furnaces which would provide molten iron for the entire Teesside complex. With the completion of the new blast furnace, the Clay Lane furnaces were now obsolete and surplus to requirement and were shut down. However, by the late 1970s it had become clear that the highly optimistic projected growth rates (of an increase of over 4% in annual steel demand) that had led to such large-scale investment in Teesside, had not materialised. The decision was thus made to scrap plans to build two further blast furnaces at the Redcar site, despite the materials for the second having already been purchased (Sadler 2001). This left the Teesside steel industry dependent upon a single huge blast furnace for its supply of hot iron; a highly problematic and often uncertain situation for a steelworks on the scale of Teesside. As Hudson describes:

"As a consequence of jettisoning the 1973 strategy, the scale of development at the south Teesside complex was drastically curtailed: only one blast furnace was completed and plans for new steel-making capacity abandoned (Bryer et al., 1982, p. 211). Furthermore, that there is only one blast furnace in the complex, coupled with the fact that the government has given no assurances as to the continuation of steel-making in the five coastal complexes beyond 1985, must cast a considerable shadow of doubt over the future of the entire south Teesside complex" (Hudson 1986, 189)

Indeed, steelworks using BOS production, such as Teesside, require a continual supply of hot iron from a blast furnace. Yet the process of iron making degrades the refractory lining on the inside of a blast furnace due to the immense temperatures the furnace reaches, and it must be periodically relined to maintain the integrity of the external structure of the blast

furnace¹¹ (Beynon, Sadler, and Hudson 1994). Large steelworks, as at Port Talbot and Scunthorpe, therefore tend to have multiple blast furnaces in order for them to be re-lined in rotation; however, as the second and third blast furnaces were never constructed at Teesside as a result of the imagined future constructed through the ten year development strategy having been only partially enacted, re-lining requires a periodic shutdown of the blast furnace. When this occurs, the BOS plant loses its supply of molten iron for conversion into steel, requiring either iron to be stockpiled prior to the re-lining or for steel production to be halted altogether, which are both costly solutions. The first re-line of the Redcar blast furnace was undertaken in 1986 and took 4 months to complete at a cost of £52m. A second re-line took place in 2000, lasting 68 days and costing £38m (Sadler, 2001). The dependence upon one source of iron has limited the flexibility of the Teesside steel industry to regulate production, and also to continue to produce steel during times of low demand, proving problematic when Teesside was to be placed in competition for investment with other British steelmaking plants and its continued future rendered uncertain. Such uncertainty was further heightened in the 1980s with the closure of rolling mills at Cargo Fleet rendering the Teesside works dependent upon a single beam mill and a coil plate mill for all its finished steel products. Steel production therefore outstripped rolling capacity, meaning that Teesside was now dependent upon supplying bulk slab steel to other UK steelworks for rolling and finishing.

The Teesside Development Corporation

With the two major industries of Teesside (steel and chemicals) shedding jobs, unemployment rates within the local area rose to the highest in Britain during the 1980s. Arguably little was done to help local authorities who had been starved of money during the

¹¹ The period from one relining to another is referred to as a 'campaign.' Hence the 2000 relining marked the end of that 'campaign' of iron production.

'rolling back of the state' under the Thatcher government. However, in 1987, as part of an initiative to revive several depressed local economies, the Government announced that the area would be regenerated through the Teesside Development Corporation (TDC) (Robinson, Shaw, and Lawrence 1999; Beynon, Sadler, and Hudson 1994). Although appearing to revitalise the image of the local area through its redevelopment of a variety of sites, arguably this was a missed opportunity to tackle the 'real' problems of Teesside (Robinson, Shaw, and Lawrence 1999). Despite building a large out-of-town shopping complex at Teesside Park, office space at the Teesdale Business Park, and recreational facilities at Tees Barrage (as well as flood defences) and at Hartlepool Marina, this organisation has been criticised for creating few jobs for local unemployed people, and for its opaque account keeping (Robinson, Shaw, and Lawrence 1999; National Audit Office 2002). In a telling reflection of the political ethos behind the TDC and its support from the government, its logo consisted of the word 'Teesside' dissected by a large pound symbol ('Tees£side').



Image 4: The Redcar Blast Furnace, pictured after 2012.¹²

Such closure of the mills within Teesside was reflective of British Steel's wider policy of capacity reduction in the face of mounting losses throughout the late 1970s and early 1980s. However, it returned to profit in 1986, partly as a result of such restructuring and partly due to rising global steel prices, and was privatised in 1988 (Beynon, Sadler, and Hudson 1994). However, as stated by Beynon, Sadler and Hudson:

“British Steel was privatised at the top of the boom. By 1992 it was reporting plunging profits, down from a record £733 million in 1989-90, to £254 million in 1990/1 and £55 million in 1991/2. The UK recession combined with the worst recession in the global steel industry for over half a century. In these circumstances

¹² Image source: <http://www.ssi-steel.co.uk/news-media/media-gallery/corporate-imagery/redcar-blast-furnace-22#joomimg> Accessed: 13/05/15

questions were raised once again over the whole structure of the company's operation in the UK." (Beynon, Sadler, and Hudson 1994, 80–81)

Such loss making was to mean further job reductions within Teesside for the newly privatised British Steel, and furthermore, with the territorial restraints of nationalisation overcome, the company increasingly began to look to overseas investment to regain profitability (Beynon, Sadler, and Hudson 1994). Thus, the privatisation of British Steel was a process of making new, and in many ways uncertain, futures for the steel industry within Teesside based around overseas markets and rationalisation of steelmaking capacity within the UK.

2.3. From Deindustrialisation to Flexibility

Teesside's steel industry was not alone in undergoing a marked shift in its economic fortunes and increasing industrial uncertainty within the 1980s. Such a shift brought with it a move within industrial and economic geography towards a greater focus upon the analysis of deindustrialisation within specific communities and how the industrial change experienced by localities within the UK and the western world might be theorised. Barry Bluestone and Bennett Harrison's 1982 text marks the beginning of this engagement and is an appraisal of deindustrialisation within America from the 1960s onwards and the varied impacts this has had upon communities within the US (Bluestone and Harrison 1982).

Whilst not addressing industrial change in the UK, it represents a shift away from a sole focus on economies at the national scale and instead makes moves towards a geography of communities which had experienced and were still experiencing deindustrialisation and disinvestment by US capital, with greater industrial uncertainty as a result. However whilst this book opened up fertile ground for a more in depth discussion of the local complexities

of deindustrialisation, the landmark text within this period is undoubtedly Doreen Massey's *Spatial Divisions of Labour* (Massey 1984). For Massey, attending to the shifts in the UK economy from the 1960s onwards required a greater attention to the complexity of how such industrial change was happening within different places than offered by structural explanations and economic analyses. Thus Massey's approach:

"adopts a mode of explanation which tries to break with the dichotomy between formal models and empirical description. *It recognises underlying causal processes, but recognises, too, that such processes never operate in isolation.* For it is precisely their operation in varying combinations which produces variety and uniqueness. The particular nature of capitalism in specific countries, the very different ways in which different parts of the economy respond to the general situation of economic recession, the very different impact which the entry of particular forms of economic activity can have on different regions and local areas: all are 'products of many determinations'. Instead of trying to normalise for such differences, or to treat them as merely deviations from a tendency, it is important to recognise their existence, to understand their construction and to appreciate their effects. British economy and society can only be understood by recognising its fundamentally capitalist nature. But this can only be changed - challenged politically - in its specific forms. *Both the general and the specific are essential, both to analysis and to action.*" (Massey 1984, 6–7 *Emphasis Added*)

Massey's text is therefore something of a call for geographers, not to move away from theorisation and causal analysis entirely, but to bring such theorisation into greater relation with empirical analysis of industrial change 'on the ground' in places such as Teesside. Put simply, to bring the abstract into relation with the concrete. Indeed:

"While an abstract model of capitalism, by providing the necessary concepts, is an aid to analysis, it cannot substitute for the analysis itself." (ibid. 16)

This empirical analysis highlights the complexities and differences of capitalism and industrial change within different places rather than subsuming these local and regional differences within a grand explanatory narrative that works to simplify such differences. In doing this Massey's work introduces space as a key factor into this analysis, and in particular a focus upon how different localities are structured spatially under late capitalism (hence the 'spatial divisions of labour'). Furthermore, key for Massey is that under capitalism there are different 'rounds of investment' which build up in layers within particular localities in different ways over time. Within Teesside's steel industry we might immediately point to things such as the partially abandoned development plan and the subsequent reliance upon a single blast furnace as an example of such a 'round of investment'. However such layers of investment are also more than purely economic:

"We are talking primarily of the economy and 'the economic', yet the sequence of wider contexts within which localities are set is also ideological and political; social in a much broader sense. The social changes in an area, the shifts in prevailing ideology and temperament, are not bound up only with economic changes within that locality. They reflect also broader shifts and in other aspects of society. The layers of history which are sedimented over time are not just economic; there are also cultural, political and ideological strata, layers which also have their local specificities. And this aspect of the construction of 'locality' further reinforces the impossibility of reading off from a 'layer of investment' any automatic reverberations on the character of a particular area.

Conceptualising things in this way makes it possible to combine an understanding of general trends with a recognition, alongside and within that, of

very great diversity. The uniqueness of place and the constantly evolving and shifting systems of interdependence are two sides of the same coin." (Massey 1984, 119–120)

Thus Massey calls for geographers to not only attend to the locality within industrial change, but also to how such change and rounds of investment are related to more than economic relations within a locality. This is a key development within how industrial change comes to be represented, theorised and understood. What such an approach allows for is the creation of a space whereby industrial change can be conceptualised as more than an economic process and can therefore be thought of in other ways as well, such as in terms of communities, culture, emotion or practice. This focus upon localities helped to inspire two research projects within the UK, the most notable of which (if only in terms of the prolific debate which it generated) was the 'Changing Urban and Regional Systems' (CURS) programme.¹³ The CURS initiative sought to apply this focus upon the locality to empirical research of seven different localities across the UK (see: Harloe, Pickvance, and Urry 1990; Cooke 1989a), including Middlesbrough within Teesside (see Beynon, Sadler, and Hudson 1994). What each of these studies achieved was a focus upon how the specific features and relations within these localities themselves shaped and were shaped by specific rounds of investment, industrial changes and social and labour relations. Within Teesside, the specificities of this region are expressly laid out within Beynon, Sadler and Hudson's *A Place Called Teesside* (1994) which drew heavily from the CURS research.¹⁴

¹³ The other was the 'Social Change and Economic Life' programme. Both were funded through the Economic and Social Research Council (M. Jones 2011).

¹⁴ Yet Massey's calls for a turn towards the locality and with empirical specificity were not wholly adopted within geography without critique. Indeed following the CURS initiatives 'localities' research was what has now been dubbed the 'locality debate' (Duncan and Savage 1991) which began in *Antipode* in 1987 and continued into the early 1990s. Without presenting the entirety of this debate here (see Jones 2011 for a more detailed overview), the main points of contention related to concerns from Marxist geographers that a focus upon empirical data signified a move away from the theorisation, in this case, of capitalism (N. Smith 1987; Harvey 1987b); the role of critical realism within contemporary geographical research (Harvey 1987b; Cochrane 1987; Gregson 1987; Sayer 1989); the relation between the abstract and the concrete (or empirical and theoretical) (N. Smith

In terms of industrial change within the North East in particular, this generated a number of contributions that sought to represent the changes that had occurred within specific localities such as Teesside (Beynon, Sadler, and Hudson 1994; Sadler 1990b; Beynon et al. 1989) and also the North East region more broadly (Beynon, Hudson, and Sadler 1991; Hudson and Sadler 1986; Hudson 1989b; Hudson and Sadler 1989).

What becomes readily apparent within this body of literature is that what is increasingly being addressed here is not necessarily what might be referred to as 'de-industrialisation' in common parlance, although this remains a key aspect of this discussion (for example within Rowthorn and Martin 1986). Rather, what lies at the heart of this discussion of the processes of industrial change underway in the UK, European and North American economies since the mid-1960s which were characterised by disinvestment¹⁵, plant capacity closure or movement and job losses (Bluestone and Harrison 1982), is growing flexibility within industrial change (and therefore greater labour uncertainty) as the cause or a process of de-industrialisation. Within this literature, such discussion of flexibility takes three main strands: firstly, through a discussion of a new flexible regime of accumulation; secondly, in relation to discussions of the role and importance of space within industrial change; and finally in the context of increasingly flexible labour practices.

1987; Philip Cooke 1987; Harvey 1987b; Beauregard 1988; Cox and Mair 1989; Sayer 1989; Massey 1991); and the role of spatiality and scale within research (Philip Cooke 1987; Warde 1989; Duncan and Savage 1989; Duncan and Savage 1990; Duncan and Savage 1991).

¹⁵ Disinvestment is a lack of investment within plant or production infrastructure or the failure to maintain a particular means of production, that whilst not always as visible as deindustrialisation is an important aspect of the latter in itself. Indeed for Bluestone and Harrison: "Because so much disinvestment is invisible to all but those who work on the shop floor or to managers who actually plan it, there has been a tendency by academic researchers and journalists to recognise deindustrialization only when the plywood goes up over the windows and the 'Out of Business' sign is posted, or when a plant is actually relocated physically to another community elsewhere in the country or abroad." (Bluestone and Harrison 1982, 8).

While the ‘restructuring’ debate (Lovering 1989) focussed largely upon areas enduring some version of industrial or ‘end-of-Fordist’ decline, other branches of industrial and economic geography, influenced not least by the French regulation school (Aglietta 1982; Lipietz 1987), were revealing the emergence of relatively more successful industrial and economic spaces as part of an emerging regime of post-Fordism or *flexible accumulation* (Scott and Storper 1986b; Martin 1988; Scott 1988; Harvey 1987a; Gertler 1992). More specifically, these new economic practices were emerging in part from a revival of craft-based production of quality and often luxury goods within notable industrial districts in northeast Italy (Piore and Sabel 1984) alongside new, often high-technology, industrial forms in US city-regions like Los Angeles, Silicon Valley and the Boston Massachusetts 128 corridor (e.g. Scott and Storper 1986b; Walker 1989; Saxenian 1994). In some regards, the ‘industrial decline’ and ‘deindustrialisation’ perspectives were being usurped amid a paradigmatic celebration of a new regime of post-Fordist flexible accumulation, which thus implied a future of industrial production centred around flexible capital investment and greater precarity for industrial workforces. Indeed, for Harvey:

“Flexible accumulation, as I shall tentatively call it, is marked by a direct confrontation with the rigidities of Fordism. It rests on flexibility with respect to labour processes, labour markets, products, and patterns of consumption. It is characterized by the emergence of entirely new sectors of production, new ways of providing financial services, new markets, and, above all, greatly intensified rates of commercial, technological, and organizational innovation.” (Harvey 1990, 147)

However, the characterisation of the changes occurring within economic relations during the 1980s and 1990s as a transition from Fordism to a post-Fordist regime of accumulation was not a universally accepted representation. Indeed for Hudson (Hudson 1989a), whilst

he acknowledged that there were wide ranging and significant changes within labour and production relations within the UK's 'old industrial regions' such as that of Teesside, he rejected that this formed the basis of a new regime of flexible accumulation. Whilst not denying that there existed changes to labour relations, including an increase in flexibility in the face of mass unemployment, for Hudson such an increase in flexibility in labour relations does not signal a transition to a regime of flexible accumulation in old industrial regions, but a redefinition of existing relations between capital and labour:

"In no sense can this be regarded as evidence of the emergence of new 'flexible production systems', but rather it is evidence of redefined relations between capitals and between capital and labour, a redefinition which enables present production strategies to be reworked in an attempt to restore the competitiveness of existing 'old' industries that make 'old' commodities." (Hudson 1989a, 15)

And further:

"The UK's regime of accumulation over the post-war period of One Nation politics was at best a deformed version of a Fordist regime [...] Moreover, if the first three decades were not Fordist, it raises questions as to the sense in which what came afterwards can be represented as Post-Fordist" (Hudson and Williams 1995, 34–35)

Thus in old industrial regions like Teesside, Hudson argues that increases in flexibility within labour relations cannot be positioned as a transition to a post-Fordist regime of flexible accumulation, but are instead a reworking of existing labour relations seeking to exert the dominance of capital over labour. For Hudson then, industrial change in the old industrial regions is far 'messier' than such structural analyses might suggest (see also Hudson 2005). Furthermore, Hudson is critical of Storper and Scott's representations of all mass production as Fordism, arguing instead that this process of manufacture was never

something widely achieved in the 'old' industries in old industrial regions such as Teesside. This is further supported by Cooke who likewise asserts that Fordist mass production was never established as a singular homogenised paradigm of industrial production (Cooke 1988). A more nuanced position is proposed by Gertler (1992), who claimed that it is difficult for firms to totally adopt new flexible working practices, and as such this shift in industrial relations should be positioned as a *pursuit* of greater flexibility rather than a binary shift from rigid to flexible forms of production. Yet what remains a common thread throughout this literature is that whilst discussion of industrial change was based in part upon empirical data and case studies of industrial change that had taken place, the implications of this discussion were more than historical and carried a series of implications about the form that continued and future industrial restructuring would take.

A second strand of discussion of flexibility in terms of industrial change relates to space and the role of spatiality within such change. Whilst Massey's (1984) *Spatial Divisions of Labour* to some extent predates discussion of post-Fordist flexibility, and thus she does not deploy the term flexibility to a great degree within her discussion, this text serves as an important turn towards how an industrial economy is structured spatially and how the relations between and within such localities have been rendered increasingly flexible, for example through the placement of branch plants within particular localities and locating of specific industrial practices such as research and development and corporate headquarters elsewhere. Within his 1987 article, Harvey – running somewhat against the tide of the localisation and industrial democratisation inherent in much of the industrial districts and new industrial spaces research (e.g. Scott 1988; Cooke 1989) – identifies how capital had become increasingly flexible over space and therefore cities must compete with one another to attract industrial investment (Harvey 1987a). For Harvey:

"Flexible accumulation also opens up new paths of social change. Spatial dispersal means much greater geographical equality of opportunity to lure in new activities to even the smallest towns in the remotest region. Position within the urban hierarchy becomes less significant and large cities have lost their inherent political-economic power to dominate. Small towns that have managed to lure in new activities have often improved their positions remarkably. But the chill winds of competition blow hard here too. It proves hard to hang on to activities even recently acquired. As many cities lose as gain by this." (Harvey 1987a, 280)

The concrete impact of such flexibility over space and the resultant industrial change from the movement of capital has been well documented within the literature relating to the closure of specific plants and industries across both the North East and western Europe as a whole (see: Beynon, Sadler, and Hudson 1994; Beynon, Hudson, and Sadler 1991; Beynon et al. 1989; Hudson 2002; 1989a; 1989b; Hudson and Sadler 1989; 1986; 1985; Sadler 1990b; 1990a; 2001; Sadler and Hudson 1983). Furthermore, in *The Condition of Postmodernity* Harvey further elaborates upon how flexible accumulation allows companies greater flexibility over space:

"these enhanced powers of flexibility and mobility have allowed employers to exert stronger pressures of labour control on a workforce in any case weakened by two savage bouts of deflation, that saw unemployment rise to unprecedented postwar levels in advanced capitalist countries (save, perhaps Japan). Organized labour was undercut by the reconstruction of foci of flexible accumulation in regions lacking previous industrial traditions, and by the importation back into the older centres of the regressive norms and practices established elsewhere in these new areas."

(Harvey 1990, 147)

Thus for Harvey, flexible accumulation increases capital's flexibility over space in that it is no longer 'tied' to a particular locale and can thus move to seek greater profit or more favourable labour or political economic relations. This therefore leads to greater inter-city competition to attract investment, yet when (or if) such industrial investment is gained, it can just as easily be lost. Indeed, as for Lipietz:

"There can only be a certain type of 'regions which win' (or rather a certain fashion of winning for a region) within the framework of a certain type of national state (or confederation: Lipietz, 1985; Leborgne and Lipietz 1990b), and these states will only 'win' in international economic competition if they know how to create this type of 'regions which win'. And the regions of countries which are 'losing' will be condemned to an ever greater *structural* subordination (for example via sub-contracting) *vis-a-vis* the regions which win." (Lipietz 1993, 16)

Whilst this analysis is at a relatively high level of abstraction and generality, and therefore vulnerable to Hudson's or Cooke's critiques that such processes are not homogeneous across all regions (Hudson 1989a; 1988; Cooke 1988), at the same time it underlines something which appeared to be less disputable: an increase in spatial flexibility for capital based upon future competition. Such an understanding of the flexibility of capital over space survives in some form through the writings of Richard Florida through the increasing competition between cities to attract greater numbers of a 'creative class' (Florida 2007; 2002), and the continued impact that Florida's work has had upon local and regional urban governance (Crouch 2011). Within Teesside, this could arguably be seen through the attempted attraction of new creative and technological industries to the area such as

within the economic planning of both Redcar and Cleveland Borough Council and the Local Enterprise Partnership for the Teesside area, Tees Valley Unlimited (see Chapter 7).¹⁶

Furthermore, discussion around flexibility also focussed upon the flexibility of labour and employment practices. Here, and in contrast to the purported upskilling and craft-based employment heralded in the more celebratory versions of post-Fordism and flexible accumulation and regional innovation (Piore and Sabel 1984; Scott 1988; Cooke and Morgan 1993; Florida 1995), industrial change is understood as a process of increasing flexibility and insecurity for labour through increasingly flexible working practices and working hours (as with the Nissan plant at Washington; see Garrahan and Stewart 1992), the rise of part time employment (particularly of women) and a rise in more casualised and sub-contracting forms of labour (Pollert 1988). Indeed, Beynon, Sadler and Hudson describe how in the 1980s ‘new’ manufacturing branch plants were attracted to Teesside largely by its high levels of unemployment, and particularly large number of unemployed women – effectively seeking a non-unionised workforce willing to cede to any demands of ‘flexibility’ made by employers (Beynon, Sadler, and Hudson 1994; Henwood and Wyatt 1986). A particularly stark example of such processes of ‘flexible’ employment within Teesside is offered in the extract below:

“Perhaps the most extreme example of casualization in the new factories concerned CDL 44 Foods frozen cake factory. In its first year in operation in

¹⁶ Indeed, Participant G4 who was involved with the management of Redcar and Cleveland’s Regeneration Strategy mentioned the work of Richard Florida within an interview saying: “there’s been a lot of studies done around that with Florida, and Richard Florida and all sorts of guys have looked at all these, you know, and this is the real challenge I think moving forward for regeneration I, you know the battle is not about, you, the battle is not about assets anymore and about providing physical assets for people or grants, the battle is over skilled people, and over creative people and who wins that battle will determine whether you’re successful or not because they’re the, as I said, they’re the people who drive the economy” (Participant G4)

Hartlepool, its owner, Mr Chris Liveras (who, despite two fraud convictions was given considerable grant aid to set up his factory), sacked his entire workforce over the long Christmas and New Year period. He then re-employed them on 2 January. In this way he avoided paying his workforce over the holidays. In a non-union factory, in a town with mass unemployment, the workers saw no choice but to accept such treatment." (Beynon, Sadler, and Hudson 1994, 146)

Furthermore, for Linda McDowell attention towards post-Fordist flexibility (such as Scott 1988; Harvey 1987a) largely overlooked the role of women in the creation and maintenance of such flexibility. McDowell argued that whilst some had positioned the shift to such means of productions as optimistic (such as Piore and Sabel 1984) and the increasing presence of women in the workforce as potentially emancipatory, flexible accumulation had rather led to an increase in part-time flexible work that was damaging for both men and women alike.

"This feature of the 'flexible' use of women's labour through part-time employment contracts is a particular feature of the feminization of the British labour market that is not found to the same extent in the rest of Western Europe. It is partly a consequence of the social insurance system in Britain in which both employer and employee contributions are less than for full-time workers. This brings with it severely restricted entitlement to a range of social benefits such as unemployment and sick pay as well as poorer provision of work-related entitlements such as holidays and security of employment." (McDowell 1991, 409)

Hence for McDowell, whilst there may indeed have been an increase in 'flexibility' in employment relations and also an increase in flexibility of traditional gender roles, an increase in the flexibility of labour brought with it an increase in female part time labour with little provision of employment benefits, with women also remaining the main

providers of household and caring labour (Hudson and Williams 1995; Henwood and Wyatt 1986). Indeed, an increase in the flexibility of labour, in the form of part time work (largely relating to women) and a rise in sub-contracting as opposed to guaranteed full-time employment was observed within Teesside in the 1980s and early 90s (Beynon, Sadler, and Hudson 1994).

Admittedly then, flexibility was often deployed in different modalities across what was becoming an increasingly disparate literature on economic and industrial change in this period. Indeed for Allen, writing at the time:

"Flexibility, [...] has become a rather broad term under which different theorists have subsumed a range of different developments." (Allen 1988, 185)

For some, changes to the UK's economy since the 1960s and 1970s came to signify the emergence of a new regime of flexible accumulation following the work of regulation school theorists (Martin 1988; Harris 1988) and the development of post-Fordist flexible production enclaves within Old Industrial Regions (Scott 1988; Piore and Sabel 1984).

Indeed for Martin:

"for much of northern and urban Britain, the transition to a new regime of flexible accumulation has been overwhelmingly synonymous with efficiency-orientated industrial rationalization and reorganization, and with the large-scale loss of jobs and skills." (Martin 1988, 226)

Within Teesside, seemingly in line with such a thesis, throughout the 1990s jobs continued to be shed at the steelworks with an increasing amount of previously core business practices now being outsourced to subcontractors (Beynon, Sadler, and Hudson 1994). In 1999 British Steel merged with the Dutch firm Koninklijke Hoogovens to form Corus, under

whom further job losses continued, including through an (albeit failed) attempt to introduce 'teamworking' in the new millennium. Yet whilst such 'flexible' approaches to labour organisation have proved effective in terms of economising efficiency (yet also in reducing employment numbers and increasing staff turnover) in other industries such as car manufacture (Garrahan and Stewart 1992), they are often inappropriate for heavy industries such as steelmaking due to the specialised nature of many of the roles and plants intrinsic to the industry (Hudson 1989a). Thus whilst aspects of the steel industry were made increasingly 'flexible' particularly in regards to the outsourcing of core business activities to external contractors, this fell short of a post-Fordist regime of 'flexible accumulation' as some might claim (see Harvey 1987a). Indeed, Cooke is sceptical of generalisations of such accounts of capitalism:

"the criticism here is not that there are no common features of 'organized capitalism' to be found across some sectors and many advanced economies from the 1880s to the 1960s, but that the universality of these features is overstated. The organization of capital, the relationship between finance and industrial capital, their relationship to the state and to labour varied over time and space, both internationally and interregionally. Moreover, although mass production became the dominant ideological tendency, or *technological paradigm*, it was far from the only, or necessarily major form of production, either of goods or services." (Cooke 1988, 235)

Thus, for Cooke the precise forms taken by capitalism and industrial production varied greatly by place and whilst Fordism may have become the dominant paradigm of production in the period leading up to the 1960s its adoption was not total and monolithic. This supports Hudson's claim that Old Industrial Regions such as Teesside never came to be fully dominated by Fordism in the first place, much less by post-Fordism, and that whilst

there are certainly increases in flexibility within Teesside's industry in this period, many of these practices were far from new and did not amount to a regime of flexible accumulation (Hudson 1989a; 1988).

These processes of industrial change continued into the new millennium within Teesside and in 2001 the coil plate mill at Lackenby was closed, causing a further 280 jobs to be lost but also, and arguably more crucially, restricting the already narrow range of outputs produced on Teesside to a variety of semi-finished coated and non-coated products. With this closure Teesside had thus become cornered in a very small and highly competitive aspect of the steel market. Indeed, as one steelworker described it:

“We were referred to as the jewel in the crown at one point [...] And they thought that started to go and that sort of title, went, or started to go in that period when the mill when they decided to close the mill” (Participant 5 ‘*Marton*’)

Without the coil plate mill, the future of Teesside's steelworks was now reliant upon supplying slab steel to other UK steelworks for finishing and also selling such slab on a crowded open market; a position that appeared unsustainable given the overcapacity in UK steel production. Without the capacity to produce finished steel products on a large scale at Teesside, subsequent investment within Corus was focussed instead on alternative fully integrated sites in the UK. In this case, such disinvestment and reduction in plant capacity through the closure of the rolling mills effectively structured a particular spatial division of labour after Massey (1984), which placed Teesside in the role of a branch plant for the wider UK steel industry. Hence, in the years following the closure of the coil plate mill, the long term future of the steel industry in Teesside was again looking increasingly uncertain as Corus shifted the focus of its future investment away from Teesside and instigated a

spatial division of labour with Teesside in the role of supplying slab steel to other UK sites for finishing. Indeed, the closure of the coil plate mill has been widely regarded as a short-sighted and damaging decision, as reflected in a government report published in 2010 concerning the mothballing of the Teesside steelworks:

“The short-sighted decision by Corus to close its rolling mill at Redcar and Lackenby eight years ago has left it unable to respond flexibly to changes in the world steel market in a way that would guarantee continued production on Teesside. This is not simply a statement that benefits from 20:20 hindsight. They were told at the time by the local trade unions and politicians that this would be the result of their action.” (HMSO 2010, 2)

As a result of this inflexibility (in regards to the products that Teesside could produce), Teesside was now dependent upon Corus taking its slab output for finishing at its other UK sites. However, in 2003 Corus announced that Teesside’s slab output was surplus to its internal requirements (*BBC 2010c*). Instead of closing the steelworks, the company announced that it was to establish Teesside Cast Products (TCP), a new company formed out of the steelmaking facilities in Teesside that would be owned by Corus, yet responsible for finding its own business on the open market (*BBC 2009a*). Now dependent upon sourcing its own trade for slab steel - which could only be sold to other steel producers with whose rolling capacity exceeded that of its slab production capacity - on the open market at a time when cheap slab was abundant within the global steel industry, a future of steelmaking on Teesside began to look very uncertain indeed.

In a turn of fortune however, following a rise in steel prices some global steel producers found themselves in a situation whereby there was a disparity between their rolling and

finishing capacity and their steel slab production outputs. Hence, in 2004, an off-take agreement was signed between Corus and a consortium of four foreign steel producers¹⁷, guaranteeing that they would purchase just under 78% of Teesside's slab output for the next ten years, at the cost of production. This contract appeared to be Teesside's saving grace in assuring TCP a guaranteed ten years of continued steel production, and safeguarding the jobs of those working at the steelworks for the next decade. Confidence of employment at the steelworks was thus guaranteed for the steelworkers through a legally binding contract which would see the consortium buying the lion's share of Teesside's slab output. For many of the steelworkers, this was the first time in their working careers that the long term future of the Teesside steelworks appeared stable and without the endemic uncertainty of potential job losses and plant closures that had dominated the steelwork's recent history. For many of the steelworkers, this meant a financially secure future for the next ten years which led to many steelworkers buying cars, holidays and even houses based upon this contractually guaranteed future. Yet, such optimism was to prove short-lived.

2.4. The Fall of Teesside Cast Products

“When I look back through the sort of late 70s, early 80s we were classed as market leader as British Steel erm... certainly through, I would say our Corus years and Tata we certainly weren't market leader anymore” (Participant 17 '*Lackenby*')

As a result of the now renewed and buoyant steel markets in 2007 Corus was bought by Tata Steel, a multinational steel producer based in India, for £6.2 billion. However, following the economic crisis of 2008, which saw a sharp decline in global steel demand

¹⁷ Marcegaglia of Italy, Dongkuk of South Korea, Duferco of Switzerland and Alvoxy of Argentina (*BBC* 2009b; Tata Steel 2009)

leading to global overcapacity in steelmaking, the profitability of the steel industry plummeted. On May 8th 2009 it was announced by Tata Steel that the members of the consortium that had signed the off-take agreement in 2004 with TCP had pulled out of the deal. The contract that was supposed to guarantee a market for Teesside's steel and hence a future for steelmaking in the region for ten years had been broken before it was even halfway completed. This effectively left TCP without a buyer for its steel and with global steel prices reaching an all-time low, the potential for selling Teesside steel on the open market was limited at best. As such, on this date Tata Steel announced a 90 day consultation period¹⁸, at the end of which the steelworks would be mothballed unless an alternative buyer could be found. For those employed at the steelworks, this announcement effectively signalled the intent to close the steelworks and a future without steelmaking on Teesside.

Health and Environment

A concern for both local communities and also academic research, relates to health within such an area of heavy industry as Teesside. Indeed the proximity of residential areas such as Grangetown, South Bank and Dormanstown to sites of large steel and chemicals works is unusual in comparison with other 'old industrial regions' (OIRs) (Hudson 2005; 1989; Phillimore 1998) and it has been estimated that some 12,000 people live within 1km of heavy industry in Teesside (Bush, Moffatt, and Dunn 2001). Such a geographical location of industry and housing in part reflects the longer history of industrial development in Teesside. The primacy of industry within Teesside and the subsequent development of residential areas in the wake of such industrial development, unencumbered by previous settlement or town planning, has thus left a legacy of housing in proximity to such sites of

¹⁸ A legal requirement for companies making more than 100 redundancies. In 2013, the minimum consultation period halved to 45 days for employers making over 100 redundancies.

heavy industry. Indeed, within the Victorian era, the smog and pollution found within Teesside was often celebrated by local residents as it represented economic success and jobs within Teesside (Bush, Moffatt, and Dunn 2001). By the late 20th century however, environmental pollution and air quality had become a concern for many residents of Teesside. Such fears are explored in Bush et al.'s 2001 paper, which highlights the concerns of many Teesside residents, such as:

"I am very concerned about air pollution in this neighbourhood. Most of the time you can't put washing out to dry without having to bring it in and rewash it." (Bush, Moffatt, and Dunn 2001, 52)

"When my daughter lived here she was always bad with allergies. She now lives in Bournemouth and does not suffer unless she comes on holiday." (ibid. 53)

Indeed, for Phillimore's epidemiological study of health within Teesside, air pollution was also a major concern (Phillimore 1998). In studying the mortality rates of women under 65 in Teesside and a comparable area of Sunderland in terms of economic and social context, Phillimore found that within Teesside between 1981 and 1991, lung cancer deaths for women under 65 were almost four times the national average¹⁹ (ibid.). Hence, concern and uncertainty about air quality and industrial pollution has been a concern for Teesside residents, however such concerns would also appear to be justified due to the relation uncovered between proximity to heavy industry and deaths from respiratory disease highlighted by Phillimore.

¹⁹ Women were chosen for the basis of this study due to the fact that with men forming the majority of the workforce in heavy industry, they were exposed to the pollution generated at such plants on a near daily basis. As a measure of residential proximity to industry causing respiratory problems, women were viewed as more indicative of such a causal relation as they had less exposure to such pollution at its source.



Image 5: The 'Save our Steel' march through Redcar in 2009²⁰. The blast furnace is visible in the background.

However, this future of closure for the steelworks was not accepted without resistance by the steelworkers of Teesside and their families, and a spirited campaign emerged in the local area to try and keep the works open and keep a future of steelmaking in Teesside alive. In mid-May 2009, workers from TCP joined a Unite march in Birmingham to highlight the struggle to keep steelmaking in Teesside. A 'Save Our Steel' campaign, fronted by the leaders of the multi-union (a coalition of the main unions representing the Teesside workforce – negotiation throughout the mothballing period was done almost exclusively on this multi-union basis) and in particular Geoff Waterfield²¹ the Chairman of the multi-union,

²⁰ Image source: <http://www.gazettelive.co.uk/news/local-news/union-boss-call-steel-support-3709534> Accessed: 13/05/15

²¹ Sadly, it must be noted that Geoff Waterfield, who was head of the Teesside multi-union and who had been the figurehead for the Save Our Steel campaign, died from leukaemia in August 2011. In February 2013, a memorial was unveiled in front of Steel House, the main management headquarters of the Teesside works, to commemorate his commitment to bringing steelmaking back to Teesside. Fittingly, the memorial is constructed out of the last slab cast prior to the mothballing, interlocking with the first slab to be cast following the restart of the works.

and with support from the local newspapers, ran rallies in the local area and distributed posters that were displayed in the windows of local houses. A Facebook group was created to support the 'Save Our Steel' campaign and had gained 8000 followers by May 2009. Various events followed as part of the 'Save Our Steel' campaign – steelworkers and their families attended marches in Birmingham and Blackpool, completed an 8 mile walk across the North Yorkshire Moors and also represented the Teesside Steel industry at the Durham Miner's Gala. However the most prominent march of the SOS campaign took place on July 18th 2009 when over 5000 steelworkers, their families and concerned residents in the local area, took to the streets of Redcar. Fellow steelworkers from as far afield as Scunthorpe and South Wales also attended to support the steelworkers of Teesside. The march received national as well as widespread local media coverage, and featured speeches from local union leaders as well as Redcar MP Vera Baird. However, as one local newspaper describes it:

“The MP, who received an icy reception when she appeared as a main speaker in front of Redcar's town clock, was met with cries of “We don't want that!” when she described the Government's plans to provide £5m for training in the event of Corus closing” (Judd 2009)

As can be exemplified by this quote, frustrations with the lack of significant government help to save the ailing steel industry ran high during this period, particularly in a period when the banks had been recently bailed out following the financial crash (King et al. 2012; Kitson, Martin, and Tyler 2011). Despite visits by Peter Mandelson (then Business Secretary) and Gordon Brown (then Prime Minister) in the period prior to the mothballing, the Labour government was seen as offering only minimal support to deal with the outcomes of plant closure rather than taking any meaningful steps to try to keep

steelmaking on Teesside. As exemplified in the previous quote above, there were therefore frustrations at these offered futures of retraining and support instead of help to keep the steelworks open. Some of this frustration can be said to have contributed to the Labour incumbent MP for Redcar, Vera Baird, losing her seat in the 2010 general election.

At the same time however, uncertainty regarding the future was also rising within the steelworks due to concerns about pension entitlements. Whilst not necessarily wanting the steelworks to close and their co-workers to lose their jobs, many members of the workforce who were over 50 and therefore eligible to take early retirement found themselves in a favourable position following the news that the plant was shutting, as this would mean that they could access their pensions and retire with a future of relative financial security. This was in stark contrast to those under the retirement age of 50, for whom the closure of the steelworks meant a future of likely, and potentially long-term, unemployment. With the modal age of steelworkers employed at the works being between late 40s and early 50s (due to there having been next to no recruitment in the steelworks for a number of years to reduce employment levels), divisions began to form between those who could and those who could not access their pensions. For those under 50, if they were to lose their jobs, they stood to lose all pension entitlement and faced a future of unemployment and financial insecurity. However, concern began to mount amongst those in the over 50 category as it emerged that the retirement law was set to change in April 2010, raising the minimum age for early retirement to 55. The impetus for this age group was thus, that if the works were going to close (which for many seemed inevitable) then they should be closed earlier rather than later to ensure that all those entitled to a pension were able to receive one. Tensions therefore rose between those wanting the plant to shut, in order that they could receive their pensions before the minimum age for early

retirement was set to rise, and those under the age of 50 who were not eligible for early retirement and needed to keep their jobs. This tension occasionally broke out into physical fights at the steelworks, which is indicative of the pressures facing the steelworkers in this time.

Nevertheless, despite the best efforts of the multi-union and the local community, as of 4pm on 19th February 2010 the last raw materials for the production of steel were poured into the blast furnace at Redcar, marking the beginning of the mothballing process. For almost 170 years, since the first foundry was built by Bolckow Vaughan, iron and steel had been produced in Teesside. Now the area was facing a future bereft of the very industry that had built it.

2.5. The Rebirth of Steel in Teesside

Although after February 2010 steel production had ceased in Teesside, this did not mean an immediate closure of the site and the instant loss of jobs. Firstly there remained a great deal of work to be done in order to shut the plant down safely and in a 'mothballed' condition, so that if an alternative buyer could be found steelmaking could return. Further to this, not all of the plants at the site of TCP were to shut. The coke ovens at Redcar and at South Bank were to stay open, selling coke on the open market following a rise in global coke prices, and also to Port Talbot who were facing a coke shortage. In order for the coke ovens to run, the power station was also to remain open in order to provide the hot air and power to run the ovens, and also to sell surplus electricity to the national grid. The wharf was also to remain in operation, both as a means of transporting coke and to engage in third party business in the freight trade. This was to prove a vital lifeline for those too

young to access their pensions and who could not afford to take the voluntary redundancy or early retirement offered by Tata. Great efforts were made by the management of the steelworks and the unions to work to 'cross match' people who needed jobs into appropriate positions. This 'cross matching' consisted of matching people from the mothballed plants who needed jobs to the job vacancies left by those taking early retirement from the plants that were to remain open. Hence a number of workers from plants such as Concast or the Blast Furnace ended up being employed at the coke ovens, the power station or wharf, filling the positions of those who had taken early retirement. These plants continued on, providing jobs, not only a means of supporting those who needed employment, but also retaining the workforce in the hope of a future whereby the steelworks could be purchased and restarted by an outside firm. In testament to these efforts, there were no hard redundancies during the mothballing; an exceptional achievement given the scale of the steelworks at Teesside.

Despite companies such as Marcegaglia and Dongkuk (who had both been part of the former consortium) showing some limited interest, finding a buyer for the Teesside steelworks appeared increasingly unlikely. However, in the months following the mothballing it became clear that the Thai firm Sahaviriya Steel Industries (SSI) was interested in purchasing TCP. In August 2010, and after much negotiation, SSI signed a 'Memorandum of Understanding' (MOU) to buy Teesside Cast Products from Corus, valued at the time at £320m (Tata Steel 2010). Although this was a positive step towards the restarting of steelmaking in Teesside, many people in the local area viewed such an agreement with scepticism. Such a MOU had no contractual basis, and effectively only served to register SSI's interest and agreement to buy the plant without containing any obligation for them to do so. Indeed, the steelworkers had reason to be sceptical about this

MOU; a similar document had been signed between Corus and two members of the consortium (Marsegaglia and Dongkuk) in 2009, however once the ten year contract fell through, the deal fell through with it. As such, whilst this was a positive step forward by all accounts, the future of steelmaking in Teesside remained uncertain. However, 182 days later on February 24th 2011, the news was announced that SSI had finally signed the deal to buy Teesside Cast Products from Corus for £290m.

This purchase was a colossal investment for SSI, a relatively small company that had, until buying TCP, been solely concerned with the operation of its rolling mills in Thailand, which specialised in the production of hot rolled coil. In a desire to become a fully integrated steelmaking company (i.e. from raw materials through to the production of a finished product) and as a result of increasing concern surrounding environmental protection regulation in Thailand (*Wall Street Journal* 2010), SSI – headed by President Win Viriyaprapaikit – saw an opportunity to achieve this via the purchase of TCP. Thus, the future of steelmaking within Teesside was in one sense retained through the imagined future and ambition of one Thai firm to become a fully integrated steel producer. Yet this purchase is something of a doubled edged sword for Teesside. On the one hand, SSI sought to buy TCP with a long term future in mind, which is reflected in the \$1bn+ investment²² it has made in the Teesside works. This would indicate that SSI are highly unlikely to walk away from the Teesside steelworks as they have invested a large amount of capital, as well as the future of their business, into the purchase and restart of the steelworks. On the other hand however, with the works being purchased by a company many magnitudes

²² This \$1bn (£620m) includes the purchase price of the works, and amounts set aside for increasing efficiency and the day to day running of operations(*Evening Gazette* 2011), and excludes more recent investments in adapting the blast furnace for Pulverised Coal Injection (PCI).

smaller than the former conglomerate that owned it²³, there is far less capital available for investment and contingencies, and with the fortunes of the parent company tied so intrinsically to the profitability of the steelworks, there is much less room for errors and losses than with a much larger parent company. Yet for the steelworkers of Teesside with the announcement of the SSI buyout came the news that 700 jobs would be safeguarded and 800 new jobs would be created at the Teesside works, providing a vital economic boost for the area as well as providing a viable future of employment for those employed at the works (*Evening Gazette* 2011), generating a renewed sense of optimism towards the future for many in the area.

Whilst the purchase of TCP by SSI was a vital lifeline for Teesside, at the same time, for some employees at the steelworks the purchase of the works actually left them economically worse off. Those who had either been too young to qualify for early retirement or had been denied early retirement as their roles were considered essential, had generally been able to retain jobs at the steelworks during the mothballing period, either through working at one of the plants that was remaining open or through cross matching into a position at one of these plants left by someone who had retired. Furthermore, these workers remained within their original pension scheme as they remained employees of Corus/Tata. Retention of this pension entitlement was of great importance for many of these steelworkers and their futures as they had managed to carry their British Steel pension entitlements with them throughout their employment at the steelworks. Throughout the company changes - from the privatisation of British Steel to

²³ To give some sense of scale, in 2010 SSI posted a profit of £53.3m on the Thai Stock Exchange, in 2012 Tata Steel posted a net profit of over £1.04bn (Blomberg Businessweek 2013; The Stock Exchange of Thailand 2013).

Corus, then Tata, and finally to TCP - as the company had always been merged or purchased as a going concern the employees remained within the same company and by law their pension entitlements were protected. The British Steel pension was a lucrative defined benefits scheme, whereby those in the scheme were guaranteed a level of pension entitlement based on contribution and number of years' service. This would allow recipients to receive a far greater entitlement than the majority of current pension schemes, which tend to be defined contribution schemes wherein entitlement is determined by the performance of the stock market. However, TCP was not sold as a going concern, it was to become a new company through its purchase by SSI. Following the 'Transfer of Undertakings (Protection of Employment)' (TUPE) regulations introduced in 2006, whilst the terms and conditions of the workforce transferred to the new company were protected, pension entitlements were exempt. Hence, for those that had been nearing the minimum early retirement age, with their transfer from Tata owned TCP to the new company owned by SSI (SSI Teesside), they stood to lose their British Steel pension entitlement and were placed instead within a new defined contributions scheme run by the new company. For many of the steelworkers in this situation this loss of pension entitlement effectively meant the loss of a lump sum in excess of six figures and a generous monthly pension. Economically, this was a huge financial blow for those caught in this situation and therefore whilst they have managed to remain in employment, many have had to re-evaluate plans that they might have previously had with regards to retirement and supporting themselves and their families in what had become now a more uncertain future.

For SSI, the key to the restarting of steel production and thus enacting the future of becoming a fully integrated steel producer was the re-commissioning and relighting of the

blast furnace, originally scheduled to take place in December 2011. However, this projection proved to be overly optimistic about the extent of refurbishment required to return the plant back to operational condition. Those who had been involved with this process have remarked how this timescale was unrealistic and unachievable and perhaps reflected SSI's inexperience or naivety in steel production. However, despite several setbacks and the deadline for relighting being pushed back, the blast furnace was relit on 15th April 2012, with steelmaking beginning shortly afterwards. The first shipment of 48,000 tonnes of slab steel produced by SSI Teesside set sail upon the Valetta registered cargo ship the 'Blue Fin' for rolling in Thailand²⁴ on the 15th May 2012.

Since that time, SSI Teesside has continued to produce steel to be shipped to Thailand. However, at the time of writing whilst each slab of steel produced is selling at a profit, due to the massive debts accrued by SSI in buying the steelworks and bringing the plant to operational capacity, the company is currently operating at a loss. The performance of SSI Thailand on the Stock Exchange of Thailand tells such a story: the company has gone from making a net profit of £53.3m in 2010, to a net loss of £21.37m in 2011 and a net loss of £346.55m in 2012 (The Stock Exchange of Thailand 2013). With so much invested in the Teesside steelworks, SSI cannot afford to walk away without crippling their business as the future of the steelworks in Teesside is now an intrinsic part of the future of the company as a whole, and so making the steelworks profitable is the only option available. As such further investment has been made into the works, including a new Pulverised Coal Injection (PCI)²⁵ system at the blast furnace. Such a system allows for lower grades of coal to be used

²⁴ As its parent company, the majority of the steel slab produced by SSI Teesside is shipped to SSI Thailand for processing and rolling into hot rolled coil, to be sold on the Asian market.

²⁵ PCI involves pulverised coal dust being blown into the blast furnace creating a chamber of hot air within. This then combusts at an extreme temperature, causing the iron ore to melt and so separate the pure molten iron from other waste products.

in the iron making process rather than relatively expensive coke, thus lowering raw materials cost and increasing the profit per tonne of steel. However, as yet it remains to be seen whether SSI can make their investment in Teesside steel a profitable venture.

2.6. From Cleveland Iron to Thai Coil

From its earliest beginnings until the restarting of the blast furnace and beyond, writing a history of Teesside's steel industry is to therefore write of futures, or more specifically the futures of industrial change. From the imagined future of making iron and steel in Teesside of Bolckow Vaughan; to the truncated programme of expansion of steelmaking infrastructure that took place in the 1960s and 1970s based upon a particular 1960s prediction of steel demand in the future; to the jeopardised futures of the steelworkers following the announcement that the plant would be mothballed in 2010; to the buying and restarting of the steelworks by SSI as part of its imagined future to become a fully integrated steel producer: we cannot talk of Teesside and its steel industry without talking about futures. However what becomes apparent even from this brief and inevitably partial history, is that there are multiple different futures inherent to Teesside's development and the industrial change that has characterised its development, and that these futures are not static and are thus subject to change. The future enacted by a steelworker over the age of 50 and thus able to retire and access their pension entitlement differs to that of a steelworker unable to take such early retirement during the mothballing period; these futures differ greatly from the economic planning of Corus and its decision that Teesside's steelworks were surplus to its requirements or to SSI's imagined future of becoming a fully integrated steel producer, yet all of these futures are (at least in part) enacted within and through Teesside's steelworks. Each of these examples are relations to a particular future and such relations are experienced and enacted through differing modalities, whether

through investment, hope, optimism, fear, uncertainty or loss. What an account of the futures of industrial change needs to attend to is the multiplicity of these different relations to the future and how they are enacted through such a period of industrial change. Indeed, our vocabulary relating to issues surrounding futures and futurity is often insufficient to address these futures substantively. A conceptual framework for discussing such futures and the modalities of relating to such multiple futures needs to acknowledge the changeable nature of the process of enacting such relations towards the future without losing sight of the specificities of such enacted relations. In the following chapters I turn to how these futures can be theorised and framed within a conceptual apparatus that allows for the roles they have played within the mothballing of the steelworks and within Teesside's wider local economic governance to be understood.

3. Futures in Geography: Lived experience, Haunting, Precarity and Futurity

To write of Teesside's history is to therefore write of futures, central to which are processes of industrial change. From the rise of Teesside as a steelmaking and heavy industry metropolis peaking in the middle of the 20th century, to its steady industrial decline in the 1970s, 80s and 90s, to the more recent events surrounding the mothballing and restarting of steel production in 2012, futures and futurity are inherent to these processes of industrial change within Teesside. Investing in building an ironworks, developing a ten year plan to expand a steelworks, privatising a nationally owned business, outsourcing core business practices to external contractors or mothballing an industrial plant are all aspects of industrial change that are enacted based upon particular orientations towards the future and which have implications for other such orientations towards the future, for example those of the workforce. Thus, the futurity of industrial change is inherently related to a specific kind of enacted orientation towards the future through which industrial change is both experienced and enacted and hence such futurity should be central to researching industrial change. I argue that these orientations towards the future provide a novel and illuminating means of exploring and understanding industrial change which has been largely overlooked within geographical debates.

Industrial change, as an emergent and becoming process, is always related to futures. Yet as outlined within the previous chapter, whilst industrial geographies have attended to the implications of changes to industrial and economic practice at the level of cities and regions, such a body of literature has been less attentive to the lived experiences of such change and how this comes to be lived through futures. Since the height of the restructuring debates in the 1980s and 1990s, the lived experience of industrial change has been well attended within other areas of geographic scholarship, however I will argue that

within these accounts futures remain peripheral to how experiences of industrial change come to be understood and represented. Within this body of literature, two conceptual approaches to industrial change are of note as ways of approaching the temporality of industrial change: 'haunting' and 'precarity'. Here, in different ways, each conceptual approach allows for industrial change to be approached as a set of temporal relationships with pasts, presents and futures. However, will be argued within this chapter, whilst futures underpin these concepts they rarely feature explicitly within their deployment. The absence of futures as a focus of conceptual discussion in their own right within these four - often overlapping - literatures (industrial geography discussions of restructuring; accounts of the lived experience of industrial change; industrial haunting; and precarity) is not without consequence. As this thesis will demonstrate, futures are a key modality through which industrial change comes to be related to, assembled, experienced, enacted and understood by a range of different actors such as individuals, businesses and government organisations. To relegate futures to the role of a temporal backdrop is therefore to overlook an integral part of the process of industrial change.

Geography has not, however, been without engagement with futures and futurity. There is a growing body of literature within geography and wider social science research that has sought to engage with the future and futurity beyond a form of background temporality that is often assumed within research. I divide this literature into two modalities of engagement. The first relates to that which seeks to theorise the future as a realm of potentiality and becoming, thus dealing with *the* Future itself as a proper noun. The second modality relates to an engagement with how specific *futures* are enacted and related to and how specific actors *orientate themselves towards* futures. Therefore this relates not to theorising the future in and of itself but rather to practices of enacting and relating to the

future – put simply, the doing of futurity. This chapter will provide an overview of how geographers have engaged with futures and whether a conceptual approach to futurity can be found within this literature that could be deployed to explore the role of futures within industrial change in the steel industry of Teesside.

3.1. The Lived Experience of Industrial Change

Throughout the period of the ‘restructuring’ debates (Lovering 1989) discussion surrounding de-industrialisation, disinvestment and flexibility within the economy placed little attention upon how such processes were lived and experienced. Massey’s (1984) *Spatial Divisions of Labour* heralded a move towards a more region and locality based focus within empirical analysis and discussion of such practices of industrial change at the level of particular locales, evidenced through the localities based work stemming from the CURS initiative (Cooke 1989; Harloe, Pickvance, and Urry 1990; Beynon, Sadler, and Hudson 1994). Regulation theorists, although becoming more attentive to space such as through the work of Alain Lipietz (Hudson 2011), were primarily focussed upon the economy at the national level (Harris 1988) and even when deployed to consider the local, city and regional scales, tended to focus upon more ‘structural’ and institutionalizing forces at the expense of lived everyday experiences (such as Piore and Sabel 1984). Furthermore, long wave and world systems theorists placed their analysis at an international level of discussion (Harris 1988; P. Hall 1988). This is not to say that the impact deindustrialisation or disinvestment had upon individual people or communities is fully ignored within this literature. Indeed, Bluestone and Harrison devote an entire chapter of their 1982 book to ‘*The Impact of Private Disinvestment on Workers and Their Communities.*’ However, such an engagement is predominantly quantitative in that it is focussed primarily in terms of the numbers of jobs lost, calculating disinvestment within communities and of lost earnings. Even the

subsection on *'Impacts on Physical and Mental Health'* (Bluestone and Harrison 1982, 63) largely deals with increases in the numbers of recorded cases of medical conditions such as high blood pressure and stomach ulcers and rises in death rates following deindustrialisation within a particular locality. With a move towards a focus upon localities - as influenced by Massey (1984) - more attention towards the experiences of communities and individuals began to feature within discussion of industrial change (such as within Beynon, Sadler, and Hudson 1994). Yet it was not until more recently that geographers began to focus upon how periods of industrial change are lived through and experienced by the people, communities and actors to which they relate at a much more specific level. Some of the most notable work here explores experiences of industrial change within post-socialist communities (e.g. Stenning 2000, 2003, 2005; Hörschelmann and Stenning 2008; Stenning et al. 2010), with Stenning et al.'s 2010 book, *Domesticating Neo-Liberalism*, in particular focussing upon how households experience this change through the context of post-socialist Poland and Slovakia. Katy Bennett has also emphasised how the experience of industrial change is not only experienced through the physical process of deindustrialisation or reorganisation, but rather can continue through performances of memory and collective identity many years after an industrial closure (K. Bennett 2009; see also K. Bennett, Beynon, and Hudson 2000). Furthermore, Valerie Walkerdine's work has focussed upon the impacts of industrial change on communities, and in particular explores this in relation to the closure of a steelworks within a South Wales community that she dubs 'Steeltown' (Walkerdine and Jiménez 2012; Walkerdine 2010). The steelworks lie at the heart of Walkerdine's representation of this community, however with its closure in 2002 many of the participants within this study expressed this as the loss of, or the beginning of the loss of, a particular affective experience of community (Walkerdine 2010). However, the final concluding chapter of the 2012 book *Gender, Work and Community after De-Industrialisation* written with Luis Jimenez differs somewhat from much of the

other contributions within industrial change literatures, in that it provides some attention towards thinking about the future and how the future can be conceptualised. Walkerdine and Jimenez draw from Guattari to provide the beginnings of thinking through how the future can be conceptualised within this particular situation.

“How can a community link back with its own creative history and with it reach forward into a new future? Such issues are all the more important in a political moment when the government is going to withdraw public funding. The possibility of people feeling safe enough to make changes by themselves for themselves and to create a new vision of a possible future has never been more urgent. Yet we can all imagine; indeed we do this all the time. We saw in chapter 8 how Bethan imagined being a policewoman both to follow her father and to keep the men in order while having adventures. Deleuze and Guattari (1987) would call this her ‘line of flight’. That is, it is her imagined way out of the situation in which she finds herself – caught, stuck.” (Walkerdine and Jiménez 2012, 190)

Here then the authors present some initial questions, or perhaps reflections, upon how we might conceptualise how this South Wales community and the people living within it might think about and practice their futures. The turn to Deleuze and Guattari also provides for a means of thinking about these futures as other than linear (e.g. past-present-future) and also as being multiple and assembled differently for each individual. However, these important questions only appear at the very end of this text as a means of concluding and reflecting upon the material within the main body of this work rather than featuring as a key theme throughout the discussion. As such, a full attention towards how different orientations towards the future can be conceptualised exceeds this text, yet its tentative attention towards futurity as more than linear is a key development in reconceptualising futures within how we understand industrial change. However, within this literature that

we might loosely group as dealing with the lived experience of industrial change, two conceptual approaches have been deployed which contain the potential for understanding futures in this more than linear capacity. I am referring here, to the concepts of 'haunting' and 'precarity'.

3.1.1. Haunting

A small but emerging literature has addressed the interplay between the physical infrastructure and the lived emotion and memory in regards to industrial change through a discussion of 'haunting' (Edensor 2008; 2005a; 2005b; Wylie 2009; Meier 2013). Here industrial pasts continue to endure through memory and industrial ruin, such as former factory workers being 'haunted' by past labour practices when encountering the now closed or derelict sites of their former employment. For Tim Edensor, 'haunting' refers not only to the spectacular, but is rather a ubiquitous process of relating to place, no matter how mundane (Edensor 2008). Thus, within Edensor's work such a concept functions as a means of theorising how place, memory and emotion become related to through the making present of the past or aspects of particular pasts. However what is also apparent yet left relatively unaddressed within this literature is how practices of 'haunting' are also practices of relating to particular imagined futures of absence. In terms of industrial change, what this conceptual approach allows for is an attention towards how a place comes to be haunted through the loss of particular industrial practices and the emotional experience of such loss. In regards to the latter, the individual is thus haunted by the lost industrial practices of the past, but also by a future that has been emptied of these practices. Indeed, in a paper discussing the experiences of former steelworkers in Bavaria being 'haunted' by their now abandoned former workplaces, this emotional experience is

strikingly apparent within some of Meier's research data, such as the following interview excerpt with a former steelworker:

"I visited the Maxhutte with some former colleagues; or rather I visited what is left of the Maxhutte today. It brought tears to my eyes, because now you can only see the steel framework. I said to myself: 'This was my workplace, I worked there.' The blast furnace was there, the roller mill was there, and and the steel mill was there. And now there are only naked steel frameworks. Nothing works anymore. For me this is... (he takes a deep breath) like looking at a dead person. I look from above the plant, from the Schlossberg, as it's called, directly down onto the Maxhutte. And I say, 'no, it's not possible. Once eight or nine thousand people worked there – and now it's all over' ... Today Sulzbach-Rosenberg is like a city of the dead. Before, there was life, there was action and and ... now there is nothing ... And if you saw the people – 60, 65 years old – crying like small children as the plant went down the drain. 'My company is dying', they said. That was their Maxhutte." (Former steelworker in Meier 2012, 9)

Thus for this former steelworker in Bavaria, a particular place is experienced through an emotional haunting of past memories of work at this now defunct steelworks. This expression of sadness and loss is a relationship between a practice of remembering, a particular place, but also of bringing this remembrance into relation with a future within which the object of remembrance remains absent. Within his discussion of photographic images of a now derelict steelworks in Dortmund Germany, Swanton also captures the emotion of such industrial landscapes:

"The ruin and what remains of the industrial past is a fracture in the postindustrial landscape; this afterimage captures the melancholia and a sense of shame that an industrial past is being lost." (Swanton 2012, 269)

Like Bennett's work, these approaches highlight how industrial change is still experienced and enacted long after the factories and plants have shut down or been decommissioned. Yet what this focus upon the 'haunting' of past industrial spaces provides in addition to this is an insight into how industrial change continues to be related to in regards to emotion, memory and a future of absence, particularly in the case of those that worked and lived within the communities affected by such change. At this point, one might also recall Massey's claims within *Spatial Divisions of Labour* that the layering of history within particular localities is more than purely monetary. Certainly this discussion of the lived experiences of industrial change highlights the importance of attending to the many different aspects of deindustrialisation and disinvestment. Yet, apparent in these discussions of hauntings, and within the words of the former steelworker in Meier's paper, these more than economic lived experiences of industrial change are also more than historic. Here past industrial practice, such as being employed at a particular steelworks, is brought into sharp relief with a future where such practice is absent. It is in this relationship that a 'haunting' takes place – through this relationship between pasts and futures. However, within the deployments of this concept, futures once again remain largely peripheral within how this concept is understood.

3.1.2. Precarity

In recent years within geography, a further strand of discussion has arisen which to some extent seeks to relate many of the issues discussed within the industrial change literature focussing upon flexibility (such as the increasing prevalence of sub-contracting, casualisation of labour and reductions in job security) with the lived experience of these processes. Recent discussion surrounding labour practices has shifted somewhat to a focus upon precarity within the labour market and industrial change in terms of increasing

precarity for employees. Drawing particularly from discussions of the increasing flexibility of labour, precarity has been deployed as a means of emphasising the uncertainty inherent within the lived experiences of industrial and employment change, particularly in the face of government austerity programmes and cuts to public funding both in the UK and abroad. Whilst geography has been somewhat slower to engage with this concept of precarity than within wider social research, critical engagements with this concept are beginning to make an imprint within geographical debate. Precarity has been deployed as a concept for understanding labour uncertainty (Waite 2008; Ettlinger 2007b; Coe 2013), cultural and creative industries (Gill and Pratt 2008; Neilson and Rossiter 2008; Ross 2008; Hesmondhalgh and Baker 2008), agency within a non-unionised workforce (Warren 2014) and in the form of a new 'precariat' class formed by those within unsecure and short-term employment (Standing 2011, 2012a, 2012b). Yet what these varied deployments hold in common is that as a concept precarity depends upon a particular set of relationships with the future. For Gill and Pratt:

“precarity signifies both the multiplication of precarious, unstable, insecure forms of living and, simultaneously, new forms of political struggle and solidarity that reach beyond the traditional models of the political party or trade union.” (Gill and Pratt 2008, 3)

Thus, in this definition precarity operates as a two-sided concept. Firstly it offers an attention towards uncertain relations of labour and employment, which are inherently predicated upon a particular set of relations towards the future. Here the uncertainty of precarity stems from the not knowing whether contracts, employment and temporary work can be maintained and extended beyond the immediate present. Secondly, it also attends to the potentiality of political action and agency within these uncertain labour relations. Such potentiality of future political action relies upon a specific set of

relationships to the future which arise from the lived experiences of precarity translated through this concept into possible futures of resistance. Furthermore, for Lauren Berlant, precarity is:

“a rallying cry for a thriving new world of interdependency and care that’s not just private, but it is also an idiom for describing a loss of faith in a fantasy world to which generations have become accustomed.” (Berlant in Puar et al. 2012)

Hence also for Berlant, precarity contains within it the potential for new futures of economic and social relations beyond those enacted through contemporary capitalism, but is also inherently related to the making problematic of a faith in a fantasy world promised through a particular relation with the state (Berlant 2011). This fantasy, or what Berlant elsewhere comes to refer to as the ‘good life’ (Berlant 2011), is a relation to a particular promise of a future of prosperity in return for consenting to the rules of the state. However, this fantasy of a promised future has been rendered problematic through the ‘austerity state’ and shrinking resources and expectations (Berlant 2011). Precarity here then, also includes the loss of the expectation of a comfortable and secure future. Yet as Andrew Warren claims, engagements with precarious labour have left the lived experience of such precarity relatively unattended (Warren 2014). As a concept then, precarity functions as a means of attending to how particular futures come to be made precarious or uncertain, and to how these uncertain futures might open up new spaces for political action. Yet whilst it is futures that are being rendered precarious here, futures and futurity only appear as temporal background within deployments of this concept.

Furthermore, despite being something of a relative newcomer conceptually, particularly within geographic scholarship, precarity and precariousness have had a long history within

capitalist modes of production. As we can see from the short history of economic and industrial practice throughout the history of Teesside provided within the previous chapter (Chapter 2), precarious and uncertain labour practices and the dominance of capital over labour has been a recurring motif throughout Teesside's industrial history. From its early inception as an iron and steelmaking hub, the industrial relations of Teesside were based upon capital investment primarily, followed by labour migration to the area to take up the many labour intensive and often casual jobs associated with iron and steelmaking in the 19th century. The rise in more 'flexible' labour practices in the manufacturing industry particularly in relation to the female workforce in the 1980s and early 1990s (see Beynon, Sadler, and Hudson 1994) again demonstrates the often uncertain and precarious nature of employment within Teesside's local economy. Employment within the steel and chemical industries might have appeared to provide a futures of secure long term employment during the 1950s and 1960s, however from the 1970s onwards concern over the long term viability of steelmaking in Teesside (evidenced through the truncated expansion programme, the dwindling profits of British Steel following privatisation and later through the sale of the coil plate mill in 2001) effectively re-introduced precariousness and uncertainty into these futures of employment. Hence, historical reflection points to precarity and uncertainty having always been prominent within Teesside's industry and labour market, particularly in regards to futures. Indeed this has formed the basis for some critique of precarity in its deployment as a novel phenomenon or as being closely associated with post-Fordism. As Neilson and Rossiter contend:

"Precarity appears as an irregular phenomenon only when set against a Fordist or Keynesian norm. To this we can add other factors, such as the overproduction of university graduates in Europe or the rise of China and India as economic 'superpowers' in which skilled work can be performed at lower cost. But the point remains. If we look at capitalism in a wider historical and geographical scope, it is

precarity that is the norm and not Fordist economic organization.” (Neilson and Rossiter 2008, 54)

And further for Louise Waite:

“It is perhaps myopic, however, to be implying that precarious labourers have *only* emerged in post-Fordist landscapes. Precarious workers are not a uniquely 21st- or 20th-century phenomenon, insecurity is not a *new* experience for working classes and of course the particular development trajectories of countries in the global South have meant that the ‘precarious condition’ is rarely even noted, perhaps because it is so ubiquitous. [...] The notable point here is that the *idea* of precarity is, of course, not new at all even if it has not been specifically labelled as ‘precarity’.” (Waite 2008, 419)

Thus whilst precarity can be a useful concept in helping to highlight the uncertainty inherent to some forms of labour practice, care must be taken to avoid framing this as an entirely new phenomenon. Certainly within Teesside and other ‘Old Industrial Regions’ of the UK (and indeed in much of the labour market of a ‘successful’ city such as London [see Massey 2007]), precarity has long been a part of industrial labour relations even if it has not been identified in these terms. Furthermore approaching precarity as something associated with post-Fordism further becomes problematic when Fordism itself was never the dominant mode of production within these regions such as Teesside (Hudson 1989a; 1988; Cooke 1988). Thus, removed of this definition of a new and emerging typology of labour relations, precarity functions as no more than as a synonym for uncertainty which has been a key feature of labour relations within ‘Old Industrial Regions’ such as Teesside (and indeed elsewhere) throughout their industrial history.

In recent decades then, industrial change has therefore featured significantly within geographical and social scientific discussion and continues to be a prominent theme within contemporary research. However, the future and futurity remain under-theorised and relatively unaddressed within these accounts of industrial change. Whilst futurity and some conception or accounting for the future might feature more or less prominently within these different discussions of industrial change, at best the future remains an implied backdrop to these accounts. Debate around industrial change relies upon a particular imaginary of a future set of industrial relations – whether flexible, precarious, or ‘haunted’ through absence – yet how the future is theorised here remains unattended within this debate. To have one’s employment or economic situation become precarious (whether or not we refer to this creating a new economic class of the ‘precariat’) is based upon a particular understanding of the future in terms of employment contingency and also of the loss of promised futures of employment and the fantasy of the ‘good life’ (Berlant 2011). However, although these futures would appear to be central to the concept of precarity, they receive little direct attention within this literature. Furthermore, work exploring the lived experiences of industrial and economic change is also predicated upon how people relate to their past but also how this is brought into relation with a future of industrial change. The steelworker of Meier’s study relates to the closure of his former place of work through being ‘haunted’ by memories of the former industrial site, but this is also brought into relation with an implicit understanding of the future that is rendered present for the steelworker which includes the absence of this industry and these remembered practices. In all of these accounts of industrial change then, the future plays an essential role, yet how it is conceptualised and understood remains relatively unaddressed. Thinking in greater conceptual detail about the role of the future within these accounts raises a series of important questions for how industrial change can be theorised. In these accounts, what is changing and how does this change take place? What is the temporality of this change?

How are these changes experienced? A substantive and conceptual engagement with futures within industrial change does more than just add an extra component to how industrial change can be explained, rather it provides the means for a more nuanced theorisation of industrial change as a process in and of itself.

3.2 Futurity within Geography

Thus far we have seen that the industrial history of Teesside is one of multiple different futures and modalities of relating to the future, but that accounts of industrial change – whether focussed upon deindustrialisation and flexibility, lived experiences of industrial change, haunting or precarity – have left such futures relatively unattended. Hence, the question becomes how can an account of industrial change attend to such multiple different futures and relations to the future and how can such phenomena be theorised? Geographers have by no means been ignorant to issues of futurity and futures - far from it. Indeed, there is a recently growing literature within geography attending explicitly to the future and futurity to which I now turn to discuss whether some answers to these questions of futures within industrial change may be found therein.

Broadly speaking, two modalities of engaging with the future can be identified within current academic discussion. The first refers to the future in terms of temporality and time and how this can be conceptualised and researched. In this case the future is a temporal realm of openness, possibility and becoming – literally a means of articulating what is to come. Barbara Adam's 2009 article raises a number of questions concerning how the future can be researched, asking how can we research the 'not yet' of futurity (Adam 2009). Within this article Adam discusses the methodological writings of Max Weber and whether

his heuristic use of dualisms such as 'facts and values' and 'means and ends' can provide an effective methodological tool for understating and conceptualising futures. However Adam finds that even heuristically used, dualisms cannot account for futures that cross such binary divisions and which are simultaneously 'not yet' but at the same time presently enacted and brought into being. The paper therefore raises a call to a social science of futurity that attends to these 'futures in the making' as Adam terms them (Adam 2009). Further work attending to how the future can be conceptualised as an object in itself within social research is provided by Elizabeth Grosz who has written extensively about time and the future with a particular emphasis upon reconceptualising time as becoming (Grosz 1999). Drawing from the likes of Deleuze, Bergson, Nietzsche and – interestingly – Darwin, Grosz critiques approaches to time that place it as the medium which contains life, claiming that in such a view:

"Time is understood as the neutral 'medium' in which matter and life are framed rather than as a dynamic force in their framing." (Grosz 1999a, 3)

Grosz further critiques the separation of time into linear categorisations, instead claiming that past, present and future are inherently interlinked. Indeed:

"Concepts of each of the three temporal modalities (past, present, and future in all their conjugative complexities) entail presumptions regarding the others that are often ill- or unconsidered: how we understand the past, and our links to it through reminiscence, melancholy, or nostalgia, prefigures and contains corresponding concepts about the present and future; the substantiality or privilege we pragmatically grant to the present has implications for the retrievability of the past and the predictability of the future; and, depending on whether we grant to the future the supervening power to rewrite the present and past, so too we must problematize the notions of identity, origin, and development." (Grosz 1999b, 18)

Furthermore, Grosz also makes the point that the future should be thought of as being open and thus as a process of becoming (Worth 2009). However, despite turning to how we might think about the complexity of time, within the previous quotation Grosz's work is primarily focussed upon how we might think about and conceptualise time and thus futurity in this first modality of what is to come. Thus, these contributions offer a valuable insight into the complexity of futurity and the need to engage with it beyond a temporal background within which social action is framed. Yet both of these accounts remained concerned primarily with how *the* future might be theorised as opposed to how multiple different orientations towards the future are assembled, experienced and enacted. Therefore, as a means of theorising the assembled and enacted futures of industrial change engagements with the future through this modality would be of a limited utility.

Yet there is a second modality of engagement with futurity within contemporary academic work that differs from the above in that rather than addressing how we might theorise the future itself as a realm of temporality (although this certainly still features in much of this discussion), contributions here focus instead upon how particular futures are enacted and made and how specific people, companies and institutions orientate themselves towards the future. This second modality therefore holds greater potential for providing a means of thinking about how the multiple futures and relations towards the future that occur through periods of industrial change within localities such as Teesside, might be conceptualised and researched through such an attention to *specific* futures. The two modalities therefore relate to two very different objects: the first to the future as a particular object; the second to the differing orientations towards the future of specific actors. The relationship between these two objects of research is somewhat nuanced as particular theorisations and understandings of the future can structure and be assembled

within specific orientations towards the future, and particular orientations towards the future might also structure and shape how the future is understood. However the key point I wish to convey here is that whilst these two objects are very much related, they remain different objects and are not reducible to one another. Thus at its most simple the difference I identify between these two modalities is that the first deals with theorising the future, whereas the second deals with the actual practice and doing of futurity. It is this second modality that can thus illuminate the role of orientations towards the future within industrial change through its attention to both the lived experience and enactment of futurity.

Somewhat spanning these two modalities however, is the 2007 book *Future Matters* by Barbara Adam and Chris Groves. This text provides a detailed discussion of futures and future and how this has come to be understood within contemporary industrial society, rooted within antiquity and the history of futurity within practices such as rituals and prophecy. The book identifies two main modes of positioning the future (Adam and Groves 2007). In the first instance the future is embodied: populated by things, objects and knowledges and tied to context. In other words, such a future is full of differing assemblages and networks of actors. The second representation of the future, and one which Adam and Groves position as tied to contemporary economics, is a commodified and empty future. For these authors, such an empty future is:

“neither tied to a destiny nor conceived as pre-existing. Rather, it is an open future, a realm of potentiality to be formed rather than transformed to human will.

Emptied of content and meaning, the future is simply there, an empty space waiting to be filled with our desire, to be shaped, traded or formed according to

rational plans and blueprints, holding out the promise that it can be what we want it to be." (Adam and Groves 2007, 11)

Hence such a commodified future is depopulated of the objects and assemblages that so fill the embodied future. The future here becomes a realm of endless potentiality devoid of context and constraint. This future thus becomes something that can not only be acted into, as might be the case of acting into the assemblages and networks of the embodied future, but also claimed and colonised. Indeed for Adam and Groves:

"The future, emptied of content and extracted from historical context, invites imagination and inventive action. It is ready to be populated with the products of progress. An empty future is there for the taking, open to commodification, colonisation and control, available for exploitation, exploration and elimination, as and when it becomes appropriate from the vantage point of the present." (ibid., 13)

The commodified future is therefore an orientation that positions the future as a realm of endless and open potentiality waiting to be claimed, commodified and filled with 'the products of progress' as Adam and Groves describe. For these authors this view of the future is a fiction and within the book the authors discuss alternatives to this view of the future. For Adam and Groves the practice of future making is one of a complex relationship between knowledge, action and ethics and whilst the totality of their discussion exceeds the capacity of this chapter to address in full, what is important to note here is a differing modality of engaging with the future as a practice of future making as opposed to theorisation of the future in its own right. Here then, discussions of how particular futures come to be created and enacted through these practices of knowledge, ethics and actions, this text allows for the focus to shift from how we can think about the future, to how futures are made and related to.

In recent years there have been a number of contributions to the discussion of futures through this second modality that have highlighted the role of particular futures and different orientations towards the future within a multiplicity of different empirical sites. Engagements here have focussed upon: how inflation comes to be governed through practices such as advertising, political speeches and government strategies (McCormack 2012), and the role of narrative discourses of transition which hold a future together within governmental discourse (Brown et al. 2012); the anticipatory action of imagining and representing futures of new and emergent technologies (Kinsley 2010; 2011; 2012), and how technologies such as video games allow the creation and experience of new ways of relating to possible futures (Shaw and Sharp 2013); the experience of and anticipation of environmental change such as within scenario planning for climate change (Rickards, Ison, et al. 2014; Rickards, Wiseman, et al. 2014), sea level change (Fincher et al. 2014) and the spatialities of environmental risk in Bogota (Zeiderman 2012); socioecological futures (Braun 2015) including how the Anthropocene makes new imagined futures of ecological abundance possible (Collard, Dempsey, and Sundberg 2015), two specific imaginaries of a future for a Milwaukee river (Holifield and Schuelke 2015), the role of school gardens in making new future imaginaries possible (Moore et al. 2015), and the imagined futures of six different kinds of forest (Mansfield et al. 2014); imaginaries of the futures of biofuel technologies and their governance (Ponte and Birch 2014; Levidow and Papaioannou 2014; Pradhan and Ruysenaar 2014; Palmer 2014); uncertain futures of radioactive waste (Gregson 2012); sustainability in wildflower harvesting in South Africa (McEwan, Hughes, and Bek 2014); the practices of food safety inspections (Bingham and Lavau 2012); remittances and monetary savings in developing countries (Green et al. 2012); and the reproduction of class, gender, race and sexualisation within teleological narratives of 'progress' (Oswin 2012). Yet despite this burgeoning engagement with futures across this

diverse range of empirical sites, what these engagements with futures hold in common is that whilst these contributions do begin to attend to the often complex temporalities involved in imagining particular futures and the ways in which this comes to structure orientations towards the future, there remains little attempt to conceptualise or theorise futures beyond the immediate empirical situation being discussed.

There are some contributions here that come closer than others to attending to futures in excess of their respective empirical sites. For example, Bingham and Lavau (2012), Kinsley (2012) and McCormack's (2012) contributions attend to the variety of different objects assembled within these specific orientations towards the future, whether in the form of the advertising, political speeches and government strategies enrolled in the governance of inflation (McCormack 2012), the technologies and practices enrolled in representing new technological futures such as reports, stories and models and how these come to be related to through anxieties and hope (Kinsley 2012), to the practices and objects involved within a food safety inspection (Bingham and Lavau 2012). Nancy Worth's 2009 paper develops work by Grosz from a focus upon how time can be conceptualised to how individual people think about and articulate their own futures (Worth 2009). Drawing from a research project working with visually impaired children and investigating their transitions to adulthood, Worth draws from both Grosz's and the psychologist Gordon Allport's uses of the concept of becoming to conceptualise how these research participants articulated their own futures. In drawing from these particular conceptualisations of temporality, such an approach provides a focus upon how a particular set of futures are assembled and enacted by these visually impaired children. Furthermore, Shaw and Sharp's (2013) paper provides a more detailed insight into how video games create and make possible the experience of new imagined futures. For these authors:

"The future is a space of imagination, where the possible and the impossible resonate together, emerging from - and looping back into - the present." (Shaw and Sharp 2013, 355)

Within video games then (albeit not necessarily *all* video games), the future features as a space of imagination, or 'irreality' as these authors come to term it, whereby new possibilities of understanding social existence can be created and experienced. Yet whilst these are moves towards engaging with futures more explicitly at a conceptual level, they fall short of providing a conceptual framework for how geographers can engage with futures across different empirical sites, such as the futures of industrial change, that can account for the multiplicity, contingency and boundaries of different orientations towards the future.

Whilst much of the engagement with futures to date has been lacking in conceptual depth, there are key contributions within this literature which suggest that geographers are becoming more conceptually attuned to futures and futurity. Holloway's paper provides an illuminating account of the complex relationships enacted with temporality through religious prophecy. The focus within this paper is, for Holloway:

"on the anticipation of a promised future that is registered and played out in (geo)political, embodied and material practices, and how communities and identities become differently politicised and brought into relation through the performative presencing of the cosmic-divine spacetimes of prophecy." (Holloway 2015, 183)

Indeed then, such an approach to the futures of prophecy highlights the multiplicity of what is being assembled within this relationship to temporality, alongside an attention to

how specific futures are made present through a range of practices and objects. What Holloway's analysis of the prophecies of Joanna Southcott in the late 18th and early 19th centuries adds to a discussion of futures here is an attention to the complex multiplicities and practices involved within making a particular future (in this case one of religious prophecy) present. Furthermore it also brings an attention to how a particular uncertain prophesied future can also endure such as in the sealing of a box of prophetic letters and documents, or otherwise collapse as demonstrated through the unforeseen death of the prophet or the conducting of x-rays upon and the opening of the aforementioned box (only to find it to contain a seemingly random selection of mundane items). This also highlights the different relations to futures enacted through these material practices of prophecy. For example, as Holloway states regarding the public opening of Southcott's sealed box of prophecy:

“The mocking by the Southcottians, Low's psychology and the Bishop's curious uncertainty thus made present a series of intersecting and divergent future temporalities as the event proceeded. These different futures coalesced and dissipated, as the latest space and time of the Southcottian prophetic encounter was formed: surges of incredulity, credulity, certainty, speculation, fascination, disparagement, faith and rationality patterned the futures made present.”

(Holloway 2015, 187)

What can be seen within this account of the opening of Southcott's box, is how a particular future endures through this object, but that also this future is related to through a number of different modalities and orientations towards this future. Once the box is opened, and its seemingly random contents of mundane items extracted and announced, for many this future of prophecy can be said to have collapsed or undergone a transition, whereas for others the disproving of Southcott's prophecies could also be said to maintain their own

orientations towards the future that the prophecies had been fake. Thus, Holloway provides some insight here into the multiplicity and complex relations enacted towards differing relations towards the future, and also an attention to how futures endure or collapse through such relations.

Ben Anderson's 2010 paper makes an important contribution here as it provides not only an engagement with how particular futures are imagined and made present within practices of emergency planning and management, but also develops a set of analytic tools for analysing such futures. For Anderson futures are assemblages of:

- *“Styles*, consisting of a series of statements through which ‘the future’ as an abstract category is disclosed and related to. Statements about the future condition and limit how ‘the future’ can be intervened on. They function through a circularity, in that statements disclose a set of relations between past, present and future *and* self-authenticate those relations.
- *Practices* that give context to specific futures, including acts of performing, calculating and imagining. It is through these acts that futures are made present in affects, epistemic objects and materialities.
- *Logics* through which action in the present is enacted. A logic is a programmatic way of formalizing, justifying and deploying action in the here and now. Logics involve action that aims to prevent, mitigate, adapt to, prepare for or pre-empt specific futures.” (B. Anderson 2010, 778–779)

Such a conceptualisation can be considered the first attempt to theorise how specific orientations towards and practices of enacting particular futures can be researched and it provides a conceptual framework for approaching how particular futures are assembled

and rendered present and actionable. However whilst such an approach provides geographers with a means of approaching how futures come to be rendered present and actionable, it cannot attend to how specific futures also change and are held together through their enactment and the lived experience of these assembled futures. Any conceptual apparatus for exploring the role of orientations towards the future within industrial change must attend to the multiplicity of such orientations, their contingency, and the boundaries within which such contingency must be maintained. Thus, whilst Anderson makes some useful contributions regarding how particular futures might be assembled and rendered present, a conceptual approach to explore the futures of industrial change must also extend beyond this.

Furthermore, Opitz and Tellman also offer some conceptual insights into rendering futures present within their 2015 paper. The authors draw from the work of Niklas Luhmann as a means of approaching futures in relation to law and the economy. Opitz and Tellman deploy Luhmann's concepts of 'present futures' – which refer to observations and imaginaries of potential futures – and 'future presents' – which refer to the actual transformation of potentiality into actuality, in other words the actualisation of the future from one moment to the next (Opitz and Tellmann 2015). Such conceptual approaches to temporality are indeed to be welcomed within this body of work and provide a means of articulating the complex relationships between future-present-past; however, I argue that such an approach nevertheless leaves out the multiplicity of what is being assembled within such futures. If we return to the example of Teesside, certainly these concepts would provide a valuable insight into the how the future might be imagined at the beginning of the mothballing and also how particular futures are actualised, yet the complexity and multiplicity of the assembling of different actors, objects, hopes, desires

and beyond and also the continued change and becoming of particular futures through their enactment and experience are left unattended.

In one of the more conceptually developed contributions to this futures literature, Hardgrove, Rootham and McDowell offer an insight into the role of specific imagined futures within youth transitions into employment through the concept of 'possible selves' (Hardgrove, Rootham, and McDowell 2015). For these authors:

“Possible selves are based on individual and social experience, and blend a conceptual explanation that appreciations [sic] the importance of self-concept as well as opportunity structures.” (Hardgrove, Rootham, and McDowell 2015, 165)

And further:

“These are the various selves that can be imagined taking form in the future: the poor server in a small restaurant, or the well-paid hotel manager; the respected bouncer at the local club, the chef, or the unskilled day labourer on a construction site. Such possible selves are rooted in daily life, in personal experience and interpersonal relationships that help an individual to picture what his or her life could be come.” (ibid. 165)

What Hargrove, Rootham and McDowell deploy here is a particular conceptual approach to a particular form of future: that of the future imagined self. However, what is also important for these authors is how such possible selves also serve as potential motivations for action, yet that such motivation is also situated within an assemblage – although they do not use this term - of other factors such as institutional and relational support and a visible route to the future self (Hardgrove, Rootham, and McDowell 2015). Thus, importantly they also emphasise that for the participants within their research:

“Their possible selves in the workforce were not floating about in their imaginations, detached from their lived experience. They formed and worked towards possible selves in the labour market based on desirable and viable options that were available to them.” (Hardgrove, Rootham, and McDowell 2015, 167)

For this conceptual approach to futures then, these possible selves are not made a propos of nothing, but rather are assembled and enacted out of past experiences and particular understandings and orientations towards the future. Yet this is not a focus of Hardgrove, Rootham and McDowell’s discussion, as they focus more readily upon the lived experience and negotiation by young men of these future possible selves. Thus, whilst this paper offers a more robust conceptual approach to a specific kind of future – that of possible selves – in theorising futures beyond this empirical site such an approach is less attentive to key issues such as how futures come to be assembled, how they are held together and how they undergo transition and change.

3.3. Towards a theory of futures

Industrial change as a process is experienced and enacted through a variety of different futures. Whilst the lived experience of industrial change has featured within geographic debates (Walkerdine and Jiménez 2012; Walkerdine 2010; K. Bennett 2009), and some moves towards thinking through the complex relations to temporality can be found within the concepts of haunting (Edensor 2008; 2005a; 2005b; Meier 2013; Swanton 2012) and precarity (Gill and Pratt 2008; Neilson and Rossiter 2008; Ettliger 2007b; Waite 2008), the futures of industrial change have remained largely in the background within geographical research. However, geographers are beginning to engage with futures and the complex relations to temporality through which the world comes to be imagined, enacted and lived.

I have divided these engagements with futurity into two broad modalities. The first relates to the theorising of the future in and of itself as a realm of temporality (Grosz 1999b; Adam 2009; Adam and Groves 2007). Whilst this engagement with futurity is to be welcomed, it attends less to the kinds of enacted and lived futures of industrial change that I seek to explore within this project. The second modality is related to the experience, imagining and enactment of specific futures: put more simply as the practice of futurity. Whilst much of this engagement has had a strong empirical focus upon specific futures (Gregson 2012; Ponte and Birch 2014; Braun 2015; McEwan, Hughes, and Bek 2014; Fincher et al. 2014; Shaw and Sharp 2013; McCormack 2012; Brown et al. 2012; Kinsley 2012; 2011; 2010; Rickards, Ison, et al. 2014; Rickards, Wiseman, et al. 2014; Zeiderman 2012; Bingham and Lavau 2012; Oswin 2012; Green et al. 2012) and has attended less to the conceptualisation of these lived futures, there have been key contributions to this debate that have sought to attend to how these futures can be approached conceptually (Holloway 2015; B. Anderson 2010; Opitz and Tellmann 2015; Hardgrove, Rootham, and McDowell 2015). However, I maintain that whilst these moves towards conceptualising futures demonstrate the recognition amongst geographers of the importance of futures, there remains within this literature no robust conceptual apparatus for how to approach futures within research that can attend to these futures (1.) across different empirical sites to explore how these futures come to be assembled from multiple heterogeneous components, (2.) how these futures are constantly changing through their enactment, and (3.) how futures can endure and be held together (or fall apart) through such change. The present project seeks to thus develop such a conceptual apparatus and to achieve this I turn to the concepts of assemblage and homeomorphism.

4. Homeomorphic Assemblages

Within the previous chapter I identified two modalities of engaging with futurity: with the future as a temporal realm and with specific enacted and assembled future and orientations towards the future. This project seeks to add to this second modality by providing a conceptual apparatus which can be utilised to explore and theorise these orientations towards the future. I will suggest within this chapter that the concept of assemblage, derived from the work of Deleuze and Guattari, is well placed as an analytic tool to research these orientations towards the future given this concept's focus upon deterritorialising processes of becoming and lines of flight and also upon the territorialising processes of assembling and reassembling. Yet there is an aspect to these orientations towards the future that the concept of assemblage is less adept at addressing – that of how specific objects are held together and the boundaries within which change must remain for an object, such as a particular orientation towards the future, to remain the same object. To attend to these limits to change I draw from John Law to conceptualise such orientations towards the future as homeomorphic assemblages to which change is inherent but must remain within particular mobile boundaries, or thresholds, otherwise the assemblage will undertake a transition and become a different object. By bringing these two conceptual approaches together, I develop a set of analytic tools to explore how orientations towards the future are assembled, held together or cross thresholds of change and undergo transitions to new objects. I call these orientations trajectories and the chapter concludes with a discussion of what I consider to be the four key aspects of this concept. Such a conceptual approach will therefore allow for an account of industrial change that attends to the specific futures through which such change is enacted and experienced, the constant making and remaking of such futures through their enactment, how orientations towards the future are assembled and enacted and also how such

orientations must remain within particular thresholds of change to hold together or otherwise undergo a transition and become a different object.

4.1. Assembling Futures

Any conceptualisation of orientations towards the future needs to remain open to the varied and differing relations to the future and the multiplicities of what is being brought together within these orientations. As we have seen within Teesside's industrial history and the previous discussion of industrial change, orientations towards the future can consist of economic predictions, investments, profits, management strategies and policies, infrastructures, desires, imagination, everyday practices, hauntings and emotions and more; how these are brought into relation and enacted within particular orientations towards the future cannot be determined a priori of their enactment. In short, any theorisation of these orientations towards the future must be attentive and open to the multiplicity, change and specific nature of this doing of futurity. This is the value of the concept of assemblage to such a conceptualisation. Its emphasis upon 'becoming' and 'lines of flight' maintains an openness to what can be assembled and how this is enacted within an assemblage, such as a specific orientation towards the future. Indeed, assemblage has already been deployed as a means of approaching the enactment of futures by Anderson (2010) and (albeit tentatively) by Walkerdine and Jiménez (2012). However, assemblage has become an increasingly utilised concept within contemporary social science, being deployed across a range of empirical situations such as the urban (Farias and Bender 2010; Farias 2011; McFarlane 2011a; 2011c; McCann and Ward 2012; McCann 2011), regions and the state (Allen and Cochrane 2010; 2007; Allen 2011, 2008, 2004), forest management (Murray Li 2007), climbing equipment (Barratt 2012), surfing (J. Anderson 2012) and steelworks (Swanton 2013) to name but a few, and has been

conceptualised in very different ways (for example DeLanda 2006; J. Bennett 2010; Connolly 2011). What assemblage offers social scientific research is a means to conceptualise and explore relations, formations and enactments whilst retaining a sense of their indeterminacy, ambivalence, multiplicity and becoming alongside a sense of how such assemblages are enacted and performed in a more nuanced manner than may be afforded by more structural frameworks of analysis. It provides an explicit attention to the conceptualisation of assembling and reassembling, dealing in processes rather than static objects, outcomes or positions. It is a concept of verbs rather than nouns. Thus, in conceptualising something continually being enacted, such as an *orientation towards* the future which are continually enacted and assembled rather than *the* Future as a realm of temporality, assemblage is the most appropriate conceptual tool available for this task.

For Deleuze and Guattari, assemblages are constantly 'becoming' sets of relations between heterogeneous components, always set in tension between making and unmaking, territorialisation and deterritorialisation (Deleuze and Guattari 2004). Assemblages and their components are never fixed points but are instead 'lines of flight,' and as such assemblages are situated within a particular ontology that eschews static categorisation, and instead embraces flux, change and process. Such an attention to the non-static nature of assemblages is particularly of use when thinking about orientations towards the future within industrial change. These orientations are also far from static, for instance, a steelworker in Teesside enacting a particular orientation towards the future would have experienced a significant period of flux and change within this enactment throughout the mothballing period, particularly in relation to the uncertainty that they would have felt regarding whether they would be able to retire with their pension entitlement. However, this is not to say that assemblages come to be defined through flux and becoming alone. As

claimed by Dewsbury (2011), we should not neglect the ‘lines of articulation’ (or territorialising) nature of assemblages. Assemblages therefore function upon two axes, one relating to the tension between territorialisation and deterritorialisation, and the other in regard to the components of the assemblage and whether there are expressive components of material. This is aptly summarised by Wise in the following passage:

“One axis is the creation of territory, on strata, thus moving between making (territorialisation) and unmaking (deterritorialization) on the Body without Organs. The other axis is the enunciation of signifiers, collectively, moving between technology (content, material) and language (expression, non-corporeal effects). Assemblages are made and unmade along each of these dimensions.” (Wise 2005, 80)

And further in the words of Deleuze and Guattari:

“On a first, horizontal, axis, an assemblage comprises two segments, one of content, the other of expression. On the one hand it is a *machinic assemblage* of bodies, of actions and passions, and intermingling of bodies reacting to one another; on the other hand it is a *collective assemblage of enunciation*, of acts and statements, of incorporeal transformations attributed to bodies. Then on a vertical axis, the assemblage has both *territorial sides*, or reterritorialized sides, which stabilize it, and *cutting edges of deterritorialization*, which carry it away” (Deleuze and Guattari 2004, 97–98 *Original emphasis*)

Such axes should not be taken as an underlying structure to assemblage, but rather they function as a heuristic tool within the Deleuzian concept of assemblage to denote the inherent tension within the assemblage between its making and unmaking (i.e. its constant process) and the vast range of heterogeneous components that go towards making the

assemblage. Such axes are described as 'tetravalence' by Deleuze and Guattari (Deleuze and Guattari 2004; Dewsbury 2011). In a highly simplistic manner, the Deleuze and Guattari assemblage can thus be seen as composed of the multiple and heterogeneous materials, expressions, structures and things that go towards making-up the assemblage along one axis (Material/Expression), and the tensions and flux incurred between the processes that are constantly bringing these objects and actors together and simultaneously pushing-pulling them apart upon the other (Territorialization/Deterritorialization) (Deleuze and Guattari 2004). This is an important point to acknowledge as it establishes that within the ontological view of the Deleuzian assemblage, assemblages are composed of multiple and heterogeneous components which acknowledges the role played by the 'non-corporeal' such as affects, emotions, knowledges and that such complex assemblages of components are always in a tension of being brought together and disassembled, showing that flux and uncertainty is inherent to an assemblage ontology. Thus the enactment of a specific orientation towards the future is not fully deterritorialized through the mothballing period, but rather held in tension between territorialisation and deterritorialisation. Such an approach allows for a more nuanced reading of the enactment of this future in that during such a period of uncertainty as the mothballing, this assemblage of materials, expressions, structures and things perhaps shifts more towards the pole of deterritorialisation on the axis that Deleuze and Guattari describe.

However, whilst this attention towards flux, becoming and processes of territorialisation and deterritorialisation make assemblages well placed for approaching futures and how they are constantly changing through their enactment, at the same time approaching the futures of industrial change through this conceptual repertoire alone allows for less to be said about the boundaries of such change. In other words, what is missing within this

concept as a way of approaching futures, specifically the lived futures of industrial change, is a means of attending to the limits to change past which a particular assemblage can no longer be claimed to be the same object. Whilst I would not go as far as those critical of the concept of assemblage in claiming that its utility is as a methodological tool and must be allied with a wider theoretical background to say anything meaningful about the world (Wachsmuth, Madden, and Brenner 2011; Brenner, Madden, and Wachsmuth 2011), I argue that in approaching the futures of industrial change this concept needs to be refined. Thus, rather than looking to supplement an assemblage approach to research with some other body of theory, I posit that orientations towards the future are best understood as a particular kind of assemblage which are performed within specific boundaries of change. In other words, after the work of John Law, these assemblages are homeomorphic.

John Law, along with others such as Marianne de Laet and Annemarie Mol (Law 2004, 2002; de Laet and Mol 2000), have developed notions of fluidity and homeomorphism as a means of exploring how objects and spaces endure within particular boundaries despite undergoing, at times radical, change. In a 2002 paper, John Law discusses fluid space in terms of the mathematical school of topology, stating that:

“topologists think about spatiality by asking questions about the continuity of shapes: the properties that the latter retain while they are also being deformed. In topology for instance, a shape is said to hold its form while it is being squeezed, bent or stretched out – but only so long as it is not also broken or torn. If it is broken or torn, then it changes, it is no longer *homeomorphic*.” (Law 2002, 94 *original emphasis*)

In this sense, homeomorphic objects can be stretched and bent, squeezed and manipulated and yet at the same time remain the same object. However, should these objects become broken or torn they are no longer homeomorphic: in Law's words, this results in rupture (or which I come to refer to as 'transition'). Yet what an attention towards 'homeomorphism' allows in relation to conceptualising assemblages, and thus in developing a conceptual apparatus for researching orientations towards the future within industrial change, is a focus upon not only the need for dynamism and change within these assemblages, but also the need for boundaries and for some aspects of the assemblage to be retained lest it rupture and begin a transition to a different object. Indeed, as has been highlighted, when utilising or discussing assemblages within contemporary academic research there is often too much weighting placed upon the deterritorialising aspects of an assemblage at the expense of its aspects of territorialisation (Dewsbury 2011). In this sense a notion of a homeomorphic assemblage is a useful means of highlighting the boundaries required to maintain the same assembled object and how these are maintained by the aspects that territorialise or stabilise the assemblage.

In exploring this notion of fluid space, Law draws from the work of Marianne de Laet and Annemarie Mol which discusses the Zimbabwean Bush Pump as a fluid object. Here the focus upon this seemingly ordinary piece of technology is designed to highlight the deterritorialisations and territorialisations that are integral to its operation and implementation across Zimbabwe. Indeed for these authors:

"The Zimbabwe Bush Pump is solid and mechanical and yet, or so we will argue, its *boundaries* are vague and moving, rather than being clear or fixed. Likewise, the question as to whether or not the Bush Pump actually *works*, as technologies are supposed to, can only rarely be answered with a clear-cut 'yes' or 'no'. Instead,

there are many grades and shades of 'working'; there are adaptations and variants. Thus the fluidity of the pump's working order is not a matter of interpretation. It is built into the technology itself." (De Laet and Mol 2000, 225 *original emphasis*)

And further:

"Our new actor, the Bush Pump, is not well-bounded but entangled, in terms of both its performance and its nature, in a variety of worlds. These begin to change more or less dramatically as soon as the Bush Pump stops acting. Yet it is not clear *when* exactly the Pump stops acting, when it achieves its aims, and at which point it fails and falters. That is what we mean to capture when we use the term *fluid*. If the Bush Pump may be called an 'actor' despite its fluidity, then 'actors' no longer (or not always) *need* the clear-cut boundaries that come with a stable identity." (De Laet and Mol 2000, 227 *original emphasis*)

Here we can see that for Mol and de Laet, the Bush Pump consists of fluid boundaries, which are mobile and inherently entangled in relations external to the pump. The pump remains the same object at the same time as having its boundaries constantly redrawn, modifications made to its arrangement and substitutions made for broken parts as it changes through a process of 'becoming'. Yet despite this deterritorialisation of flux and change, the pump is (re)territorialised through the parts that remain the same and conceivably through its continued action of providing water. Thus, static boundaries are an inappropriate optic for understanding the pump in the eyes of these authors, as the limits of the pump and the limits of the pump's agency are also inherently vague and mobile.

Drawing from this discussion of fluids and boundaries, in his discussion of space Law proposes four suggestions of what a topological view of space and objects can be said to

look like (Law 2002, 99–100), which I suggest also apply to homeomorphic assemblages. The first states that no particular structure of relations can be privileged above others, acknowledging the need for change. The second however, states that continuity is also required. The relations of these assemblages cannot all change at once, otherwise the assembled object becomes ruptured and changes into something else. Therefore whilst change is essential, it must take place incrementally. Thirdly, Law states that no particular boundary around an object can be privileged. Components can be added to the assemblage, just as they can be removed (or remove themselves). Fourthly, mobile boundaries are required. Just as the need for change must be tempered by the need for this to take place bit by bit, the rejection of particular definitive boundaries must be tempered by the need to recognise that mobile boundaries are needed to hold these assemblages together. Importantly then, change within a homeomorphic object must take place within particular mobile boundaries. Thus, Law's discussion of fluid space is dependent upon an attention towards the thresholds of transition – the point at which change reaches such a degree that the boundaries of the object are crossed. At this point the object cannot be said to retain its homeomorphism as it has changed to such an extent that it has 'ruptured.' In relation to the Deleuzo-Guattarian assemblage, I contend that these homeomorphic assemblages allow for the mobile boundaries of change to be addressed and explored within their application to specific objects, such as the lived futures of industrial change.

Indeed, an approach to assemblage that is attentive to both the need for an attention towards mobile boundaries offers something of an answer to some of the levelled at this concept in its use as an analytic tool. For Neil Brenner, David J. Madden and David Wachsmuth (Brenner, Madden, and Wachsmuth 2011; Wachsmuth, Madden, and Brenner

2011), in reply to McFarlane's employing of assemblage as an analytic tool with which to explore and understand urban processes (McFarlane 2011c; 2011a), assemblage works best in a methodological application rather than as an analytic tool:

"The concept is most useful, we contend, when it is mobilized in the context of a broader repertoire of theories, concepts, methods and research agendas that are not derived internally from the assemblage approach itself" (Brenner, Madden, and Wachsmuth 2011, 230).

And further:

"as he unfurls his argument, the concept of assemblage increasingly becomes an open-ended, all-purpose and potentially limitless set of abstractions regarding the urban questions that displace rather than dialogue with the questions, concerns and orientations of urban political economy" (Brenner, Madden, and Wachsmuth 2011, 232)

The implication here is that there is something missing from assemblage, and that if it is to have any use at all then it must be attached to a more established set concepts and theories (Rankin 2011). Hence, assemblage is positioned as only useful insofar as a methodological tool for approaching concrete research, whereas abstract theorisation is better left to 'broader' theories such as, in this case, political economy.²⁶ Replies are offered to such criticism by McFarlane, who stresses that whilst assemblage makes no assumptions about what is to be researched in advance, this does not mean that it fails to attend to the structures and power relations that might be found within a particular assemblage (McFarlane 2011b), and also by those who acknowledge the utility of using

²⁶ There are certainly parallels between this argument and the criticism levelled at the localities focussed CURS research programme, such as that of Smith who claimed that such an approach would be overly descriptive and as such would be "unable to emerge from the morass of statistical information" (N. Smith 1987, 62).

assemblages as a means of reconceptualising power and power relations (Dovey 2011; Acuto 2011). Yet an attention towards the homeomorphism and mobile boundaries within assemblages renders the utility of such a concept as more than purely descriptive. Indeed, with regards to researching orientations towards the future, and in particular those throughout industrial change within Teesside, what such a conceptual approach allows for is an attention to how these futures are assembled and enacted. The intention here is to not just describe the orientations towards the future that are to be found within periods of industrial change, but rather to analyse how these orientations are enacted and how they are becoming and subject to change within particular mobile boundaries. This is what an assemblage approach offers to an analysis of the futures within industrial change.

4.2 Trajectories

Thus far then, we have seen that accounts of industrial change, whether focussed upon deindustrialisation and flexibility (such as Bluestone and Harrison 1982; Massey 1984; Rowthorn and Martin 1986), the lived experience of such industrial change (Walkerdine 2010; Walkerdine and Jiménez 2012; K. Bennett 2009) including emotional ‘haunting’ (Edensor 2008; 2005a; 2005b; Swanton 2012; Meier 2013), or precarity within labour (Waite 2008; Neilson and Rossiter 2008) have left the futures made and enacted through such change relatively unaddressed. Although there is a growing engagement with orientations towards the future within geography there remains no conceptual apparatus for how to theorise such orientations towards the future that can attend to their multiplicity, specificity, change and boundaries. The concept of assemblage (after Deleuze and Guattari 2004) is well placed to structure such a conceptual approach through its attention to both territorialisation and deterritorialisation (Dewsbury 2011). However, the concept of assemblage is less attentive to how change must occur within mobile

boundaries in order for particular objects, in this case futures, to endure. Deleuze famously claimed that concepts should be viewed as a toolbox (Massumi 2004), and just as a worker selects the appropriate tool for the job, even refining that tool to a specific task such as by attaching a particular drill bit, adjusting the depth of a plane or changing the width of an adjustable wrench, the tool of assemblage must be adjusted to fit the particular task of theorising specific futures. The result of such an adjustment is the notion of the homeomorphic assemblage, which draws from the Deleuze and Guattarian principles of becoming, territorialisation and deterritorialisation, but also draws from John Law's work on homeomorphism and topology. Through such homeomorphic assemblages I have developed a conceptual vocabulary as a means of researching and theorising orientations towards the future. I call these orientations 'trajectories'. In the sense that I use the term, trajectories are homeomorphic assemblages that function as a particular orientation towards the future. They are distinct from 'the Future' in terms of a realm of what is to become, instead relating to how specific actors (such as people, companies, organisations and institutions) orientate themselves towards the future. There are four key aspects to this concept of trajectory:

1. *Trajectories are Heterogeneous and Multiple*

As assemblages of orientations towards the future, trajectories can incorporate a vast number of heterogeneous components such as emotions, knowledges, memories, planning, objects, people, desires and expectations which can also include the styles, practices and logics identified by Anderson (2010) and the knowledge, action and ethics presented by Adam and Groves (2007). In addition to this, they are also multiple in that different actors enact their own unique trajectories. Trajectories are composed of many heterogeneous elements that vary between different trajectories and therefore their composition cannot be

determined in advance of being researched. No two trajectories are the same. Different trajectories may also be more or less concrete or stratified than others in that some trajectories might be very clearly mapped and planned, whereas others might exist as more abstract desires. For example, a local council might enact a highly detailed trajectory of economic regeneration based upon a variety of planning documents and predictions about the future local economy with planned timelines of actions and investment, whereas an employee within a steelworks might enact a trajectory of remaining in employment at the steelworks until retirement, the exact age of which they may not have decided upon. These two trajectories are clearly very different both in the content of what has been assembled within these orientations towards the future but also to the degree at which such an orientation is enacted as concrete and stratified within the assemblage, however both remain trajectories enacted by these respective actors.

2. *Trajectories are Becoming and Contingent*

Trajectories are held in tension between being deterritorialised and territorialised and as such they are constantly becoming sets of contingent relations. Thus, trajectories do not stand for a future in terms of a destiny or 'what is to come' and neither do they refer to 'the future' as a realm of open and becoming potentiality. Furthermore, they are not reducible to planning, certainties or predictions (although these can be assembled within a trajectory) but rather are assemblages of how a specific actor (whether an individual person, company, institution or otherwise) imagines, experiences, practices and enacts their orientation towards the future. Trajectories are therefore a process – they are the doing of futurity. Furthermore, a more concrete and defined trajectory is no guarantee that what has been assembled within the trajectory can be made actionable and this is often

known to the actors enacting a trajectory. A local council, for example, is well aware that the future mapped out within its planning documents is often highly contingent and by no means guaranteed.

3. *Thresholds and Transitions*

As homeomorphic assemblages trajectories are composed of both lines of flight and lines of articulation - both deterritorialisation and territorialisation. As such, change is inherent to trajectories yet does not define trajectories in their entirety. Following from Law I conceptualise trajectories as homeomorphic in that change must occur incrementally as the relations of the assemblage must be retained within a particular set of boundaries if it is to remain the same object. However these boundaries are also mobile and cannot be defined as absolute limits to the assemblage. There are therefore two further key concepts inherent to trajectories: ***thresholds*** and ***transitions***. The enactment and performance of a trajectory must occur within a particular threshold of change for the trajectory to remain the same object. These thresholds are not absolute however and are also subject to deterritorialisation and change. Nonetheless, should a trajectory cross or exceed these trajectories then it becomes ruptured and loses its homeomorphism, meaning that it undergoes a transition to a different trajectory (see Figure 1 for a diagrammatic representation of these concepts). This period of transition also varies depending upon the trajectory that has been ruptured and the new trajectory being assembled. The transition from one trajectory to another could be instantaneous or there could exist a longer period of transition whilst this new trajectory is being assembled, whereby this state of transition acts as a form of temporary transitional trajectory in its own right. Furthermore, the nature of these thresholds and transitions and how they are experienced cannot be defined a priori

of research. A transition from one particular trajectory can be a highly emotional and regrettable event for the actor to which the transition pertains, at other times a transition could be highly desired and actively sought by the actor.

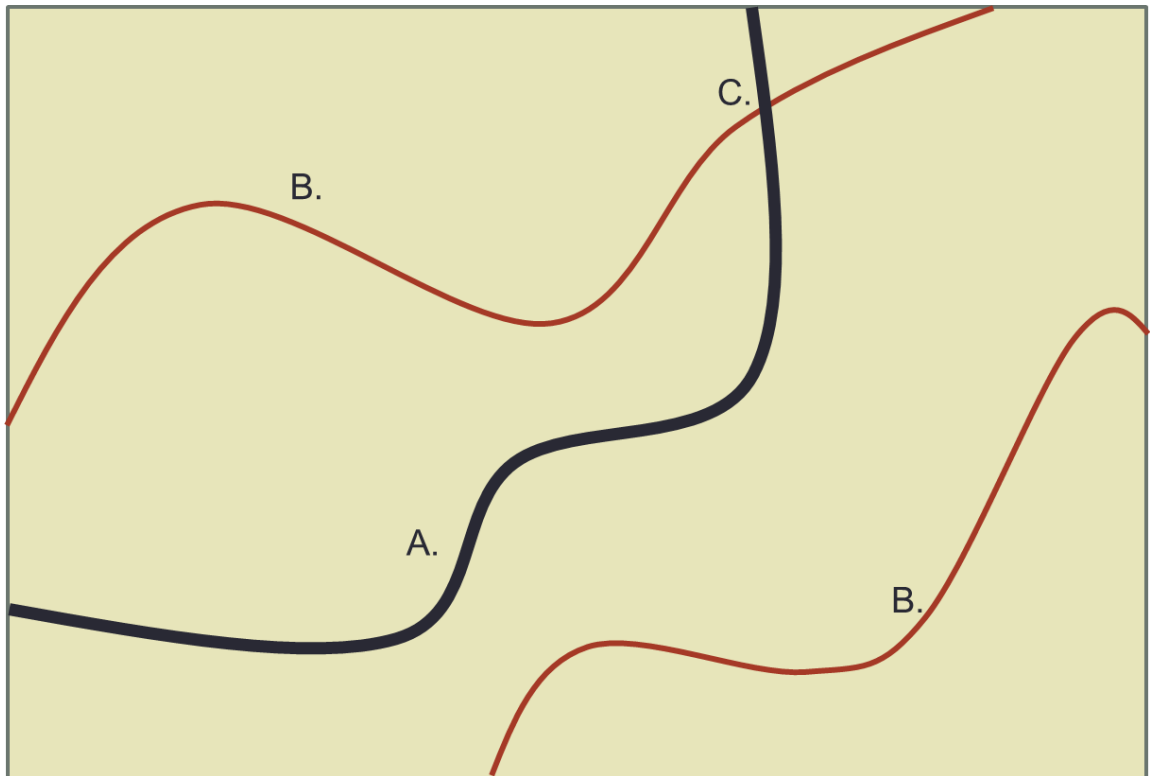


Figure 1: A representation of the concept of Trajectories whereby A. represents an enacted trajectory. B. represents the mobile thresholds within which the trajectory must remain if it is to retain its homeomorphism and remain the same object. At the point of C. we see that the trajectory has crossed one such threshold and therefore a transition takes place whereby the trajectory becomes a different object.

Trajectories are therefore a particular form of assemblage which also embody the principles of homeomorphism and fluidity described by John Law, which have been developed as a conceptual apparatus and vocabulary for researching and theorising the orientations towards the future inherent to industrial change. This deployment of

assemblage draws out how orientations towards the future are heterogeneous and multiple, becoming and contingent, homeomorphic and thus composed of both thresholds and transitions. Making these aspects of assemblage explicit through the aforementioned conceptual apparatus allows for an approach which can be applied across multiple different orientations towards the future, which can thus function as a tool for more than description of such orientations without the need to resort to grand or generalising causal narratives. In sum then, what such an approach affords is an attention to the specificity of orientations towards the future and how these can change through industrial change.

4.3 The Trajectories of Industrial Change

To conclude here then, the history of Teesside has therefore been one of industrial change which has taken place in large part through the enactment of particular orientations towards the future, whether at the scale of companies such as Corus deciding not to invest within Teesside's steelmaking infrastructure or of the individual steelworkers trying to retain their pension entitlements. Whilst industrial change has been a prominent topic of debate within human geography and the wider social sciences since the early 1980s, within much of this discussion futurity and the role of particular orientations towards the future have been left somewhat under-theorised and unattended. Thus, in the same way that Massey in 1984 called for geographers to turn to the specificities of how industrial change was being enacted within localities, this project seeks to address the specific orientations towards the future, which I call trajectories, through which industrial change is experienced and enacted. This is the aim of this project – to theorise and explore the orientations towards the future that are inherent to industrial change. To do this I draw from both the concept of assemblage, which is well positioned to theorise orientations towards the future given its explicit focus upon lines of flight and becoming yet also through its retention of a

clear attention towards articulation and territorialisation, and John Law's development of homeomorphism and the role of mobile boundaries in particular. In bringing these two conceptual approaches into relation, I have developed the conceptual apparatus of trajectories as a means of exploring how particular orientations towards the future are assembled, enacted and experienced. Trajectories are homeomorphic assemblages of diverse and heterogeneous components such as emotions, knowledges, memories, people, places, objects, planning, desires and expectations. Although constantly becoming through their performance and enactment, change within the trajectory must take place incrementally and within particular mobile thresholds in order that the trajectory can remain the same object and thus retain its homeomorphism. If these thresholds are crossed then the trajectory undergoes a transition to a different trajectory. Such a conceptual approach will therefore allow an account of industrial change to attend to the specific futures through which such change is enacted and experienced which can attend to how such futures are constantly being made and remade through their enactment, how they are assembled and enacted and to also be attentive to how such orientations towards the future must remain within particular thresholds of change or otherwise undergo a transition and become a different object. Through the application of this conceptual apparatus this project will explore how trajectories come to be assembled, enacted and experienced within three aspects of industrial change within Teesside during and surrounding the period within which the steelworks was mothballed: the trajectories of the steelworkers; the management of the steelworks; and the economic regeneration planning of the local council and the Local Enterprise Partnership Tees Valley Unlimited. Of course, from this the question emerges of how to apply such a conceptual approach in practice: in short, how to research a trajectory. This is the issue to which I turn in the next chapter.

5. Researching Trajectories

This chapter begins with the question of how an orientation towards the future can be researched. The concept of trajectories holds several implications for research practice following from the key aspects of the concept outlined within the previous chapter (see section 4.2). Namely here, a trajectories-led research project must attend to multiplicity, contingency, thresholds and transitions. These implications condition the practice of researching trajectories and a particular series of decision that must be taken with regards to the methodology of the research and the selection of empirical sites. This chapter attends to these research implications before moving on to outlining the shape that this research took in practice as a result of these implications of adopting a trajectories-led approach to researching the futures of industrial change.

5.1. Research implications

Each of the key aspects of trajectories as stipulated within the previous chapter has particular implications for the conduct of a research project. Firstly, any deployment of the concept of trajectories as a means of exploring futures must be attentive to multiplicity, both in the sense of the multiplicity of what is being assembled within a given trajectory and also to the multiplicity of different trajectories. The concept is a tool to explore the enactment of multiple different orientations towards the future across different sites and so research utilising this approach would require an attention to multiple different trajectories as opposed to attempting to focus solely upon one in particular. The implication of this is therefore that a focus upon multiple sites affected by the mothballing of TCP would be the most appropriate deployment of this concept. Whilst a focus upon a single site, say through an extensive ethnography of the steelworks management for example, would have allowed for some trajectories to be explored, the multiplicity and

interplay of trajectories beyond this site would have been lost. Hence a decision was made early in the planning of this project to focus upon the three sites of the steelworkers of Teesside, the steelworks management and local regeneration governance. Whilst many other relationships with trajectories of industrial change could also have been included (local union infrastructure, national government, subcontracting firms for example), these sites offer an insight into three vital sets of relationships with trajectories that are enacted through industrial change: their disruption, management and assembly. Industrial change always includes some form of disruption through the becoming and contingency of such change. Indeed one of the most prominent features of the mothballing was the disruption it enacted, particularly for the steelworkers of Teesside. As such, addressing the trajectories of the steelworkers affected by the mothballing would be vital in any research project exploring this period of industrial change. Also central to researching the futures of industrial change is the management of trajectories and how this enacts further relationships with future. The management of the steelworks and their efforts to hold a trajectory of steelmaking together would therefore be essential when researching how the disruptions of industrial change come to be managed through trajectories. However, industrial change also assembles novel trajectories. The efforts of RCBC and TVU to assemble a new trajectory of economic growth within Teesside out of the disruption and change of the mothballing period therefore also offered a significant insight into how new trajectories come to be assembled and how they are related to the industrial change from which they emerge. Thus, disruption, management and assembly are vital to an understanding of the multiplicity of the futures of industrial change; in regards to the mothballing of TCP, the trajectories of the steelworkers, the management of the steelworks and the attempts to create a new trajectory by RCBC and TVU were the key actors involved within these processes in Teesside.

The second key aspect of trajectories of becoming and contingency carries with it several implications for the application of this conceptual approach within research. Firstly, a researcher utilising this approach must be attentive to both change and continuity within the research. Change is indeed inherent to trajectories as homeomorphic assemblages, however, this concept has been developed specifically to focus upon how such assemblages come to be held together and retain their homeomorphism throughout such change. Therefore, whilst the researcher must attend to what is changing within the trajectory, continuity and the holding together of a trajectory is of equal importance within this conceptual approach. Furthermore, the contingent nature of trajectories also means that no assumptions can be made of any particular trajectory *a priori* of research. Different actors, whether individuals, companies or local government institutions all assemble their own trajectories composed of heterogeneous and multiple components and practices; however, no assumptions should be made regarding the form of these trajectories. Similarly, the trajectory assembled by one actor, for example a steelworker, should not be assumed to be necessarily representative or typical of other actors within a similar situation (although the concept maintains the possibility that this could be the case). Whilst themes or common experiences may indeed come to be identified through trajectories-led research, these should not be assumed prior to such research taking place.

The concepts of thresholds and transitions enact their own methodological issues within a trajectories-led approach to research. At its most simple, the primary issue for a researcher here is the question of at what point does change cross a threshold within a given trajectory? There are two points of note here. The first is that the researcher must acknowledge that the concept of trajectory has been designed as a heuristic tool as a means of attending to the complex roles of futures within social life. As such, the concepts

of thresholds and transitions are not meant to serve as identifiers of definitive points, but rather to act as tools to emphasise the ways in which specific orientations towards the future are constantly subject to change, yet continue to endure unless such change exceeds the capacity of the trajectory. Secondly, identifying the crossing of a threshold of change will be a qualitative judgement by the researcher based upon an analysis of a given trajectory both before and after a given period of change and asking whether the trajectory can still be enacted in its previous form. For example, should a steelworker articulate a trajectory of an assembled future of retiring at 55, yet following a radical change to their trajectory they are no longer able to foresee when they will now be able to retire then this could be considered the crossing of a threshold of change and a transition to a new, uncertain trajectory.

5.2. Researching Trajectories in Teesside

Following the implications of adopting a trajectories-led approach as described above, the research conducted for this project was divided into three stages, each focussed upon a particular empirical site but also mapping onto a different aspect of the enactment of trajectories. The first was to focus upon the steelworkers of Teesside and their lived experience of the mothballing of TCP as a means of exploring how trajectories are disrupted through industrial change and how this is lived through and experienced. The second attended to the steelworks management throughout the mothballing period and their efforts to hold a particular trajectory of steelmaking together through this period of industrial change. The final stage of research was focussed upon local and regional economic regeneration governance and the attempts of two government institutions (a local authority and a Local Enterprise Partnership) to assemble and enact a new trajectory of economic growth in the wake of the mothballing. The decision to focus upon this range

of empirical sites and relations with trajectories was taken as a means to explore the multiplicity and diversity of different trajectories and the various processes of experiencing disruption, holding together and assembly that are all enrolled within these varied trajectories. The decision to focus upon three sites was also taken to allow for these trajectories to be explored in sufficient depth so as to allow for the heterogeneity and diversity of the components and actors assembled within these trajectories to be appreciated within this research.

Semi-structured interviews were utilised as the primary means of gathering research material across all three sites (supplemented with documentary analysis of key planning documents within stage three). Interviews were conducted with 20 current or former steelworkers, 8 with participants within the management of the steelworks and 6 with participants within RCBC and TVU (3 in each) whose roles were closely linked to the assembly and delivery of a new trajectory of economic growth. The rationale behind enrolling this method across these sites was due to semi-structured interviews allowing for a balance to be achieved between avoiding assumptions prior to the research, whilst also attempting to maintain a focus upon change and continuity within trajectories. Herein lies something of a methodological issue within a trajectories approach to research: how can a researcher avoid making assumptions prior to the undertaking of research? Indeed, it might be considered that the formulation of any conceptual approach other than that which emerges from the research itself (as with grounded theory – see Glaser and Strauss 1968) is always predicated upon a series of assumptions. For example, the development of Actor-Network Theory was an attempt to challenge some of the assumptions inherent within ‘social’ research (Latour 2007; Latour 1993), yet as Law (1999) discusses, the very naming of Actor-Network Theory as a theory (and its associated abbreviation to ANT) elides

the translation and process inherent to the early development of the theory and which therefore engenders a series of assumptions about what ANT is. The notion that we can approach research entirely free of assumptions, prejudice and subjectivity is always a fantasy, as has been well addressed within feminist literatures relating to reflectivity and positionality and critiques of positivism (Rose 1997; D. J. Haraway 1991; 1988). Rather, instead of seeking to avoid the making of assumptions, a trajectories-led approach allows for an attention to contingency within research that is intended not to prioritise any particular assumptions or boundaries within a trajectory. Thus, whilst any research is always inherently based upon a series of assumptions, a trajectories approach does not hold any component or process as central or essential to a trajectory and is therefore open to contingent and unexpected relationships and processes emergent within research.

Unlike political-economic geography approaches to industrial change²⁷, interviewing as a methodology has sometimes been overshadowed within assemblage-led and non-representational research, in favour of methods deemed to be more practice based or 'representational' (Hitchings 2012). However, recent contributions within geographic debates have defended the use of interviews as a valuable methodological tool. For Bissell, the interview is itself a performative and generative encounter in its own right. Bissell writes:

"I wanted to use interviews as unpredictable, improvised encounters that potentially heighten an attunement to the volatile, unpredictable affective tensions that teeter on the threshold of perceptibility. In this respect the interview encounter is a self-reflective technique that solicits from the interviewee a

²⁷ Which has made use of interviewing extensively as can be seen within Beynon, Hudson and Sadler's (1994) study of Teesside.

heightened exposure to those subtle transformations that, when noticed, can create a cascade of backwards-tracing realisations.” (Bissell 2014, 193)

Here then, interviews are an unpredictable encounter which contain a bodily dimension of expression, which in relation with the substantive content of the discussion allows the researcher to become attuned to the ‘subtle transformations’ and affective tensions that can generate new understandings or ways of approaching a particular issue. Semi-structured interviewing allows for an attention to these subtle affective tensions and maintains the role of the interview as a generative encounter from which new themes, issues or ways of understanding particular phenomena can emerge. Indeed, interviews have continued to be used as a means of researching assemblages across a range of empirical examples, including street lighting (Shaw 2014), affect and fear of crime in the night-time economy (Schwanen and Brands 2013), assemblages of rock climbing (Barratt 2012), and assemblage-led approaches to surfing (Anderson 2012).

The interviews did not follow a set ‘script’ or list of questions but some prompts or potential areas of discussion were developed in advance of the interview (Longhurst 2005). This was to allow the interviews to remain open enough so that the precise topics of conversation would not be predetermined by the researcher, but to also follow a loose structure that could focus the discussion to attend to the key themes of change, continuity and to help enable the researcher to focus upon specific thresholds and potential transitions. Thus, I would be able to both develop some idea in advance as to the areas of discussion which would be of importance to this study, but would also remain able to leave ample room for the participants to elaborate and talk about what they considered to be pertinent on their own terms. Such an approach has been widely used within geographical research for precisely this rationale. Indeed for Longhurst:

"allowing the discussion to unfold in a conversational manner offers participants the chance to explore issues they feel are important. At the end of the interview or focus group, however, I would check my schedule to make sure that all the questions had been covered at some stage during the interview or focus group."
(Longhurst 2005, 121)

And also for Katy Bennett:

"Whilst you should have a checklist of the issues you would like to cover, you should be prepared to let the encounter run its course, as this will not only allow the interviewee to express herself in her own way but also raise matters you might not have anticipated." (Bennett 2002, 155)

This approach provided the most appropriate means of investigating trajectories within this empirical setting as it therefore allowed an openness to the heterogeneity of these assembled trajectories to be maintained within the interviews, yet also to retain a focus upon specific research objectives such as exploring the thresholds and transitions of such trajectories. The interview schedule was also something of a living document to which I made a number of changes throughout the research process and across each of the different stages. For example, within the first stage of research working with the steelworkers of Teesside, the initial interview schedule included a theme on the interplant rivalries and competition between different parts of the steelworks as a means of exploring what working life was like at the steelworks during the mothballing period. Yet after the first few interviews it quickly became apparent that this was not a significant theme that the participants introduced in their own terms and appeared peripheral to their experiences of disruption throughout the mothballing. As such, this theme was removed from the schedule (although if a participant introduced this theme in their own right then I would still seek to explore this in relation to the participant's own trajectory). Furthermore,

whilst this initial schedule included a theme about how the mothballing affected the future of the participant, it did not include a specific focus upon pension entitlements. Again, early on in the research pension entitlements emerged as central to the trajectories of these steelworkers and so the schedule was changed to incorporate a specific focus upon pensions.

There is also a point to be made here concerning how accounts of trajectories were assembled across the accounts of multiple different participants. Here the research is divided between stage 1 and stages 2 and 3. Taking stages 2 and 3 first, participants interviewed as part of these stages of research were interviewed as individuals enrolled within wider organisations: the steelworks management within stage 2 and either RCBC or TVU in stage 3. As such whilst they described their own individual trajectories in terms of their own work practice and their experiences of being involved within their respective organisations, they were also enrolled within the trajectories of these organisations. Thus within these stages, an account of the trajectory held together by the steelworks management, and the trajectories assembled by TVU and RCBC was generated through drawing from these multiple different individual trajectories and exploring how they existed in relation to one another and were enrolled within the trajectories of the steelworks and TVU and RCBC. However, whilst the participants within stages 2 and 3 were enrolled within the trajectories of their respective organisations, the steelworkers of stage 1 were not enrolled within the same relationship with an organisation or body. Many participants had left employment at the steelworks following the mothballing whereas some remained. Some had been able to access their pension entitlements whereas others hadn't. Thus these steelworkers neither all belonged to the same organisation nor all experienced the mothballing in the same way. As such, participants within this stage were

therefore interviewed as individuals, with each participant enacting their own particular trajectory. Thus, it is not possible to create an account of a singular 'steelworker trajectory' within which all of these participants are enrolled in the same way as participants in stages 2 and 3 were enrolled within the trajectories of their organisations. However, whilst not claiming that there exists a singular common trajectory for these steelworkers, there remain a number of commonalities and points of congruence across their experiences of the mothballing. Research within this stage therefore focussed upon exploring these themes of experiencing the mothballing across the varied trajectories of the steelworkers. Thus, whilst stages 2 and 3 focussed upon exploring and attending to the trajectories of the steelworks, RCBC and TVU through interviewing participants as being enrolled within the trajectories of these organisations, stage 1 attended to the common themes and experiences of disruption within the mothballing across the multiple different trajectories of the steelworkers of Teesside. Each stage of research is laid out in detail below.

5.2.1. Stage 1. Steelworkers: Trajectories lived and disrupted

Within the first stage of the research, 20 steelworkers were interviewed using the semi-structured interview method outlined within the previous section. All participants were white males, which is reflective of this workforce as a whole. In order to explore the disruption to the steelworkers' trajectories enacted through the mothballing, a key focus here was upon change and continuity across this period. Themes included within the interview schedule addressed attentions towards the implications of the mothballing upon things such as pension entitlements, retirement ages and planning for the future. These interviews were also conducted with a focus upon the lived experience of changes to the trajectories of these steelworkers, and as such key themes within the interview schedule included how the participant felt emotionally throughout the mothballing process, whether

they had felt stressed or under pressure within their job, if they had felt their job was threatened and what they felt the implications of the mothballing were for them personally including in terms of their pension entitlements. Although the interviews were largely kept open to allow the participant the opportunity to identify topics and issues that they felt were most relevant within their own experience of the mothballing, a key focus was how they felt that this process had impacted upon their futures. Participants were therefore asked to discuss further any instances which emerged during the interviews where the mothballing was discussed in relation to their own plans and futures. Through this attention towards how the mothballing had disrupted and changed the futures that the participants had previously assembled, I was able to explore the thresholds and possible transitions within these participants' trajectories. If a participant discussed how the mothballing had now meant that they would have to work longer than expected and for a more uncertain pension entitlement, this is consistent with the crossing of a threshold and a transition to a new trajectory enacted through the mothballing. Furthermore, if a participant discussed how their pension entitlement had been threatened through the mothballing, but they had ultimately been able to take early retirement and access it, then a threshold of change had been approached but not crossed as this trajectory had retained its homeomorphism. Moreover, the semi-structured nature of the interviews allowed for the contingent and heterogeneous nature of the trajectories and the steelworkers' own experiences to be at the forefront of this research as it both afforded the room within the interview to explore unexpected or emergent topics, themes or experiences and also for the participants to put their experiences into their own words as far as possible and highlight the multiple different objects and actors assembled.

All participants were informed that their interview data would be securely stored and anonymised. How the data would be used and the goals of the project would be explained to the participants within the 'preinterview phase' (Corbin and Morse 2003). Here the purpose of the project would be talked through and the participants would have an opportunity to ask any questions or to seek clarification on any aspect of the research. Once any questions had been answered, participants were asked to sign a consent form (or in the case of the one phone interview that was conducted, the consent form was read aloud and the participant then asked to orally confirm their consent). Participants were also informed of their right to withdraw from the study at any point and I made sure that all participants had my contact details should they want to get in contact for any reason following the interview. Indeed the eleventh steelworker to be interviewed contacted me via email the day after being interviewed to say that they wished to withdraw consent. It would be unethical to discuss further details of this withdrawal save that the mothballing of the steelworks clearly remained a deeply emotional and traumatic experience for this participant. Following his request I erased the transcript and recorded data from the interview and informed the participant in question when I had done so.

Given the focus within this first stage of research upon the lived experiences of what was for many steelworkers a traumatic event, this stage of research carried with it the possibility of discussing sensitive topics. Qualitative methods such as semi-structured interviews often contain the potential to discuss sensitive topics over the course of the research as the participants are asked or may begin of their own accord to discuss personal and often intimate details of their lives (Corbin and Morse 2003). Yet as Raymond Lee has identified, the definition of research as 'sensitive' is often left to a common sense understanding rather than explicitly defined. For Lee, 'sensitive' research is thus:

“research which potentially poses a substantial threat to those who are or have been involved in it.” (Lee 1993, 4)

And further:

“Another way to put this is to say that sensitive topics present problems because research into them involves potential costs to those involved in the research, including, on occasion, the researcher.” (ibid. 4)

Whilst all of the interviews undertaken within this project included some form of cost²⁸ to participants (and also potentially the researcher) even at the simplest level of the time spent within the interview, some topics were clearly still sensitive for some of the participants and carried some form of emotional cost. Without wishing to exclude the possibility that participants in stages 2 and 3 also found the topics discussed to be sensitive, such a cost of stress or becoming upset was most apparent for some of the steelworkers interviewed in phase one of the empirical research. Indeed the mothballing of the steelworks and their experience of this period, especially for those steelworkers who had lost their pension entitlements, was highly stressful for many and a number of participants appeared to still experience the mothballing as a sensitive topic even after the plant had reopened. Some steelworkers became visibly upset when talking about the closure of the plant, the loss of their pension entitlements, or what their futures might be in terms of employment. Most of the time this manifested through the steelworkers talking more quietly, looking away or sometimes beginning to tear up. Within these instances, I had to

²⁸ Although Lee (1993) defines sensitive research predominantly through potential costs, it is also reasonable that researchers should be attentive to the potential benefits that may be gained by both participants and researchers within sensitive research. This could partly refer to enjoying or finding talking about particular topics as beneficial. Indeed as for Corbin and Morse: “our experience, which includes many years of conducting interviews on sensitive topics, has been that participants react positively – and in fact, many are grateful – for the interview experience” (Corbin and Morse 2003, 336). However this also brings with it particular ethical concerns regarding the training and role of the researcher.

be attentive to the dynamics of the conversation and particularly aware of potential implications that displaying emotion might have for the masculine-rooted identity many steelworkers possessed. In the majority of these situations the participants appeared to be willing to continue with the interviews, often making light of their own emotions through humour. However, on one occasion a participant broke down crying during the interview. In this situation I stopped the interview recording, telling the participant that I was doing so. Once the participant had regained composure I asked if they were okay and whether they would like to stop the interview there. The participant stated that they wished to carry on and so I continued with the interview, however making sure to try to avoid the topics that we had been previously talking about so as to attempt to avoid upsetting the participant further. This continuation of the interview could be considered what Corbin and Morse define as the 'phase of emergence' within an interview (Corbin and Morse 2003, see page 343) whereby the interview concludes through moving to a less emotionally intense stage of discussion. This allowed me to round off the interview and also made sure that I was not leaving the participant in a distressed state as continuing with the interview allowed them to regain composure. Thus, some aspects of the interview process were sensitive for some participants in that there were particular emotional costs involved with discussing topics surrounding the mothballing period. Yet problematic interactions within interviews should not necessarily be positioned as failures either of the researcher to ask the 'correct' questions or of the interviewee to provide the 'correct' responses (Roulston 2014). Rather the interviewer must use their own personal judgement as to whether to stop or continue the interview (Bahn and Weatherill 2013). In the one case where the interview had to be temporarily stopped when the participant broke down, I made sure that the participant was aware that the interview could be stopped and they could withdraw at any point but allowed the participant to determine whether they wished to continue with the interview.

5.2.2. Stage 2. Management: Trajectories held together

The second stage of the empirical research was also based around semi-structured interviewing for its primary source of gathering research materials. The research here is based upon interviews with eight participants who had all been involved with the management of the steelworks in Teesside throughout the mothballing period. The roles of the participants varied within this group of participants, but included senior trade union officials and central site managers responsible for the management of the Teesside steelworks. A key focus within this stage of research was upon how a particular trajectory, in this case of continuing steelmaking within Teesside, can be held together in the face of radical change. Therefore, interviews within this stage focussed upon the actions of the steelworks management to attempt to maintain the steelworks and the workforce in a state in which the site could be bought by a third party and steelmaking restarted. Within this stage, the key interview themes were therefore designed to explore the potential thresholds of change within this trajectory and the practices the management were taking to avoid crossing them and therefore enacting a transition. Interviews here then allowed the participants to discuss how the actions of the steelworks management were keeping the steelworks in a condition in which it could be bought, which therefore allowed the thresholds of the steelwork's trajectory to be identified and how change and contingency approached these thresholds within the mothballing period. Participants within this stage of research were initially asked to describe their roles within the management of the mothballing. Following this, they were asked to expand upon any topics relating to possible conflict, stress and the management of the workforce that emerged from this initial discussion. Additionally, participants were also asked specifically about the creation of a resource centre within Steel House, the process of cross-matching and the skills retention

scheme implemented during the mothballing period and their roles within these practices. The interview schedule was adjusted to aid this focus upon identifying specific thresholds of change and the potential transitions of the steelworks through including a more focussed attention towards the resource centre, cross-matching and the skills retention scheme and how these were implemented. The interviews also enabled a further focus upon the emergent relationships within practices of management and how different heterogeneous components (e.g. the trade unions, HR departments, senior management) were assembled together within the steelworks management throughout this period. As such, participants would be asked to elaborate upon these relationships as they emerged within the interview.

As within stage 1, participants within this stage were again informed of the purposes of this research and, prior to the interview, asked to sign a consent form and informed about how the primary research material generated was to be used. However, whereas the size of the workforce of steelworkers was such so as to make anonymity relatively easy to achieve, within the population of the steelworks management it was conceivable that even when using pseudonyms it may be possible that some participants could be identified from their knowledge and position. In light of this, participants here were offered the opportunity to review their interview transcripts prior to the use of their interview data. Further, access to this group of participants was initially gained through a specific contact, or 'gatekeeper' (Gronning 1997), at the steelworks on the agreement that this individual would have the opportunity to see the final version of the chapter within which this data was to be discussed prior to its submission. Thus access to this empirical site of the steelworks management was conditional (Lee 1993; Gronning 1997). As Lee explains:

“Access, in other words, has to be ‘bought’ at the cost of restrictive conditions being imposed on the researcher’s activities. Broadly speaking, in these situations three major kinds of condition are imposed by gatekeepers on researchers. These are: (a) restrictions on the methodology used by the researcher; (b) the completion of a piece of research *for* the gatekeeper in return for access; and (c) the right of the gatekeeper to examine, modify or censor published material arising from the study.” (Lee 1993, 125)

Thus, in this case in Lee’s terms access to the management of the steelworks was ‘bought’ through conceding a right to the gatekeeper to review the material prior to submission. I agreed to this as without this access I would not have been able to conduct any meaningful research into the management of the steelworks and whilst discussing the company, the focus was not to be upon judging the actions of the management or to be critical of management policy. However, I do not want to appear ungrateful or present the requests of the gatekeeper to be unreasonable given the circumstances of the research. Indeed, as Lee (1993) talks about potential costs to the participant, the gatekeeper allowing a researcher into this empirical site could lead to the disclosure of potentially sensitive information regarding the company. Allowing a researcher access therefore carries with it a particular amount of risk which the gatekeeper is attempting to mitigate through making such access conditional (Gronning 1997), which is entirely understandable given the position of the gatekeeper as part of this organisation. Yet this raises ethical considerations relating to whether other participants should be given equal access to the thesis prior to its submission. Indeed, the ethical question arises here as to why a member of the company management gets the opportunity to review this material and not, say, the trade unions. Of course, releasing the thesis to all participants and their respective organisations for review would be logistically impractical. Allowing the management gatekeeper access to this material prior to submission is the ethical trade off and the price to be ‘paid’ to ensure

access to an otherwise inaccessible population essential to the empirical practice of this research project.

5.2.3. Stage 3. Regeneration governance: New trajectories assembled

The third stage of the empirical research centred upon the planning for economic regeneration of two local government institutions: Redcar and Cleveland Borough Council (a local authority) and Tees Valley Unlimited (a Local Enterprise Partnership). A total of six semi-structured interviews were conducted with participants within this stage of research (3 from RCBC and 3 from TVU). The roles of these participants again varied and included senior council members (elected) and managers (appointed) within RCBC and management positions within TVU. All participants had strong links to the delivery of either RCBC's or TVU's plans for economic growth. This research was supplemented with documentary analysis of the key planning documents for each respective organisation²⁹. Within both aspects of this research the focus during this stage was upon how new trajectories are assembled and their enactment attempted. As such, discussion here was focussed upon how the planning for economic regeneration assembled a future of growth for Teesside. This stage of research took the planning documents of these organisations as a starting point, whereby I embarked upon a process of documentary analysis that sought to highlight the thresholds and potential transitions that both organisations were attempting to enact through this planning discourse. This took place through a close reading of both the *Regeneration Masterplan* and the *Statement of Ambition* using an analytic framework based upon the core principles of the concept of trajectories. This framework was centred upon three overall themes:

²⁹ RCBC's *Regeneration Masterplan* and TVU's *Statement of Ambition*.

1. *What is being assembled*

This theme sought to address the heterogeneity and multiplicity of the trajectories being created through these documents by attending to the objects that they attempt to assemble. Initially this included identifying all of the concrete objects identified within both documents, but also extended to their assembly of abstract concepts such as a particular approach to futurity and the concept of economic growth which were also enrolled within these trajectories.

2. *How this assembly is positioned as taking place*

The second key theme addressed within the documentary analysis was the processes through which RCBC and TVU positioned the assembly of a new trajectory of economic growth taking place. Through focussing upon how the practice of this trajectory is assembled within these documents, this therefore maintains an attention towards both the attempts of RCBC and TVU to enact the crossing of a threshold and transition to a new trajectory of economic growth and the processes of change and becoming associated with this. Examples of this included identifying concrete planning for change, such as costed spending and investment plans, but also involved more vague strategies of how this transition was to be achieved, such as the goal of attracting future (and thus entirely contingent) private sector investment to achieve key aims.

3. *The actors and roles involved within this assembly*

The final key theme within the documentary analysis centred upon identifying actors that both RCBC and TVU position as being enrolled within the delivery and achievement of its new trajectory of economic growth and the roles that they map out for them. Within the documents both TVU and RCBC identify key actors they represent as playing important assembling roles within their new trajectory including private sector companies, government departments and local

institutions. It must be stated here that this distinction between the objects assembled within this new trajectory of economic growth and the actors identified as playing an assembling role is made by TVU and RCBC rather than the concept of trajectories. This theme attends to identifying these actors and the roles that they have been positioned as playing, which included the roles that TVU and RCBC mapped out for their selves throughout this process.

Thus, the documentary analysis afforded for several insights to be made into the assembly of a new trajectory of economic growth by TVU and RCBC through its focus upon what was being assembled, how this assembly was positioned as taking place and the key actors identified as performing this assembly. This served as the starting point for the analysis within this stage of research. Interviews with senior members of both RCBC and TVU were then used as a means to explore these thresholds, transitions and futures presented within these plans further. Again, within this stage of research the interview schedule was revised to provide a focus upon the assembling of a new trajectory of economic growth. The schedule for these interviews differed slightly from the first two stages in that it took a number of cues from the planning documents and therefore contained a number of more concrete interview questions, as opposed to the open ended topics included as part of the schedules within the earlier stages. Yet, whilst the interviews also asked participants to expand upon the documentary analysis themes of what was being assembled, how this was to take place and what actors would play a role in this assembly, they also asked participants to expand further upon specific aspects of the documents and specific sets of figures included within them. A key point within the interviews was to ask participants to further elaborate upon the roles that RCBC and TVU positioned for their organisations within this new trajectory. Thus, the mixed methods approach of documentary analysis with interviews within this stage of research allowed for an attention to the heterogeneity, change and thresholds and transitions of these new trajectories. The focus upon what is

being assembled within the documentary analysis of this stage allowed for an attention to the multiple and heterogeneous actors and objects being assembled within the new trajectories that RCBC and TVU sought to enact. The change and becoming inherent to these trajectories was explored through both the documentary analysis and interviews through attending to how these trajectories were being assembled, who was enrolled within their assembly and how change was planned and predicted. The planning documents of both RCBC and TVU also lay out a series of thresholds that must be crossed and transitions that must be enacted to enable the assembly of this new trajectory of economic growth (such as becoming less reliant upon large industrial employers), which were explored both through the documentary analysis and interviews through asking how this change was to be achieved.

As within stages 1 and 2, all participants were informed of the outline of this project and how the interview data would be used within the prior to the interview and asked to sign a consent form. As within stage 2, anonymity for these participants could not be fully guaranteed due to the sometimes high profile positions from which the participants were speaking. Again here, all participants were offered the opportunity to review the interview transcripts before their interview data was used within the project.³⁰

³⁰ A note on transcription: All interviews were recorded on a digital voice recorder and then transcribed via the transcription software 'F4'. As a means of preserving as much of the tone, timing and emphases of the conversations as possible, I adopted a particular style of transcription. Here a pause lasting less than approximately half a second is indicated by a comma (','), a pause of roughly half a second is indicated by a full stop ('.'), and pauses longer than half a second being denoted by cumulative full stops roughly equal to a half a second per full stop ('...' being equal to a roughly 1.5 second pause). This has been maintained within the interview quotations included as part of this thesis. Furthermore, all participant names have been replaced with pseudonyms based on local place names. However, it must be noted that these locations in no way relate to the residences of the participants for which they are used. Any names mentioned by participants who are not public figures (e.g. national politicians) have been removed and are denoted by letters (e.g. [A], [B] etc.).

5.3. Trajectories in practice

Researching with trajectories holds a number of methodological implications. These condition the particular decisions a researcher must make with regards to methodology and site selection, in that the concept is most appropriately deployed as a means of exploring multiple trajectories and through a methodology that allows the researcher to minimise the assumptions made prior to research taking place. Following the three key aspects of trajectories as outlined within chapter 4, this project identified three empirical sites as a means of exploring the multiplicity of the trajectories of industrial change enacted through the mothballing of TCP. A methodological approach of semi-structured interviews, supplemented with documentary analysis within the third empirical stage, was adopted as a means of firstly, attending to the contingency and becoming of trajectories research; secondly, remaining open to emergent themes and topics within the gathering of research materials; and finally, also maintaining a focus upon the potential thresholds and transitions inherent to the futures discussed within the interviews themselves.

However, these three key aspects of trajectories also engender several limitations and challenges for research. A focus upon multiplicity and heterogeneity allows for the complex sets of relations between very different actors to be explored within trajectories, however, it also brings with it the limitations of not being able to account for the entirety of the multiple different relations and components assembled throughout a trajectory. As such, the totality of the relations enacted through a trajectory can never be fully accounted for and any account is always inevitably partial. Furthermore, the focus upon becoming and contingency and also thresholds and transitions imparted through the second two key aspects of trajectories also prioritises and emphasises events of intense change within

trajectories. Thus, whilst exploring a process of industrial change (such as the mothballing of TCP) through a focus upon becoming and contingency is a useful means of researching the impacts that such change has upon trajectories, there remains the potential that the everyday mundanity of living, working, managing and enacting trajectories can be overshadowed. However, whilst acknowledging these potential limitations, the concept of trajectories is a tool that allows for the futurity of industrial change to be approached in a particular way. A trajectories-led research project is able to attend to the multiplicity and complexity of futures and also their inherent contingency and change within specific sets of mobile boundaries, and thus is well placed to provide a new perspective on the futurity of industrial change.

6. “When it was all silent and all finished”: Disrupted Trajectories

“For all intents and purposes you thought ‘well that’ll be the last steel ever made on Teesside’, you know if somebody told me that in two years’ time you’d be starting it back up again I wouldn’t have believed them in a million years” (Participant 6 ‘Nunthorpe’)

This chapter concerns how new future possibilities come to be rendered present within the trajectories of individual people, in this case the steelworkers of Teesside, and how these trajectories can be disrupted through this presence. As established in Chapter 4, a trajectory is an assemblage of varying forms of planning, relations, emotions and embodied experience in a process of flux and becoming and situated within a threshold of change within which it remains the same object. At its most basic then, it is a relation to, and experience of, the enactment of futures. This chapter seeks to explore these relationships to the future enacted through the trajectories of the steelworkers within the mothballing period of steelmaking within Teesside. To do this, the chapter draws from interviews with current and former steelworkers affected by the mothballing and seeks to make three insights into the relationship between the trajectories of these steelworkers and the mothballing. The first, in section 6.1, explores how multiple different potential futures come to be assembled within a trajectory as manifestly absent possibilities, and how a particular future of steelworks closure came to be rendered present within the trajectories of the steelworkers. Here diverse means of relating to this future of steelworks closure such as rumours, news reports, conversations, phone calls and also soundscapes come to serve as key modalities through which this future of closure is assembled as present. The second part of this chapter attends to how following the rendering present of a future of closure the trajectories of the steelworkers come to be disrupted, but also how these trajectories come to change and continue through this process of industrial change. It does

this through two insights. Section 6.2 attends to the issue of pension entitlements, which were central to the trajectories of a financially secure retirement that many steelworkers had sought to enact. For many of the steelworkers, these pensions became rendered problematic yet remained present within their trajectories. Through an engagement with the work of Lauren Berlant, this section goes on to explore how these pension entitlements continue to be assembled within many of the steelworkers' trajectories through a relationship of 'cruel optimism' that both sustains the steelworker through the promise of the object of a pension, but also 'wears out' the subject through a process of attrition. The final insight of this chapter is provided by section 6.3 which explores the role of loss within the experience of industrial change through the trajectories of the steelworkers. Differing from cruel optimism in that the lost object is rendered absent from the trajectory (rather than present through the promise of a particular object in the future), what is lost is also rendered manifest within the trajectories of the steelworkers through its absence. Here, the loss of future plans, workplace identities and practices of masculinity are all (at least partially) lost through the industrial change of the mothballing, yet continue to be related to through their loss by the steelworkers. The overall goal of this chapter is therefore to explore how futures of industrial change come to be rendered present within trajectories, how these futures disrupt trajectories and how different relationships within these trajectories are enacted and experienced through this process of change.

6.1. Making a Future of Closure Present

The assembly of a trajectory is also the practice of assembling multiple possible futures. In his 2010 paper, Ben Anderson positions anticipatory action as a practice of rendering present possible futures that may never happen (through imagining and planning for example), however these futures "do not cease to be, in some way, absent in that they

have not and may never happen” (B. Anderson 2010, 783). Through practices of imagining and planning these imagined futures are made present as potentials amongst many possibilities, whilst remaining at the same time absent. Here then, multiple possible futures are made present within a specific orientation towards the future of anticipatory action. Similarly for John Law, in his discussion of how methods are assembled, presence and absence are composed of:

“(a) whatever is in-here or *present*; (b) whatever is absent but is also *manifest in its absence*; and (c) whatever is absent but is *Other* because, while it is necessary to presence, it is not or cannot be made manifest.” (Law 2004, 84)

Thus for Law there is a distinction between what is absent yet made present through its absence, and that which is absent yet disappears and is thus categorised as ‘other.’ In this sense for a particular trajectory a future currently being enacted is assembled as present within a trajectory, however whilst other multiple future possibilities and potentialities of what may occur remain absent, they are simultaneously rendered present through their potentiality in absence. In Law’s terms then, relating to potential possible futures renders them as a ‘manifest absence’ within the imaginary of a particular trajectory. Thus, within trajectories, different futures are enacted as present to varying degrees. There are present futures which appear as currently being enacted, there are manifest yet absent futures that have not and may not come to occur yet are related to as possible futures, and there also exist absent or other futures that are not assembled within a specific trajectory.

However, trajectories are constantly becoming and subject to change through their enactment and these multiple futures can come to be related to in different ways and through different modalities that alters their presence within the trajectory. For example,

within Teesside the announcement by the steelworks management that the works were to be mothballed enacted a transition from this future being enacted as a manifest absence of a possible future, to a present future of enactment within the steelworkers' own trajectories. In other words, once the announcement had been made to close the steelworks, a future of closure ceased to be made present only as a possibility (and thus absent) and was instead enacted as a present reality. Whilst this does not represent a shift from an open to a teleological future, for the individual steelworker the decision to mothball the steelworks sets the conditions, or diagrams the planning and trajectories that can be enacted by the individual steelworkers who now face a future without the steelworks. Following the announcement to mothball the works, the future could therefore remain positioned as an open realm of possibility and potential, but for the steelworkers and their own personal trajectories, the future began to look rather definite in the presence of this future of closure.

At the beginning of the mothballing period, prior to when a formal announcement had been made, there were multiple different sources of information sometimes providing different messages through which the steelworkers related to the future. Rumours, newspapers, news reports and information from managers and contacts within the business provided a range of information and opinions about the future of the steelworks, and the steelworkers related to these forms of information in different ways. In this sense then, the variety of statements and sources of (dis/mis)information about the mothballing are modalities through which the futures pertaining to the steelworkers were made relatable. Furthermore, there is a difference between making a future relatable in that it can be viewed as one speculative possibility among many (e.g. speculation on the closure or not of the steelworks prior to mothballing being announced), and also through enacting

a future as present, in that it is a future that is now being enacted or is viewed by an individual as a near certainty rather than a possibility (e.g. the steelworks closing following the announcement of mothballing). Again, it bears reiterating here that this relationship with the future (which I call a trajectory) is not *the* future in terms of a temporal realm, but rather an individual experience of and orientation towards a particular personal future, in this case on the part of the steelworkers.

Amongst the differing modalities of relating to the multiple futures of the steelworks, a theme recurring within the interviews was the prevalence of rumours around the site and in the community more widely during the mothballing period. Indeed, for *Acklam*:

“well, if you’ve never worked in the steel industry, the whole place was run on rumours, everything from not getting bonuses, we're making a fortune, and its closing down every year.. I would say every year from the strike in 81.. 80 to 81, we had a rumour that we were going to close [...] I’ve explained to some of the new lads now we’ve gone back who get a bit worried about rumours turning up ‘well we’re not making steel and they’re thinking of closing the place’ and I said *the whole place runs on rumours, don’t believe any of them.. people play a game they start a rumour on the blast furnace, and see how long it takes to get back to them in the club*, through people that work on different parts of the plant, so it’ll work its way around, and it’s just a game everybody plays, everybody’s got an opinion”

(Participant 20 ‘*Acklam*’ My emphasis)

Here then for the participant we can indeed see that rumours formed an inherent part of the practice of working on the plant. It is apparent from the above quotation that these rumours functioned through a circularity – quite literally in the example given above of the

game being played by some steelworkers of starting rumours and waiting for them to be repeated back to them at a later date. What we also see in this quotation is a particular logic of not believing rumours through a practice of reassuring more inexperienced colleagues. *Acklam* explains how the younger, more inexperienced workers employed since the restarting of steelmaking place greater stock in rumours, which engenders a particular emotional experience of concern and worry. However, *Acklam* enacts a logic of not believing these statements relating to a particular future of closure based upon his past experience, and therefore at this point a future of closure cannot be assembled as a present future within *Acklam's* trajectory but remains a manifest absence of one possible future amongst many.

A further example of a differing modality of relating to a future of closure, and perhaps how a rumour might form through a particular practice, was offered by *Ormesby*, who was employed as a driver of heavy goods and articulated lorries across the steelworks prior to the mothballing. Indeed, I asked him whether driving the wagons across the site was a comparatively solitary job:

“ah no, because you had to, you weren't allowed to sit in the wagon when you were getting loaded and unloaded, you had to get out and stand in a particular area, [...] it's the nature of the job that you talk to people you get out you talk to the riggers who are loading you or you talk to the crane drivers who are loading you, or just talk to the people on the plant that you know, all of the drivers that you know, so it isn't solitary there was a lot of social interaction” (Participant 16, '*Ormesby*')

Thus *Ormesby's* job placed him in an unusual situation in comparison to most steelworkers in that within the day to day practice of his job he travelled between multiple plants and was able to communicate with a large number of people across the site:

“so yeh I seen various people, you’ve got the optimists, it’s going to be saved there’re going to put coal injection which they’re obviously trying to do now and er we’ll be into profit.. and others that the doom-casters, that it’s just going to shut and erm.. and you just soak all this in, and erm.. it’s getting, you sometimes you hear something at one ends of the site and before you got to the other end it has reached there” (ibid.)

However *Ormesby* also described how he circulated information, particularly through listening to the radio in the vehicles that he drove:

“that's what we talked about you know people said I’ve seen this on the internet, this is happening and you’re.. listen to the radio, Radio Tees was great for giving us information, with being in a wagon I could have the radio on and I’d hear something on the radio and I’d filter it round the site, oh he’s just said that other radio” (ibid.)

Here we can see how different styles of relating to the future (rumours, the internet and radio) circulate through practices of talk across the site. *Ormesby* not only heard various pieces of information and rumours from the people he spoke to across the site, but was also a source of disseminating information either that he had heard elsewhere or over the radio. In regards to the latter, *Ormesby* heard information pertaining to the future of the steelworks over the radio in his lorry cab, and then relayed this information to those that he meets travelling between the plants of the steelworks. This circulation of information

could be considered a practice through which some of the rumours described by *Acklam* may take form within the workforce of the steelworks.

However, as for *Acklam*, many participants refused to believe or treated with scepticism the rumours they heard around the plant, explaining that rumours had always circulated amongst the workforce and again enacting the logic that rumours were not to be trusted as styles of relating to the future. Therefore, rumours made particular futures relatable as one of a number of speculative possibilities and which may have enacted experiences of concern or worry (such as the younger steelworkers in *Acklam's* account). Yet, for those employing the logic that rumours were not reliable styles of relating to the future, this particular future remained manifestly absent within their individual trajectories. Indeed for *Eston*, when asked whether there had been periods of stress in the steelworks in times prior to the mothballing period the following exchange took place:

“Eston: Not, not like this, cause we’d had it before, we’d heard the rumours, and we’d always thought oh we’ve heard it all before, and then you’d get a little bit titchy but then it’d be ok, but this, we knew was serious [*emphasising ‘serious’ with a bump of his hand on the table*], [...]

Interviewer: And what about it was different about this one, that meant that this one was serious..

E: Well once they’d said.. well I remember the morning actually, some of them had come from a meeting and said ‘we’re going to close’. ‘yeh righto’ [*sarcasm*].. so I said I’d text me son you know, cos he’s at Steel House he might know, and I got a text back in ten minutes and he rang us back said ‘Dad this is really serious’ [*a lowered voice*]

I: Yeh

E: 'It looks like we're going to go, like''

(Participant 4 'Eston')

Here then we can see that although the participant had heard the rumours that the steelworks had been in difficulty ("we'd heard the rumours") that this future of a closed plant was held with some scepticism based upon a logic that rumours could not be trusted ("we've heard it all before"). Hence this future was manifest in that it could be imagined and articulated, yet absent from the participant's orientation towards the future at this point. However, when colleagues returned from a meeting, presumably with or about information provided by the management, this provided a different style of relation to this future of closure through the statements that said the plant was going to close. Yet, again the participant remained somewhat sceptical ("yeh righto") in relation to both styles of rumours and statements from colleagues until holding a phone call with his son, who being situated in Steel House would be closer to the company management. It is only at this point that for the participant that the future that the steelworks would close becomes assembled as present within his trajectory ("It looks like we're going to go, like").

The moment at which this future of plant closure transitioned from being one manifest absent possibility amongst many, related to through modalities such as rumours and news reports, to being a present future being enacted in practice is a key transition for the steelworkers' trajectories. Indeed, this transition from an absent possible future to a future made present occurred through different styles itself. For *Linthorpe* this occurred through phone calls with an in-law and a manager:

“again I seemed to be away at the wrong time, I was on holiday that day and actually my manager at the time actually rang me which I was grateful for, I think my father in law actually rang me to tell me it was on the news, so I personally found out er, that way..” (Participant 14 *‘Linthorpe’*)

Even for those that had been involved with the company management, this future had been relatable yet absent up until the day of the announcement that the works would be mothballed. For *Kirkleatham*:

“December 2009 erm, the announcement was made on the Friday morning about half past 7.. erm, up until 7 o’clock the night before I was in Corus’s headquarters or Tata Steel’s headquarters in London, preparing the next three years’ worth of raw materials buy.. and right up to twelve hours before I was planning for three years ahead... and then er, got to work at half past seven got a phone call from the boss, everyone in the conference room for half past 8 I’ve got something to tell you, I’ve got something to tell you, and I could tell by his voice it wasn’t good news, and I said is it bad news and he said yes it’s the worst and at half past 8 we were all told we were closing.. but up until twelve hours before I was I was haggling with all the other people in Corus about who was going to get what share of raw materials for the next three years” (Participant 19 *Kirkleatham*)

Hence, *Kirkleatham’s* orientation to the future prior to the mothballing being announced consisted of a further three years, measured through supply deals and raw material stocks. However after a phone call from the steelworks management followed by a conference meeting, a different future consisting of plant closure was made present as a part of *Kirkleatham’s* trajectory. For those involved with the management at a plant level, this transition from a possible but absent to a present future was through such a group announcement in a conference room. For *Loftus*:

“ah I'll never forget December the 4th, we went there and we were all, well we packed it [A] who was the director, my director my immediate director at the time, er, phoned me up and says can I get to Steel House in ten minutes he wanted me in the theatre because something was going to be announced.. we went to the theatre and sat with [A] and I said what's this about, he said I don't know.. it's something very big.. and bearing in mind the Consortium deal had fallen through some months before what's happened here, has it come back into the game, have we got another buyer are we going to carry on and at that the back door opened of the theatre and Kirby Adams came in with Phil Dryden, Kirby Adams was the main man at Corus at the time, or Tata I suppose it would be, Phil Dryden was the long products director, and John Bolton come following him in who was the Teesside director but looking absolutely shell shocked [...] and.. Kirby Adams on the stage as cold as you like, ah, December the 4th, er, told us the announcement that Teesside was to shut except for Redcar coke making erm, the power station obviously to keep the coke making going and the ore terminal and that was it, everything else was going” (Participant 8 '*Loftus*')

Again here we see that a series of potential futures are made relatable, and therefore manifest, through speaking with co-workers. In the above example *Loftus* describes how he had been informed by his superior that something big would be announced to which the participant speculates could be the return of the consortium or another potential buyer of the steelworks being announced, both of which are manifestly absent possible futures. However, once in the meeting a series of statements are made by the senior site and company management to the effect that the steelworks would be mothballed. Immediately for *Loftus* this renders the other potential futures he may have envisaged absent, replaced by the presence of a future of site closure. What the above quotations highlight is a transition that renders a future that was previously one of a number of manifestly absent

possible futures, relatable as present. Thus this transition from plant speculation and rumour to phone calls from family members (such as for *Linthorpe* and *Eston*) or a direct statement from central management (as for *Kirkleatham* and *Loftus*) rendered particular trajectories (such as continued employment) changed beyond their thresholds as a future of closure was made present.

However, whilst the announcement from the company management rendered the future of plant closure present, the presence of this future continued to be enacted and experienced through different modalities throughout the mothballing period. For many of the steelworkers, the presence of this future of closure was reinforced in the wake of the mothballing through the sounds of the steelworks. Indeed, for *Acklam*:

“the worst feeling I’ve ever had is walking from where I, I’ve got about, about a ten minute walk from where I work to where I go and get changed, our base is where the management offices are, because we're out, as far out of the Concast, it’s the furthest point, and I've got to walk through the plant and when it was all silent and all finished and all the steel was finished it was the most weird feeling walking through that, sad, even though I’m walking through there with thousands of pounds in me pocket, it wasn't right, it just wasn't right, again most of the lads around our area felt the same, it’s not right, we should be able to walk out of here with it running, with people taking over our jobs...” (Participant 20 ‘*Acklam*’)

Here then, what is evident from *Acklam*’s account is the importance that sound, or indeed the very absence of particular sounds, can play when relating to a trajectory of closure.

Differing from other studies of deindustrialisation and post-industrial landscapes that have instead focussed upon the visual (such as Meier 2012 and Swanton 2012), for a number of

the participants in this project the importance of sound within a particular emotional experience of closure was a key theme of relating to a trajectory of closure. Indeed for *Ormesby*:

“the plant had been mothballed, I’d say I stayed there about a month after that, I mean it was a very eerie experience, when you’re working on a live plant there’s noise all the time steam, and cranes going up and down, movement of vehicles, and plant.. and it was silent, I could hear people, talking over at the other side of the plant what were left, and yeh, it really felt that it was very strange after being there for so many years, the activity, cos there was always people going in and out and wagons going in and out” (Participant 16 ‘*Ormesby*’)

And further for *Kirkleatham*:

“it's afterwards when it all goes quiet, it was funny when it all went quiet cos it there you know there was guys blubbing in the control room, big guys, big guys blubbing the in the control room because once that release was there, right pfff [*mimics pressing a button*], literally it was a big red button was the final act and, the guy pressed the button, saw the lights change to show the valves had shut and think fuck we've done it, we've shut the plant down, with nowhere to go it would seem at the time, and that was when people started to sort of show their emotions, before that it was a normal working day pretty much [...]

[...] the shutdown started at 8 o'clock on a Friday morning, and I worked right through, and I didn't have to but I did, I worked right through until erm.. about 12 o'clock on the Saturday, and then I went upstairs for a cup of tea and then it was spookily quiet cos all the cooling fans were turned off, you know it really was absolutely quiet there's always a bit of hum and a drum beat around the place and

it literally was graveyard quiet, and that's when you think shit.. done it..”

(Participant 19 '*Kirkleatham*')

Whilst other academic work on emotional experiences of place have focussed upon the visual, through the emotional making of landscapes (Urry 2005) viewing particular sites of memory (Meier 2013) and through photographs (Swanton 2012; O. Jones 2005; Edensor 2005a), we can see from the previous quotations that the aural also plays a key role in the experience of relating to the presence of a future of closure. For these steelworkers it is through the absence of particular sounds that a particular future is made apparent within their own orientations towards the future and this process is inherently emotional. For *Kirkleatham* this absence of sound marks the reality of closure as present and equally for both *Ormesby* and *Acklam*, the experience of the lack of sound within the steelworks was experienced as unfamiliar and through the emotion of sadness and also shame in *Acklam's* account. In this sense then, the absence of the particular sounds of a working steelworks continues to render present a future of steelworks closure within the trajectories of these steelworkers.

6.2. The Cruel Optimism of Pension Entitlement

Through a multiplicity of different modalities then, the steelworkers of Teesside found that a future of works closure had been rendered present within their own trajectories. The presence of this future threatened to render other possible futures absent and as such, the steelworkers of Teesside found that their own relationships towards the future were undergoing a profound transition, particularly with regard to pension entitlements. These pension entitlements emerged as the most pressing issue throughout the mothballing for many of the steelworkers. Whereas the loss of a job and unemployment were also viewed

as potential threats to trajectories, for many a pension entitlement represented a guaranteed future income stream and a financially secure retirement. Furthermore, there were no compulsory redundancies throughout the mothballing period, however a number of steelworkers lost their pension entitlements or found them significantly reduced through the mothballing. Therefore, the role of pension entitlements within the disruption of the mothballing is vital to understanding the futurity of this process of industrial change within Teesside. Whilst engagements with pension provision in addressing the shift from defined benefit schemes³¹ to defined contribution schemes³² have explored the inherent uncertainty and risk of investing in pensions (Clark 2012), the role of decision making and planning (Clark, Knox-Hayes, and Strauss 2009) and the agency of the retirement investor subject (Langley and Leaver 2012), what is less apparent within this literature is the role that a pension plays within the enactment and assembling of a particular future of a financially secure retirement. For many of the steelworkers of Teesside, the rendering present of a future of steelworks closure made access to their defined benefit pensions problematic and for many this was an integral part of their trajectory of a financially secure retirement. Indeed as *Marton* describes, these pension entitlements were:

“a cash cow that nobody would see the likes of [again], you know the amounts of money was six figures, erm.. lumpers [lump sums], plus you know, probably four figure pensions, and that’s the type of thing that we're talking about, and a guy who 50, 55 year old, that’s good enough to more or less retire depending on your own personal circumstances or even get another temporary daft job where the, responsibilities aren't as high” (Participant 5 ‘*Marton*’)

³¹ A guaranteed pension entitlement based upon factors such as service history and final salary.

³² A form of pension scheme based upon investment whereby pension benefits fluctuate based upon the investment returns.

Hence, this pension entitlement was a central component within such a trajectory and was the difference between 'paying the house off' and 'winding down,' and having to continue working longer for an uncertain financial future. This situation was rendered even more complex by a change in retirement regulations raising the minimum retirement age to 55 on 6th April 2010 (HM Revenue and Customs 2011a; 2011b). For the steelworkers over 50 but younger than 55³³, the steelworks needed to close before the date of the regulation changes in order to be guaranteed access to their pensions. Thus, some steelworkers were in a position whereby they needed the steelworks to close before 6th April otherwise they could foreseeably lose their pension entitlements. For *Nunthorpe*:

"There'd be a rumour 'Oh there's someone coming in for us' and the young lads [would say] 'Great fantastic' and we'd be 'Oh yeh great' but at the bottom of our hearts we'd be thinking.. 'I hope not'" (Participant 6 '*Nunthorpe*')

And further:

"So, you, I'll be perfectly honest when it was going to shut I wanted it to shut, yeh, it might be a selfish thing but.. you know if I was honest I think if anybody you know most of the lads at that age would say the same because you know it could have lived to fight another day and shut down in a year's time and all's you got then was you'd have only got your redundancy which was.. I think it's something, you're talking something like 40 thousand I think we got, sounds a lot but.. it's not two years wages is it, you know and where are you going to get a job at our age you know, no skills except working in the steel industry..." (Participant 6 '*Nunthorpe*')

³³ The majority of the workforce were in the age range of late 40s to early 50s at the time of the mothballing. This was a result of previous rounds of redundancies in the preceding decades whereby older steelworkers had been offered early redundancy and a lack of hiring of new rounds of younger employees.

Also for *Eston*:

“as I mentioned those over 50 when they knew it was going to shut, we needed it to shut before April.. or we’d lose out on all our benefits, pensions, and and money, so then we were thinking, ‘Christ, let’s get it shut now then’ cos they kept adding another month on while the talks you know, so then we were getting stressed cos it’s gonna shut but if it shuts after April we’re gonna miss out on our pensions”

(Participant 4 ‘*Eston*’)

However, with a large proportion of the workforce still under the age of 50 and therefore not eligible to take early retirement and access their pensions, the fact that many steelworkers would be retiring with such generous pension entitlements caused conflict within the workforce. As *Marton* put it:

“there was a lot of conflict and then of course, there was a small minority of people who weren't going to be able to get away like myself, who were close to the retirement age.. and then once those found out they were, some of them you know the types of characters you have... erm... some real, erm... not very.. erm, thoughtful, not very sensitive clapping their hands and cheering and rubbing their hands that they were getting out with all their money knowing that all these guys weren't going to go and that they didn't have that choice... and I do recall a couple of times that some people were getting threatened and there, there was conflict was starting to, you know, they’re gonna punch, punch a couple of these characters” (Participant 5 ‘*Marton*’)

Yet there was further division within the workforce not only between those over 50 and those under, but due to the fact that those employees with skills determined to be essential to the running of the plant could find that their application to take early retirement or voluntary redundancy would be denied by the company. *Longbeck* had been

involved with some of the discussions around cross-matching those that needed a job into the plants that would remain running and those who would need to be kept on as essential to the business through his role in the unions. Here he describes an example of some of the conflict within the workforce:

“there was one guy who I was very very close to and I couldn't tell him even though he was looking at ‘Well that's the aspirations that's what I'll get if I retire, what other options are available to me,’ and he was going through all this lot, and I couldn't turn round to him [and tell him] because we were keeping all these meetings confidential, he'd got no chance of getting out.. absolutely none whatsoever, because he'd got all the skills that we needed for networking, nobody else has got it, so he gets kept on.. one of the guys who had got networking skills who had been let go because he'd been working on Concast, we didn't have any Concast anymore, then he starts working for Corus process engineering over in Cumbria, working on projects over here so he's in the bloody office after having his redundancy and pension and he's working as a contractor, and this guy went absolutely ape shit, you know because, [he said] ‘What the hell is he doing back here, he's practically working full time in this bloody office, I couldn't get out yet he has’, and that's the sort of conflict that it put up” (Participant 10 ‘*Longbeck*’)

Here we can see a situation between two employees with similar skill sets yet with two very different experiences of transition within the mothballing. The first is denied early retirement as his skills are deemed to be essential to the company, whereas the second is able to accept such early retirement. Having received his pension and lump sum the second employee is then employed in a different branch of Corus but seconded into the Teesside works alongside the first employee. Hence in this situation we have two employees with similar skill sets working in the same place however one has received a pension and lump

sum whereas the other has not been able to achieve this. In this sense then one has experienced a transition in his trajectory in not being able to retire and enact a future of a pensioned retirement, whereas the other has been able to enact this trajectory and even return to work within the same part of the steelworks.

Thus, across the steelworkers there were a series of ambivalences with some needing the steelworks to close and others needing it to remain open in order for their trajectories to retain their homeomorphism as diagrammed by a machine of financial income. What is clear however, is the centrality of pension entitlements within the specific futures that the steelworkers within Teesside sought to enact. I argue that in this period, for both the group of steelworkers who needed the steelworks to close before April 6th 2010 and those who were below the age for early retirement, this relationship to pension entitlements can in many cases be considered one of 'cruel optimism' drawing from the work of Lauren Berlant (Berlant 2011). Here an 'optimistic' relationship is inherently based upon a particular future in the form of a promise of a particular object. I argue that many of the steelworkers maintained an 'optimistic' relationship with a particular future of a financial security, key to which was their pension entitlements. For Berlant 'cruel optimism' is:

"a relation of attachment to compromised conditions of possibility whose realization is discovered either to be *impossible*, sheer fantasy, or *too possible*, and toxic." (Berlant 2011, 24)

For the steelworkers of Teesside, the rendering present of a future of works closure for many had the effect of jeopardising the pension entitlements that they had previously positioned as central to a future of a financially secure retirement. Thus, for many the 'realization' of this future has, in Berlant's terms, become compromised.

“What's cruel about these attachments, and not merely inconvenient or tragic, is that the subjects who have *x* in their lives might not well endure the loss of their object/scene of desire, even though its presence threatens their well-being, because whatever the *content* of the attachment is, the continuity of its form provides something of the continuity of the subject's sense of what it means to keep on living on and to look forward to being in the world.” (ibid.)

Furthermore then, as for Berlant above, the compromising of a diagrammed trajectory of a financially secure retirement was not something that many, if any, of the steelworkers took lightly. Rather, for many within this cohort, pension entitlement had been at the core of how the futures and relationships with the future that they had been enacting prior to the mothballing. The jeopardising of a pension entitlement in the form of its optimistic relationship with the steelworkers was thus not solely a financial loss, but the rendering present of an uncertain and insecure future.

“This phrase points to a condition different from that of melancholia, which is enacted in the subject's desire to temporize an experience of the loss of an object/scene with which she has invested her ego continuity. Cruel Optimism is the condition of maintaining an attachment to a significantly problematic object.”
(Berlant 2011, 24)

The final part of the above quote by Berlant emphasises the key point of what the concept of cruel optimism allows for us to explore in relation to the futures of industrial change. Crucially here the point is made that cruel optimism is a process of continuing a relation with an object, the achievement of which has now become highly problematic. For these steelworkers whilst a particular pension entitlement is threatened through the presence of a future of works closure, pension entitlements remain present within their assembled trajectories. It is this continued presence of this increasingly problematic object within their

trajectories that makes this relationship one of cruel optimism as opposed to rendering this object lost or absent. This is the crux of cruel optimism – that the presence of pension entitlements is maintained even when a future of a *specific* pension entitlement can no longer be enacted, and it is this continued relationship with this present problematic object which leads to a process of attrition or a ‘wearing out’ of the subject (Berlant 2011). Such a ‘wearing out’ can be seen within the previous quotes in the stress that *Eston* describes (‘we were getting stressed out’) or in the tensions and even physical confrontations described by *Marton*.

However, this is not to say that the experience of the steelworkers was homogeneous throughout the mothballing with regards to achieving pension entitlements. Indeed this is far from the case and thus it may be possible to speak of multiple cruel optimisms for the workforce rather than describing this relationship in the singular. For *Eston* and *Nunthorpe* prior to the mothballing of the works their relationships to a future of a financially secure retirement becomes increasingly cruel in Berlant’s terms, as achieving this object becomes more problematic. However, when the works were mothballed and these steelworkers were able to access their pension entitlements, this relationship can no longer be described as cruel in that the attainment of this object of desire (their pension) is no longer problematic. Yet, for those steelworkers in *Marton’s* position, not being able to retire enacts a relationship of cruel optimism in that *Marton* continues to enact a trajectory where this problematic future of pension entitlement is rendered present, which on the one hand is harmful through the stress of this being made problematic and a process of attrition through having to work for longer, yet also sustaining in that *Marton* continues to work towards a pensioned retirement. Thus, here *Eston* and *Nunthorpe’s* relations with a future of financial security are temporarily experienced through a relationship of cruel

optimism in that the enactment of these futures is threatened. However for *Marton*, this future is not only threatened but lost - at least in the form he had previously imagined and planned for - yet he continues to enact a relationship with this lost future.

Marton is not alone in his experience of the continued presence of a problematic future of pension entitlement. The steelworks was eventually purchased by SSI in February 2011, yet as it was not sold as a going concern, it became a new company through its purchase by SSI. Following the 'Transfer of Undertakings (Protection of Employment)' (TUPE) regulations, whilst the terms and conditions of the workforce that would be transferred to the new company were protected, pension entitlements were exempt. Hence, for those remaining in employment at the steelworks with their purchase of TCP by SSI and their transfer to the new business, they stood to lose their defined benefits British Steel pension entitlement and were placed instead within a new defined contributions scheme run by the new company. Indeed for *Linthorpe*:

“obviously one of the blows to people like me when we were bought out by SSI was, we then became, we got out of the British Steel pension scheme became deferred pension, so the impact upon, things in my life at that point, having built a plan where I'd bought AVCs [Additional Voluntary Contributions] where I feel, where I got to sixty my pension would be enough I could afford to retire, therefore at 60 I had the choice, that will probably no longer be the case, with me moving into defined contribution schemes, where ultimately, what time I can retire would depend upon the stock market” (Participant 14 '*Linthorpe*')

And further for *Marton*:

“and even now I'm contemplating well when am I going to retire now cos me pensions froze out.... I lose erm, 6% for every year I want to take it out earlier, so if I want to retire at 60, I'll lose 30%, if I want to retire at 55 I lose 60%.... so if I want to retire early now I'm going to lose 60% of me, and I say lose 60% I'm obviously taking it out ten years earlier, but I don't, its reduced by 60% so my, the amount that I take because obviously I'm taking it out over a longer period, and I couldn't possibly do that so, it means that I'm probably going to have to work for another ten years” (Participant 5 'Marton')

Ostensibly then, steelworkers such as *Marton* and *Linthorpe* lost their defined benefits pension entitlements - which therefore rendered the future of a financially secure retirement problematic - not because they lost their jobs or the steelworks closed, but rather because the steelworks reopened. This loss of pension entitlement rendered present a different pension entitlement which for many would mean having to continue working longer for a smaller, and potentially uncertain, retirement income. The loss of their previous pension entitlement and the future that had been assembled around it therefore enacts a transition to a new trajectory within which a cruelly optimistic relationship with a pension entitlement continues to sustain these steelworkers, but also wears them out in a process of attrition both emotionally in the stress of the loss of this previously planned future ('all your plans about paying your house off and everything and.. winding down and all that'), and also the physical bodily attrition of having to work perhaps 10 years longer in what remains a physically demanding job.

6.3. Lost Futures and Lost Identities

Whilst cruel optimism provides one means of approaching how the rendering of a future of closure as present within the trajectories of the steelworkers in Teesside was related to,

the impact of the mothballing was also articulated through a language of loss. Whilst the loss of a particular future of a specific pension entitlement was touched upon towards the end of the previous section, particularly in the cases of *Marton* and *Linthorpe*, there is a key difference in the experience of loss of a future than one rendered cruelly optimistic. For the continued relationships of cruel optimism described within the previous section, objects central to the trajectories of the steelworkers are rendered problematic but continue to be assembled as present within these trajectories. However, in terms of the loss of particular futures and practices from a trajectory, these components are rendered absent, yet continue to be manifest within these trajectories through their absence. The difference here is thus between a relationship with a future that is rendered problematic, yet which remains present and therefore related to through a relation of cruel optimism, and a relationship with a future that is lost but remains manifest within the trajectory *as* lost. This relationship of loss is therefore similar in how it comes to be experienced to experiences of loss through 'haunting' (Meier 2013; Edensor 2008). The steelworkers in Meier's (2013) study were 'haunted' by the loss of past employment practices and sites of industry, and also implicitly by a future where such practices remained absent. This therefore differs from cruel optimism in that for Berlant a relation of cruel optimism depends upon the continued possibility of the object of relation in terms of an 'optimistic' future promise of fulfilment, whereas for the loss articulated through 'haunting' the promised object is already discovered to be and related to as, impossible to achieve. Thus whilst continuing to work for a pension entitlement, the achievement of which has been made problematic or reduced in size, can be conceptualised as a relationship of cruel optimism in that the promised future of receiving a pension is maintained and continues to be worked towards by the subject, a relationship of loss closes the possibility of the enactment of the lost future and renders it absent (yet still manifest) within the trajectory.

Differing in empirical situation, Marion Collis's (2005) work on women's experiences of hysterectomy exhibits a number of parallels with the experiences of the steelworkers in Teesside. Basing her work upon interviews with 20 women who had undergone hysterectomies for benign conditions, Collis's work explores the multiple emotional experiences of undergoing this procedure. Notably the experiences of these women were multiple and varied, yet a number of commonalities between them emerge. Much of this discussion centres upon differing conceptualisation of loss and how this was related to by the participants. In my reading of this there are two key distinctions of how this form of loss as can be applied to the steelworkers of Teesside. The first relates to the loss of a particular future through, in this case, the ability to reproduce and have children. Some of the women in Collis's study experienced this loss of a womb or uterus as a process of grief and mourning for the children that they might have had. However, others who articulated that they had had as many children as they intended to rejected this form of loss. Here then we can see how a particular trajectory involving having a particular number (which is by no means the same for each participant) of children is experienced as lost by those women experiencing a hysterectomy who had not already had this number of children, nevertheless this was not shared by the women who had fulfilled this aspect of their trajectory. Secondly, this form of loss was experienced as a loss or challenge to a particular feminine identity. Here women articulated how the loss of their womb or uterus challenged their identity as women or their performance of femininity. Thus, whilst some women may have had the number of children that they intended (if this was ever distinctly known), they may still have experienced this loss through the loss of part of their performance of a particular identity. In a similar distinction as between Darian Leader's mourning and melancholia as modalities of relating to loss (Leader 2009)³⁴, Collis's study

³⁴ Drawing from Freud, within *The New Black: Mourning, Melancholia and Depression* Leader draws out a distinction between mourning as a process of dealing with the grief of a loss which is known to the subject and inherently related to past memories and the absence of the lost object in the

therefore highlights two experiences of loss; firstly, though the loss of a particular future and secondly, through the loss of a particular identity. Both of these forms of loss were articulated by the steelworkers interviewed as part of this study.

In terms of the steelworkers in Teesside these forms of emotional loss are strikingly apparent within the mothballing period. Indeed for *Marton*, the closure of the steelworks was experienced as the loss of a particular trajectory, in this case one where he could retire at 55:

“the pension I've got now would be, nothing.. so it left me with a, you know, all your plans about paying your house off and everything and.. winding down and all that, I have to work now, for the next 10 years.. [...]

[...] you know, the people I'm working with now don't need the job cos they've got all that money behind them and they're back at work, I you know, I need the job and er, my heart goes into it I know I need it” (Participant 5 '*Marton*')

Here then we can see that *Marton* is now planning for a future whereby he will spend the next ten years working until he is in his early 60s as opposed to retiring at 55 as he had planned before the mothballing. It must be noted here, that whilst *Marton* maintains a relationship with a pension entitlement that can be considered cruelly optimistic, this remains separate from the future that has been lost through the presence of this relationship of cruel optimism. In a similar modality to the women within Collis' study that expressed their loss as a loss of a particular future, *Marton* experienced the mothballing as a loss of particular future that he had previously planned for, enacting a transition to a new

subject's future, and melancholia as a process of relating to a loss whereby what has been lost in the process of losing an object is not necessarily known in relation to the subject's own identity.

trajectory. Yet *Marton* remains 'haunted' (Meier 2013; Edensor 2008; 2005a; 2005b) by this loss both through his continued practice of working at the steelworks, particularly with co-workers who were able to access their pensions, and also through the figures and calculations he makes regarding when he will now be able to retire. This loss is also particularly emotional for *Marton* (who was involved with management at a plant level) in that the people he works with managed to secure their pension and have also returned to full time employment in a period where he was unable to retire, whereas he has now lost a significant proportion of his pension entitlement and works within a stressful management situation. Thus, a new future of having to work longer for a smaller pension has been made present for *Marton*, changing his trajectory beyond the thresholds of its homeomorphism and enacting a transition to a new trajectory of working practice which remains diagrammed by an abstract machine of financial income. However through his previous plans and relations with co-workers who were able to retire with their pensions, *Marton* remains haunted by this lost trajectory.

Yet, as for the women in Collis's study, this experience of loss during the mothballing period was not universal across the workforce. For some steelworkers, the rendering present of a future of steelworks closure actually enabled the enactment of their trajectory of a financially secure retirement. Indeed for *Brotton*:

"Brotton: I had originally hoped to retire at 55 and by 2000 I was 50 so I was only looking to pass the time away until I could get out er.. 55 came er.. I couldn't get out they wouldn't let me go

Interviewer: right

B: so I ended up having to stay until 2010 when everywhere closed er so.. to me. erm it wasn't the suffering for me as as far as I was concerned personally I was very happy to get out and get on with the rest of me life you know" (Participant 9 '*Brotton*')

Here we can see a very different experience of the closure of the steelworks. For *Brotton*, whilst the closure of the steelworks was not something to be celebrated as many other people depended upon the works for employment, the mothballing was an opportunity to retire that had not been available in previous years. Thus, *Brotton* had reached the age required to access his pension entitlements even in spite of the changes to early retirement ages in April 2010. Thus, similar to the women that expressed that they had 'no regrets' with regards to undergoing a hysterectomy, *Brotton* similarly expressed 'no regrets' in leaving the steel industry in that he could fulfil his trajectory of receiving his full pension entitlement. Furthermore, *Brotton* is not 'haunted' by this loss of employment in the same way that might be said of *Marton*. *Brotton* claims to have been happy to 'get out and get on with the rest of me life,' and this loss of continuing to work at the steelworks is not assembled as present within *Brotton's* current trajectory.

In addition to the loss of a particular future, the mothballing of the steelworks was also experienced as a loss of a particular performance of identity. Even for some steelworkers that managed to leave with their pensions and therefore a relatively financially secure situation, they articulated a range of emotions relating to a loss of or challenge to a particular identity. For *Easterside*:

"I reached the age of 50.. and... erm.. come the Christmas time I had to make a decision and.. there was no other option and people said to me but, it was very

hard for me on the fact that I handed my voluntary redundancy in knowing fine well what the outcome was going to be and, erm.. felt ashamed.. erm.. thinking I'm a union rep.. and I'm handing a voluntary redundancy form in knowing what the outcome is.. an awful period for me really. [...]

erm.. but.. if I hadn't taken that then.. I I, my pension would have been same as everybody else's.. and 65 you know, and it was grab it while you can... and some people actually didn't get out and the way that they were treated was absolutely terrible..." (Participant 18 '*Easterside*')

Easterside therefore expressed feeling ashamed that he was applying for voluntary redundancy whilst performing the role of a union rep. Handing in an application to retire is thus a challenge to his role of representing the workforce, many of whom could not leave either by being below the 50 threshold or through being too important to the operation of the company. However *Easterside* justifies this by asserting that if he did not leave then he would have to work until 65 and his pension would have been put at risk. Thus, *Easterside* experienced the practice of applying for redundancy through shame and the loss or challenge to a particular identity located within being a union representative, he also justifies this through a particular logic that applying for such redundancy had to be done in order to retain his particular trajectory.

Furthermore, the mothballing of the steelworks as a process of loss was also expressed through the loss of particular practices of masculinity or a masculine identity. Linda McDowell explores some of the connections between dominant representations of modern masculine identity and work. For McDowell:

"Above all, what defines being a man in modern societies is participating in waged work. It is work, albeit work that is 'suitable' for a man, that confers and confirms the central attributes of masculinity, whether the work concerned is the embodied labour of the 'working man' (that is working-class men) whose manual employment depends on strength and forms of masculine social solidarity or the cerebral, rational labour of non-manual employment. In both cases, masculinity is constructed in opposition to femininity; it is everything that femininity is not and so confirms that while man's 'natural' place is in the labour market, woman's is elsewhere, often in the private sphere of the home." (McDowell 2003, 833)

This is particularly relevant in Teesside where from the very beginnings of Teesside's industrial roots:

"the kind of industries established on Teesside relied upon the employment of large numbers of men in work that was arduous and dangerous." (Beynon, Sadler, and Hudson 1994, 21)

Whilst the role of women in the workforce has changed since the beginning of Teesside's industrialisation in the 1840s, Teesside's history of heavy industry has left a legacy of a strong relationship between labour and a particular masculine identity which is particularly evident within the steelworks. Indeed, in terms of the role of the man in the labour market and thus as the household provider, *Marske* expressed how this role was challenged by the mothballing:

"it all just seemed to be a big whirlwind even though it was like threatened for a year and a half when it did hit you, it hit you like [*emphasises the word 'hit' both times*] you know... but er, all I kept coming home saying well saying to me daughter and things like that, I may not have the money to do this with you or I might not

have the money to do this with you but er, it was a very worrying time like, I mean, erm..." (Participant 7 '*Marske*')

Here the challenge to *Marske's* ability to provide for his family as the 'breadwinner' of the family was experienced through worry. *Marske* had been too young to be eligible to receive his pension and this strongly emotional concern over security was still evident within the interview. Throughout the period in which a future of closure had been made present, *Marske* lost a future of a reliable income, and therefore also the means to support his family. This participant was able to remain in employment through the mothballing period, however with redundancy and unemployment very much present within the future possibilities it had assembled, *Marske's* trajectory came very close to crossing the thresholds of change that would have seen his trajectory lose its homeomorphism.

In terms of the nature of the labour of working in the steelworks, for other steelworkers the physical practices of the job were also experienced as a form of 'camaraderie' due in part to the dangers of working with liquid steel, but also the experience of working in a masculine dominated environment.

"Yeh, when I first [started] in 1983 and went on Concast and a few more lads all started at the same time and become close friends still are all these years later [...] still are, it was always a close.. because the job I was in.. er, was quite a tough job, er. You're working with liquid steel 1500 degrees and you're stood a couple of feet away from it, it's hot and, it's dangerous, so I don't know if that brings you closer together cos you've gotta laugh and joke, about the job, while you're there to get you through it you know, so that camaraderie was there" (Participant 4 '*Eston*')

Indeed for *Eston*, as for a number of other participants, working at the steelworks was accompanied by a sense of camaraderie with other steelworkers that he attributes to the often intense conditions of working in the steel industry. Indeed after describing the steelworks as a 'brilliant environment' to work in prior to the mothballing period I asked what about it made it brilliant. *Eston* replied:

"Just the camaraderie, just the lads just got on as I said, you're going out to work while you're at work there was all mickey taking, but all in good humour and you had to have that to get through.. cos it was a rough job, and that's what did get you through you know just the jokes and, and things like that, that got you through it all.." (ibid.)

For participants such as *Thornaby* the mothballing of the steelworks and accepting early retirement was accompanied through an experience of the loss of this form of camaraderie.

"I mean it was 36 years.. I hated the job, loved the lads... and that is one thing now, I don't miss the work I don't miss the hassle, I don't miss the heat, cos obviously within the power station, but I miss the crack.. I really miss the crack, because you could go to work and there'd be days you'd come home, you'd be in pain with the amount of laughter throughout the day [*laughs*].. you know with people ribbing each other and the stories of people were getting up to, and things.. so I do miss the crack, but I don't miss the work... and I don't miss the worry and the, er, breathing the fumes and the heat, er and all that type of thing" (Participant 3 '*Thornaby*')

Thus for *Thornaby* and *Eston*, working in the steelworks was also the practice of particular identity, one centred upon close male relationships ('the crack') and dangerous, often

physically challenging and demanding, labour. However, a further and perhaps the most explicit expression of the mothballing as a loss of the performance of a particular identity was provided by *Nunthorpe*:

“If I'd have had a choice I would have went back there you know, I would have done anything but I'd rather work in the steel industry than work in Asda stacking shelves or you know.. whatever, it's what I know.. you know it's the environment I'm comfortable in erm... I don't know you work in the steel industry and you just... you finish your shift and you think.. I've done a day's graft there you know, I've done man's work and you come home and you can have a can of beer and you feel like you've done a day's work you know, and er, I don't know when you're not working I think you just lose a bit of self-respect, what I lost most was confidence [*emphasis on 'confidence'*], I don't know why, but I just lacked confidence you know which wasn't me really, I've always been reasonably confident but that was me main thing you know because I think.. you know you'd hear of people getting jobs who you used to work with and you'd think oh yeh I don't know if I could do that you know, and, you think well why, but it's just lack of confidence” (Participant 6 '*Nunthorpe*')

For *Nunthorpe*, the loss of employment at the steelworks was experienced as a partial loss of particular identity. The practice of doing 'a day's graft' of 'man's work' brings with it a sense of pride and confidence for *Nunthorpe* in relation to a particular conceptualisation of masculinity. When *Nunthorpe* took early retirement from the steelworks due to the mothballing this loss of this practice of labour led to a loss of self-confidence as part of his masculine identity, founded around doing 'men's work' in a particular location, which was no longer being enacted. Thus in terms of the masculine identity associated with waged work articulated by McDowell (2003) we can see from the previous quotations that this

steelworker identity is constructed around work that is appropriate for a man (such as *Nunthorpe's* 'man's work'), is experienced as a working-class identity through the manual difficulty of the work (as for *Eston* with the dangerous nature of working with steel) and 'masculine social solidarity' (the 'camaraderie' described by *Eston* and *Thornaby*). For these participants, the closure of the steelworks was a significant challenge to, and loss of, this form of masculine identity that each had participated in enacting. Again, this loss of identity was experienced in a multiplicity of ways, with some clearly upset at the loss of this masculine role (particularly as 'the breadwinner') or experiencing a 'loss of confidence' with the loss of the practice of this identity. However, with others expressing that whilst they missed some aspects of this identity, this was offset by no longer having to experience the negatives of working at the steelworks ('so I do miss the crack, but I don't miss the work... and I don't miss the worry and the, er, breathing the fumes and the heat').

6.4. Trajectories disrupted

The process of industrial change that was the mothballing of TCP was therefore one of the disruption of the futures of the steelworkers of Teesside. Different trajectories of employment, identity and a financially secure retirement all came to be disrupted to varying degrees by the mothballing. This chapter has made three arguments. Firstly it has highlighted the multiple and complex ways in which different futures are rendered as present and manifestly absent within trajectories. Here rumours, news reports, conversations, phone calls and soundscapes all featured as means through which a future of closure came to be firstly rendered manifest, and later as present within the trajectories of the steelworkers of Teesside. Here then, industrial change comes to be known and experienced through the rendering present one of many futures that had been manifest as absent possibilities. Secondly, the chapter has explored how through the making present of

a future of steelworks closure, trajectories come to be both disrupted and continued through relationships of cruel optimism. Through the example of pension entitlements the chapter has shown that a future of closure rendered the pension entitlements that had been central to the trajectories of a secure retirement that many of the steelworkers sought to enact as problematic, yet that these pension entitlements remained present within many of these trajectories through a relationship of cruel optimism. Here pensions continued to sustain these steelworkers through the future promise (yet now in many cases in a much altered state) of a financially secure retirement, yet at the same time were 'wearing out' these subjects through a longer working life and the stress of this transition. Finally, this chapter also explored the role of loss in the experiencing of the disruption of trajectories through the mothballing of the steelworks. Differing to cruel optimism in that the lost object is not related to through a promised future, loss here is the rendering absent of a particular object or future from a trajectory. However, whilst these former components of trajectories are rendered absent, they also continue to be manifested through their absence within these trajectories. Here then, retirement plans, workplace identities and masculinities all came to be lost from trajectories, yet steelworkers continued to relate to and be 'haunted' by these lost objects.

Through these three insights into the empirical site of the trajectories of the steelworks workforce throughout the mothballing period, this chapter therefore highlights how trajectories are disrupted through the making present of futures of industrial change, whilst also showing how these orientations towards the future continue. It is through these trajectories that industrial change comes to be experienced and related to: through the multiple different modalities by which futures of industrial change are rendered present, the cruelly optimistic relations to pension entitlements, and through what is lost from

these trajectories during this industrial change. However, disruption is not the only means of relating to the trajectories of industrial change. Throughout the disruption within periods of intense industrial change, trajectories and futures can also be held together through particular practices of management. Within the next chapter I turn to this relationship to the trajectories of industrial change by addressing how the steelworks management attempted to hold a future of steelmaking together and ensure the continuity of this trajectory throughout the disruption of the mothballing period.

7. Holding the future together: Homeomorphism and transition in the management of the steelworks

The mothballing of Teesside Cast Products precipitated uncertainty not only for the trajectories of the steelworkers of Teesside, but also for the steelworks management. This chapter attends to how a trajectory can be held together throughout a period of transition through a focus upon the management of the steelworks during the mothballing period. Here I draw from the work of John Law (1994) to conceptualise firstly how a particular practice of management was assembled within the mothballing crisis through a discussion of the creation of a 'resource centre' in Steel House as a 'centre of ordering' (1994), and secondly, how the holding together of a particular trajectory during the mothballing period was a process of retaining the homeomorphism of the steelworks as a steelmaking object. Whilst this is not an Actor-Network Theory study (although it is certainly influenced by this canon of work) and as such the focus is placed upon the role of the human actants in the steelworks³⁵, the manner in which Law attends to agency and how networks are held together (in particular through practices of organisation) is useful in illuminating how a particular trajectory was held together throughout the mothballing period of the steelworks in Teesside.

During the mothballing period the steelworks management faced a number of challenges. Firstly it had to manage the transitions that many workers were experiencing within their trajectories (as seen in chapter 5) through providing advice, information and counselling regarding what redundancy or retirement benefits that the steelworkers might be entitled to, and also to provide support in conjunction with a range of local and national agencies

³⁵ An account that is more attentive to the heterogeneous elements of a steelworks can be found in Swanton 2013 which provides an analysis of a steelworks as an assemblage in itself.

based upon their responsibility as an employer. Secondly, it also had to ensure that the steelmaking infrastructure remained in a state where it could conceivably be bought and steelmaking restarted³⁶. Whilst this took place in regards to the physical machinery of the steelworks through the keeping open of plants that could not be easily restarted if fully shut down (such as the coke ovens) and with a process of carefully mothballing other aspects of the site so that they could be restarted (as with the salamandering of the blast furnace), this also occurred in regards to the workforce. To hold a trajectory of steelmaking in Teesside together the management had to ensure that it was able to retain enough of the steelmaking workforce so that in the event of the steelworks being bought by a different company the necessary skills, knowledge and experience would be available to restart the production of steel and to train up new members of the workforce. A skilled and experienced workforce therefore formed a threshold of change within the trajectory of steelmaking held together by the management, which if crossed would make the enactment of this trajectory near impossible. This chapter therefore explores how this trajectory of steelmaking was held together in the face of transition through a period of acute industrial change. The chapter is split into two broad sections, the first addressing how management was assembled within the steelworks, and the second how this management was able to hold a future of steelmaking together.

7.1. Assembling management

I will begin with a matter of terminology, and whilst it may seem unusual to initiate this chapter with something of a caveat, this forms an important point that is key to the

³⁶ This period was prior to the purchase of the plant and the signing of the 'MoU' as described within chapter 2. Therefore at this point despite some speculation, the possibility of the steelworks being purchased and steelmaking restarted was largely an assumed possible future rather than being concretely enacted.

argument of this section. When referring to the management of the steelworks throughout the mothballing period with 'management' in the lower case, I am referring to a broad coalition of actors that were involved with the practice of 'managing' the steelworks and the mothballing during this period. This includes trade union officials, managers from the varying plants of the steelworks³⁷ and also the central steelworks Management (with a capital 'M'). In this sense I refer to management as something broader than the body of individuals that might be formally referred to as 'Managers' in terms of their employment, to rather focus upon how practices of managing and ordering were assembled in this period. I formulate this as a practice of assembling a number of differing human actors (and also non-human actants) that were assembled to try and manage the mothballing and hold a particular future of steelmaking together through a period of transition.

Within geography, management has been engaged with through a number of empirical sites such as the restructuring and spatial reorganisation of firms and management headquarters after the work of Massey (1984), waste management (Schindler and Kishore 2015; Bulkeley and Askins 2009), nuclear waste management (Warnback, Soneryd, and Hilding-Rydevik 2013), the management of risk (Donovan and Oppenheimer 2015; Lane et al. 2013), spatial management of sporting events (Klauser 2013), and natural resource management (Lockwood and Davidson 2010) to name but a few. Within these literatures management features as a process of ordering or planning in regards to a particular site, however there has been relatively little attention within geography concerning how the process of management as an object comes to be assembled in its own right. Valve et al.

³⁷ The steelworks consists of a number of different plants which perform different processes necessary to steel production. These plants have their own management structures for the oversight of the operations on these plants which also exist in addition to a central site management based at Steel House.

(2013) provide some insight here by foregrounding how management itself comes to be made possible. Within this paper, the authors discuss the processes by which natural resource management is made possible through the case of both freshwater resource and forestry management within two regions of Finland. The paper describes what they come to call the process of 'plan-ability' by which they refer to the ongoing processes of forming and maintaining of relationships within the planning system that make such resource management possible. For Valve et al.:

“Much ordering and organisation are needed before a workable planning collective (Latour, 1999; 2004), bringing together people, timetables, guidelines, jurisdictions, money, and monitoring data, among many other things, is in operation. Realities thus become 'sorted out', not just thanks to planning but necessarily also *for* planning.” (Valve, Akerman, and Kaljonen 2013, 2085 *Original emphasis*)

Here then, this study foregrounds the processes of ordering and organisation that are necessary for management as a process to take place. Without the 'sorting out' of realities the assembling of management and its relationships would not be possible for these authors. Furthermore, Lavau (2013) adopts an approach to management that attends to this as a process of ontological work. Here, drawing from the work of John Law and Annemarie Mol, Lavau offers a view of practices of sustainable management of water within the Goulburn River in Australia as a process of 'ontological cleaving,' whereby water in the form of irrigation water (to be used by farmers) and environmental water (necessary to the ecological wellbeing of the river ecosystem) are at once drawn together yet also held apart. In Lavau's words:

"I tell of multiple enactments of Goulburn River - irrigation water and environmental water - as emergent in particular gatherings of practices, technologies, and stories that constitute river management" (Lavau 2013, 418)

Hence, for Lavau, this ontological practice of holding together and drawing apart takes place through an emergent assembled management practices, technologies and knowledges. For both Lavau and Valve et al. then, management does not feature as a homogeneous and monolithic process that pre-exists the objects it seeks to order and organise, but is rather an assemblage (although they do not use this terminology) that comes to be assembled through, and for, the process of ordering. This thesis, in adopting its trajectories-led approach to research, also seeks to approach the management of orientations towards the future on similar terms – through attending to how a management object is itself assembled through these processes of ordering and organisation. To do this I turn to the work of John Law.

There is a short section in Law's *Organizing Modernity* which describes a scene from Law's ethnography of the Daresbury Laboratories. In this scene, a vital piece of equipment necessary for a number of essential laboratory functions has malfunctioned and cannot be fixed easily. In Law's words:

“Driven by urgency, people were working a 12- or 14-hour day. They were tired to their bones. They were quite depressed. And they were very anxious. I noticed, in particular, the way in which those involved were a mix: managers, scientists, engineers, technicians, fitters and riggers – all kinds of people clustered around the machine as they tried to diagnose its ailments and fix up cures. They talked with one another, they cooperated, they argued, and they complained. And for a few weeks at least they formed a world of their own with its own working processes of networking and ordering, a world that seemed to have little to do with the other worlds or places beyond the SR (Synchrotron Radiation [sic]) Source. Everything else was a distraction.” (Law 1994, 41)

Whilst this is a very different empirical situation to the mothballing of Teesside both in the type of problem faced and the scale of the issue, and whereas Law uses this extract as an example of different spaces of ordering within the laboratory, what we can see here is how in relation to this particular situation the means of managing this problem is assembled through a variety of different people and practices. Law's text, of which this extract is a part, focusses upon how modes of 'ordering' are performed within formal institutions, with a key attention towards the heterogeneity of these modes of ordering. For Law there is never an 'order', but rather continual processes of 'ordering' that serve to continually perform the relations that hold together a particular network. However, what I find illuminating in relation to the steelworks in Teesside is how the above extract provides an example of the assembling of a novel mode of ordering in response to a particular event or crisis in the context of the laboratory. During the mothballing of TCP, a process of 'ordering' of trajectories was assembled within the management of the steelworks as a novel form of organising in response to this process of industrial change. The management of trajectories then, is not a process of imposing an 'order' but a constant process of 'ordering' which in the case of the steelworks management took place through a novel management assemblage.

The assembling of practices of managing and organising can be seen through a number of examples during the mothballing of the steelworks, however I want to focus upon one example here which I find particularly useful in highlighting the process of assembling this form of managing the mothballing: the creation of a 'Resource Centre'³⁸. Following the

³⁸ The creation of such a 'resource centre' as a means of dealing with redundancy and industrial change cannot be positioned here as unique to the mothballing of TCP. Indeed, following the closure of the Harland and Wolff shipyards in Belfast in 2000, a similar 'one-stop shop' providing information on benefits, training and employment opportunities was set up by a government taskforce (Shuttleworth, Tyler, and McKinstry 2005).

announcement that the steelworks would be mothballed in 2010 there were a number of pressures facing the management of the steelworks. In the words of *Hemlington*:

“there was 1911 people to review, across the site, in total, and there was 756 people left at the end.. when we’d mothballed, so there was a lot of interviewing, which in effect is from the counselling a lot of people wanted to know the figures before they would decide if they would want to leave, erm, there were a lot of spreadsheets people together a lot of the time, spent with individuals, erm.. meanwhile the plants are still running, the plants are still operational, we still had normal HR business to get on with, payrolls to run erm, things like that”

(Participant M5 '*Hemlington*')

From the point of view of managing and ordering the workforce then, in the wake of the announcement to mothball, virtually the entire workforce required reviewing either in terms of their pension and redundancy entitlements or in regards to redeployment within the steelworks. Thus, the management of the workforce in this period was a process of managing and ordering of trajectories in a process of transition. In order to provide information and manage people’s expectations of what they might receive through either retirement or redundancy, the entire second floor of Steel House was converted into a resource centre that would act as the main point of contact for steelworkers to be counselled, and thus their trajectories managed and ordered, regarding their expectations and to access support.

“we were set up in this building [Steel House] and we took over the whole of floor two in this building, and that became the, the hot spot really where people would come and talk about redeployment into other jobs, job interviews, come and talk about redundancies so it was an open all hours kind of scenario” (Participant M5 '*Hemlington*')

The resource centre is thus a site of management that has an explicit geographical form.

Law highlights what he terms 'centres of ordering' in his study of the Daresbury

Laboratories. For Law:

"Roughly, then, a centre of ordering is (likely to be) a place which *monitors* a periphery, *represents* that periphery, and makes *calculations* about what to do next in part on the basis of those representations" (Law 1994, 104)

Indeed this resource centre functioned through practices of monitoring, representing and making calculations about a particular periphery – that of the steelworkers on the varying plants across the steelworks. As *Hemlington* highlights in the above quotation, this was a space where steelworkers could come to discuss the options available to them which placed a particular emphasis upon the practice of calculating, and the facilitating of steelworkers calculating, what to do next. It is here that particular futures would be represented to steelworkers in regards to pensions, redundancy payments or employment eligibilities based upon particular monitoring and calculations which included number of years' service, employment position and skills. The space of the resource centre was therefore a centre of ordering futures, of monitoring the aspirations and trajectories of the steelworkers, of representing futures or aspects of futures that may impact upon such trajectories (such as representing what redundancy or pension payments might be open to the steelworkers), and of calculating the viability and desirability of particular futures. Furthermore, the creation of this space could also be considered a process of 'plan-ability' as described by Valve et al. (2013) in that the ordering of this space is necessary for these assembled practices of management to take place.

However this resource centre was not enacted solely by the management staff at the steelworks but was rather supported by a range of local and national actors. As *Carlton* describes:

“there was a lot of planning obviously involved with the external agencies so the main ones were Jobcentre Plus, and then the funding agencies so you had the Skills Funding Agency, erm you had, oh what are they called, Business [Business Link] [...] but the reason I mention them is that they were really good in terms of the support and the funding that they got, [...] and then on the periphery of that there was all the pensions people, finance people, erm.. a whole host of other agencies.. and the reason I mention them is because there was so many involved, that’s where Jobcentre Plus came into play so they acted as the lead agency and as a point of contact for all the other ones so that it wasn’t just myself managing them all, Jobcentre Plus was the main point of contact.. and then obviously management and the unions were involved in them meetings in terms of what the resource centre would look like and how it would be offered” (Participant M3 ‘*Carlton*’)

Thus the resource centre was a centre of organising futures practiced through an assemblage of agencies such as Jobcentre Plus, funding agencies such as Skills Funding Agency and Business Link, in addition to other actors including the Human Resource department of the steelworks. This assemblage was also ordered through making Jobcentre Plus the lead agency that then managed the actions of the other agencies within the resource centre. However, in line with Law’s assertion that there is never an order but rather practices of ordering (Law 1994), this coalition of different agencies and actors also needed to be further ordered and managed. *Carlton* explains further:

“Carlton: what did work fairly well is how we collated that information, because obviously each agency had their own processes, and some of it was duplicated so

what I'd said was I don't want a guy coming in, seeing the different agencies and providing the same information, so they came up with a way that they could share that information so that you just you came in and you'd register once with that detail and then if you were seeing different people you weren't going through the same ground

Interviewer: right right

C: so and I think that was important, because you know, it was difficult getting people in because it was different and they didn't know what to expect and for them to come in and have to give the same information several different times I think would have put a lot of people off, so that worked quite well" (Participant M3 'Carlton')

The resource centre therefore acted as a centre of ordering in that it monitored, represented and made calculations concerning individual steelworker's trajectories, through a process of information collation and sharing, allowing for more efficient 'monitoring' of the periphery. However this centre of ordering was also subject to processes of ordering in its own right in that a lead agency was identified in Jobcentre Plus and also through the process of ordering the information collating practices of the differing agencies were ordered and managed by managers such as *Carlton*. The resource centre provided access to a range of agencies and services that could advise the steelworkers in regards to their prospects for training, reemployment and where they could be counselled regarding their pension or redundancy entitlements. Yet, what is also apparent in the above quotation is that the assembling of a resource centre in its own right was not sufficient to manage the mothballing. Indeed, this required the participation of the steelworkers themselves.

“bearing in mind it was here at Steel House and obviously it was the plant that was affected, and you found, certainly at that time, whether it’s changed, a lot of the people wouldn’t, or hadn’t been to Steel House, so it’s how really you would engage with them people in terms of getting them in and er, obviously what was already a difficult time, coming to somewhere that they’re not really familiar with as well.. erm.. and I suppose that we got around that by.. eventually once we’ve said right this is what it’s going to look like, and this is what’s on offer, is er developing a presentation which was led by ourselves, and Jobcentre Plus in terms of inviting all employees and contractors in Steel House, a hundred people at a time down in the lecture theatre, and giving them an overview of what the resource centres meant to be, how it would work really, and then also inviting them up to floor two to say look go book your first session really, and what that looks like” (Participant M3 ‘*Carlton*’)

Thus the management of the mothballing and the organising of the workforce could not be undertaken without the workforce being assembled, in this case quite literally, within these practices of ordering. In the above quotation then we can see the above presentations concerning the services available to the steelworkers as a practice of representation of and to the steelworkers. However, the workforce was not a single homogeneous entity to be assembled and managed as a passive collective, but was rather composed of a multiplicity of individuals with a variety of trajectories and emotional experiences of the mothballing. Understandably in this situation then, the practice of managing and organising this group was sometimes challenging for those attempting to enact these practices. For *Carlton* again, these presentations did not always run smoothly:

“we had a week of erm, them sessions er four a day, erm, and again like some were fine, some were difficult in terms of you know, people you know challenging, sort

of what you're saying.. mostly great, but sometimes in quite an aggressive way really.. and you saw quite a lot of that erm, you know more than what you should have to deal with, but it wasn't a frequent thing in that, you know I suppose, it was few and far between to a certain degree, and sometimes it was about getting to know the guys and like what they were thinking" (Participant M3 '*Carlton*')

Here *Carlton* gives an example of how on occasion there could be resistance to the processes of ordering the workforce undertaken during the mothballing, sometimes to the extent of aggression. Indeed, the tension and emotions on the site also had to be managed and organised throughout this process and again this was achieved through an assembling of different actors within a practice of ordering and managing. For example, *Boosbeck*, a senior Trade Union official based in Steel House described one of the roles of the Trade Unions in the mothballing as:

"throughout the mothballing er, we were used as support for the HR ladies because we were actually used as bouncers, well bouncers in the wrong word but er.. guys were coming in.. and you know they were getting frustrated er.. regarding getting their papers and getting signed off and going and they were coming in and I think a lot of the girls in the HR team got a lot of grief.. so it was a case of 'looka lads, can you just get yourself down there, if they need to spout off or they need to let off a bit of steam can you just be a bit of a buffer, before they got to the front of the queue, you know and you might be able to resolve a few issues'" (Participant M1 '*Boosbeck*')

As *Boosbeck* highlights then, the trade union officials were also assembled into the management of the mothballing and the organising of the resource centre through acting to try and diffuse some of the potential confrontations that might have taken place between the steelworkers and those members of the HR department undertaking varying

processes of ordering and managing of the mothballing. Indeed *Boosbeck* highlights how the Trade Union members acted as a ‘buffer’ for the ‘HR ladies’ – an aspect of the formal Management of the steelworks – against any potential anger and hostility from the very workforce that they existed to represent the interests of and whose trajectories were threatened with transition³⁹. Yet this collaborative approach to the management of the mothballing was also apparent within the relations between the trade unions and the management even prior to the mothballing period. *Eaglescliffe*, in talking about re-joining the management of the steelworks prior to the mothballing period, described this relationship further:

“we moved even closer to working with the trade unions on things like, the number of times we met them we would meet them almost on a daily basis in what I can best describe as really a participative and management role really, we just had a meeting every morning, we didn’t sit, you know management one side of the desk and the unions the other it was just a meeting of people and they had opinions to, er, to express, and guide us through it, because we always knew that Teesside had its work cut out [...]” (Participant M4 ‘*Eaglescliffe*’)

Whilst some might point to the subordination of trade union power since the 1980s and the ‘new realism’ of industrial relations (Garrahan and Stewart 1992) as a means of explaining this process of collaborative management, Trade Union activism has never been as militant or antagonistic within Teesside as within many other Old Industrial Regions of the UK such as the Durham coalfields (Beynon, Sadler, and Hudson 1994). *Boosbeck* further

³⁹ Not to mention the enactment here of a particular form of management gender relations of male Trade Union officials adopting the role of protectors or ‘buffers’ for the ‘HR ladies’. Gender identities within management roles has been discussed at length by Linda McDowell and this example within the steelworks of Teesside exemplifies the myriad roles of masculinity and the conducting of emotional labour within management roles (McDowell 2001).

discusses this collaborative practice of management further within the context of the mothballing:

“I could never recall being in a meeting where it ended in you know you, I have seen some clips in some films where they like [*slaps hand down*] and ‘like up yours’ [...] and off you pop, ‘we’re going on strike and we’ll do this’.. it wasn’t about that because it was about the closure it wasn’t about er disagreements it was about working together.. I can’t remember ever leaving a meeting er when we were at logger heads, er there was some heated discussions, not everything was agreed, and there’s, I mean [A] will tell you and that what I tried to explain in there, you always talk..” (Participant M1 ‘*Boosbeck*’)

And further, when I asked *Boosbeck* whether the power of the unions now lay within this collaborative management approach:

“without a shadow of a doubt.. I think because what you’ve got you’ve got er... and it’s not an old management style, but it’s certainly a management within the steel industry now that it’s not a young, it’s not a young management team.. so they’ve been through them days when they bashed each other on the head, and no good came of it er... and it’s about erm.. through through relationships getting better and the sharing of communications and the sharing of information I think it was realised by the management team, by god there’s some good ideas there, we need to channel into this we need to use it.. I can’t just go and rely on my management team who, some are anti-union, cos they’re just going to dismiss it.. I mean [A] he was great at getting er.. the management and the union team to work together.. erm.. there was a will to work together.. I think there was a very sensible approach from the trade unions that a., we need this management team as much as what they probably need us right now, because they don’t want to do it on their own..

they they've got to get it through to us the understanding of the process, so we can go and relay it back to the workforce because what we had to remember in all of this and all is through having the good relationships is, we were mothballing this plant we weren't closing it, the last thing we wanted to do was start any, erm animosity any erm.. malicious behaviour where people were breaking machinery er deliberately damaging stuff.. we had to close this down so that we could actually start it back up again" (Participant M1 '*Boosbeck*')

We can see from both *Eaglescliffe* and *Boosbeck* then that the trade unions representing the workforce on site and the company Management worked closely together both before and during the mothballing period. Thus, both of these aspects of the steelworks management were assembled within the practices of ordering the steelworks throughout the mothballing period, but this also drew from management practices that also pre-existed the mothballing.

The short extract from Law's *Organizing Modernity* included at the beginning of this section highlights how in the face of a broken piece of vital machinery a heterogeneous group of actors were assembled within novel practices of managing and ordering in attempting to generate a solution to this breakdown. The same process can be seen within the management of the mothballing, whereby a range of actors and practices were assembled to order and manage such a process of industrial change. Some of these pre-existed the mothballing period such as the collaborative relations between company Management and the unions, and some of which were novel practices of ordering, such as the setting up of the resource centre and working with outside agencies such as Business Link or Jobcentre Plus. Such ordering enabled the management of trajectories and of futures through practices such as the establishment and running of the resource centre in Steel House. In

this regard the resource centre functioned as an 'ordering centre' whereby the trajectories of the steelworkers were monitored, where options and possible futures were represented to individuals and where calculations about pensions, retraining, job opportunities, redundancy payments and possible futures were made. As for Law's example, the above practices of ordering operate as a response to transitions of trajectories, however what I turn to now is how a particular trajectory can be held together through such a period of transition.

7.2. Holding a trajectory together

Brown et al. (2012) discuss how particular discourses of transitions, such as within UK government policy, "*hold the future together*" (Brown et al. 2012, 1609 *Original emphasis*). Whilst their discussion surrounds how 'transition' becomes used within particular discourses to hold together possible and desired futures⁴⁰, the notion of the 'holding together' of a future or trajectory is a useful means of approaching what the assembled management of the steelworks was attempting to achieve throughout the mothballing period. In contrast to Brown et al.'s discussion of discourses of transition holding particular futures together, during the mothballing period the assembled management of the steelworks held together a future of restarting steel production in the face of transition brought about by industrial change. Instead of achieving this by employing a discourse of 'transition', it was achieved through the manner in which the steelworks were mothballed and the holding together of a skilled workforce that would enable the steelworks to be

⁴⁰ And thus differs to how I employ the concept of transition as a crossing of the threshold of change that a trajectory can undertake without losing its homeomorphism and becoming a different object.

reopened if a buyer could be found. This was enacted through two key initiatives that I wish to focus upon here: cross matching and the skills retention programme.

In discussing how a particular trajectory of restarting steelmaking was held together I could discuss a number of different practices and activities that occurred in relation to the steelworks. I could talk of the 'Save Our Steel' campaign organised through the unions (with some support from the site Management) that conducted rallies and attended marches across the country to raise the profile of the situation that the steelworks in Teesside was facing in the period prior to the mothballing, and then also attempting to keep the works in the spotlight once the steelworks had been mothballed in the hope of attracting or encouraging buyers. I could also talk of the physical practices involved in mothballing the works, of the process of salamandering the blast furnace in such a way that it could be restarted, or at a much smaller scale the nuts, bolts and buckets of oil of the practices and experiences of the steelworkers of taking apart and mothballing the machinery that they had worked with, in some cases, all of their working lives. Each of these, and other practices too, undoubtedly played important roles in the holding together of this future of restarting steelmaking in Teesside and an entire thesis could be devoted to tracing and discussing these practices alone. However, what I wish to engage with here are two differing practices of holding the future together throughout the mothballing process: the cross matching of employees and the creation of skills retention programme. My rationale behind this choice is twofold: firstly this is a pragmatic choice to focus upon these two practices of management during the mothballing period in order to explore how a particular future is held together in greater depth; secondly, following from the first section of this chapter, both of these practices of holding a trajectory together were dependent explicitly upon the collaboration and enactment of an assembled management made up of

heterogeneous different actors. Ultimately what this focus allows for is an attention towards how in the face of the deterritorialisation and transition of industrial change, a particular trajectory of steelmaking is held together and retains its homeomorphism through assembled practices of management.

Once the decision to mothball the steelworks had been made, a transition was enacted from a trajectory of the steelworks as a 'going concern' (an operational plant) to a mothballed steelworks. However mothballing the site would not be sustainable indefinitely and as such the mothballing was itself an ongoing transition from one trajectory to another. Without wishing to reduce the future to a binary set of options, the two futures that were rendered present for the management of the steelworks were either: the steelworks would continue to be mothballed until the viability of it being restarted would expire almost completely, due in large part to almost irreversible degradation of the physical infrastructure on site or the loss of the necessary skill base from the local economy, leaving only the viable aspects of the works that may be able to continue operations as a standalone business (such as the coke ovens or power station) operational, and only as long as they remained viable in an open market; or an outside buyer could be found that would be willing to invest within the steelworks and restart steel production. It was this second future that the assembled steelworks management sought to hold together in the face of this transition. Yet here then, the retention of a skilled workforce acts as a threshold of change for the trajectory of continuing steelmaking within Teesside which could not be crossed if this future was to be held together.

Skills have been engaged with by geographers through a number of different modalities and empirical sites, whether the de-skilling of a workforce (Braverman 1974), the learning of skills and crafts (Holmes 2015; Lea 2009), skills shortages within local economies (Watson, Johnson, and Webb 2006; Danson 2005), cross industry transfers of skills (Izushi and Aoyama 2006), skilled migration (Aure 2013), and as a measurement of regional wages and city size (Florida et al. 2012). Skills have also been positioned as a means of addressing uncertainty and redundancies brought about by industrial change through the policy discourse of 'employability' (Hartshorn and Sear 2005; Danson 2005; Shuttleworth, Tyler, and McKinstry 2005). Yet for Shuttleworth et al.:

"Employability is, however, about far more than bringing the jobless back into work. It is also about increasing the flexibility of those already in work so that they can take personal responsibility for their careers and cope with increasing uncertainties in the labour market." (Shuttleworth, Tyler, and McKinstry 2005, 1653)

Thus, skills are utilised within this policy focus upon 'employability' as a means of increasing the flexibility of the individual members of a particular workforce through their skill set as a means of allowing them to cope in increasingly uncertain labour markets. Yet whilst skills have been deployed within this 'employability' discourse as a means of dealing with uncertainty in terms of the individual, the role of skills was somewhat different within the mothballing of TCP. What was taking place within the Teesside steel industry following the mothballing was an attempt by the assembled company management to retain enough of a skilled workforce so as to be able to hold a trajectory of steelmaking together. Here the dissolution of the workforce through complete closure and redundancy would lead to the crossing of a threshold of change and a transition to a new trajectory for the steelworks within which no future of steelmaking could be rendered present. However, the process of

attempting to hold this trajectory together had to be managed through particular practices, two of which form the focus of the remainder of this chapter.

Within chapter 4 of this thesis I elaborated upon how I conceptualise trajectories as being fluid and homeomorphic. However as a trajectory is also an assemblage, it does not sit above or behind the objects to which it pertains, but rather exists through an assembling of heterogeneous components. As Dan Swanton (2013) identifies, a steelworks is an assemblage of materials, knowledges and practices (Swanton 2013) and as such the homeomorphism of this assemblage is also dependent upon the homeomorphism of these assembled components. Within Teesside, the homeomorphism of a trajectory of continued or restarting steelmaking was dependent upon maintaining the homeomorphism of the steelworks as an assemblage in its own right. Therefore the holding together of a particular trajectory of a future of steelmaking is also the holding together of the steelworks within a particular threshold of change. Indeed, as an assemblage a trajectory is always becoming in that it is constantly in a state of flux (Massumi 2004), however such becoming must occur within particular mobile boundaries or thresholds (of which no one boundary is privileged above others) in order for the assemblage to remain the same object.

As for Mol and de Laet's Bush pump (de Laet and Mol 2000), the steelworks is composed of multiple mobile boundaries, or thresholds, which cannot be crossed otherwise the object loses its homeomorphism and undergoes a transition to a different object. In the face of increasing deterritorialisation and change throughout the mothballing period, the assembled management of the steelworks engaged in numerous practices of holding together the steelworks assemblage. In order to keep the site in a condition whereby it

could be bought by another company and steelmaking restarted, two key things needed to happen. Firstly the manner in which key aspects of the steelworks were mothballed had to take place in a particular way. Perhaps the biggest example of this is the blast furnace which had to be shut down, or salamandered, in such a way that it could be restarted in future. Without observing this process, the blast furnace (one of the steelwork's most central components) would be rendered practically unusable, and the trajectory of restarting steel production in Teesside would lose its homeomorphism. Furthermore, decisions had to be taken in regards to which plants to close, with some plants remaining open as standalone businesses, as with the coke ovens for example. Secondly, enough of the workforce had to be retained or at least kept within the area, as the steelworks would not be able to restart with a completely inexperienced workforce. In addition to the steelworkers that were taking their redundancy or retirement packages and thus counselled as described previously, the assembled steelworks management also needed to retain core aspects of its workforce in order to work on the plants that remained operational during the mothballing, ensure the continued maintenance of the mothballed site and equipment, and who could be retained for their skills and experience if the works were to restart steel production. Should the steelworks be closed in their entirety, a large proportion of the steelmaking workforce (which had not been of retirement age) would likely need to move out of Teesside to find work, taking valuable skills, knowledge and steelmaking experience out of the local area. Should this dissolution of the workforce occur, any trajectory that retained a future of steelmaking for Teesside would undergo a transition to a new trajectory where such a future was absent. Thus, whilst the mothballing of the physical iron and steelmaking infrastructure was obviously of great importance to holding a future of restarting steel production together and present, an equally or potentially more important challenge related to this latter issue of retaining the necessary skills either within the business or at least within the Teesside region. Through the

retention of a particular level of skill and experience within the local workforce then, a potential future of a return of steelmaking to Teesside was held together by the assembled management of the steelworks. I want to focus here upon the two main ways in which the assembled management of the steelworks held together a trajectory of steel production through retaining a skilled employment base: cross matching employees that were below the early retirement threshold into job vacancies left by retirees in the plants that were to remain open, and a skills retention scheme designed to retain those that could not retire but could not find alternative employment within the company.

7.2.1. Cross-Matching

As discussed previously, in the face of the mothballing of TCP the key priorities of the management of the site were to ensure that those needing jobs could be kept in employment and also that enough of a skilled workforce could be retained within the business or at least kept within the Teesside area that restarting steel production would remain a viable and present future. A key modality through which this was attempted was via a process of cross-matching. This involved identifying vacancies left by people retiring or accepting voluntary redundancy from the plants in the steelworks that were to remain open during the mothballing period and allowing employees from the plants that were to be mothballed to apply for these vacancies. As *Eaglescliffe* describes:

“one of the things I’m really proud of was that we worked together with the trade unions and managed that exercise without having, er, if anybody wanted to stay even if it was on the er, skills retention programme, then that’s what they could do so they didn’t, they didn’t have to go hard redundant.. what you did have and it was inevitable given the age profile of the workforce was you had a number of

people then who, from their own personal point of view thought 'well this isn't a bad time for me to go anyway on a retirement basis so I can get me pension,' at that time the law was changing about when the ages of people could take early retirement pension etc. so that was a spur to some people to say 'hey I'm going to take my pension now and that'll do me thank you very much so I'll go,' you had other, tended to be younger people, who wanted a life, wanted a job rather they had a life to run and a family to feed and all the rest of it erm.. and again with very much from within Tata we were able to cross match people with other parts of the area, er, and that turned out to be really successful" (Participant M4 '*Eaglescliffe*')

And further for *Stokesley* and *Boosbeck*:

"it was you know, a part of the process, dealing with the HR and manpower implications there was cross matching facility that we could put in place with a cross match committee, er, made up of obviously Management HR, TU lads, er.. where we were trying to broaden our horizons as far as we could, to make sure we didn't have any casualties in amongst all of this, and used other arms of the business, so trying to cross match people into the beam mill which wasn't part of our business at the time, cross match people into Skinningrove and Hartlepool so it was a real effort from everyone's part, from the satellite businesses, to help and assist in getting people er fixed up," (Participant M2 '*Stokesley*')

"what the crossmatch committee did was it identified anybody within that new raw materials business that I was talking about who would like to go as well so even though you were a steelmaker, er you had the opportunity er what they did, you've got iron making and steelmaking they went to the raw material and said to all the guys 'right, who wants to go?' and all the guys who were over 50 who meant getting their redundancy and, they wanted to go they'd go tomorrow at the drop of

a hat.. so then there was an exercise to get the guys out who wanted to be out, and get the guys from steelmaking into them jobs, trained up” (Participant M1 ‘Boosbeck’)

Evident within the above quotations then is that the process of cross-matching allowed for people who were unable to take their pension and retire to apply for emerging vacancies in the still operating plants and if they were successful therefore remain employed within the company. We can also see from both *Eaglescliffe* and *Stokesley* how this was enacted through a committee that was formed through aspects of the formal company Management, the HR department and Trade Union representatives and therefore exemplifies the assembling of a particular practice of management as discussed within section 7.1. In terms of the holding together of the steelworks and the holding together of a trajectory of restarting steel production, what the above also shows is how this was a process of ordered or managed change. Through identifying those employees that might be willing to retire from the steelworks (‘who wants to go’) the management were enacting a significant deterritorialisation of the steelwork’s labour force, however in a way in which it allows the steelworks to retain its homeomorphism as a steelmaking assemblage and thus hold the trajectory of restarting steel production together. Here then, as within Law’s four criteria of homeomorphism, no particular boundaries are privileged, and steelworkers can be added or removed or remove their selves. By cross-matching those from the steel and iron making sections of the steelworks that could not retire into the job vacancies left behind by those eligible for early retirement (and therefore able to fulfil their desired personal trajectories in many cases) the management of the steelworks was able to hold together enough of the skills, experiences and knowledges that would be needed to restart steel production.

Yet as for Law, for an object to retain its homeomorphism, change to the object must remain within particular thresholds and must occur incrementally otherwise the object will undergo a transformation (or 'rupture') into a different object. As *Carlton* begins to identify, the cross-matching process was not simply a process of identifying vacancies and finding people to fill them. Indeed:

"you don't just drop a steelworker into the coke ovens there's a big training thing involved in that, so you had the recruitment part of it which was identifying what the vacancies are, advertising them, getting people to do the applications, getting the managers to sift them, getting the interviews, and then getting people contracts etc, erm.. over a relatively short period of time, I mean it wasn't all done in the same period, I think er, they worked around that to a certain degree"

(Participant M3 '*Carlton*')

And further for *Boosbeck*:

"the guys who wanted to leave were sort of like, we had to say to them 'well looka guys, you can leave you can go, there's your money there's your redundancy, there's your pension it's safe, but we need to train these guys up, and so if you just drop us in the lurch', so they all stuck their hands up, 'we'll stay', so what we did is we actually took the guys back on as agency workers that's the only way we could do it, so we had the agency, they came back on as the agency and they helped train the steelmakers who were successful," (Participant M1 '*Boosbeck*')

Here then the deterritorialisation enacted within the steelworks by the management through cross-matching had to be managed to ensure that such change and becoming remained within particular thresholds, in this case thresholds of training and proficiency within a particular role. The process of managing this cross-matching was thus one of

holding together skills within the workforce as the steelworkers from the mothballed plants had to be trained and learn the skills required to work in their new cross-matched positions. The loss of skills and experience through the dissipation of the workforce through redundancy and retirement would cross a threshold of change for the trajectory of steelmaking that the assembled management sought to hold together. Without the required levels of skill and experience within the steelmaking workforce, a future of restarting steelmaking on Teesside could not be rendered possible following this transition. This is not to say that the remaining workforce of cross-matched employees were unskilled, but rather that their own skills and knowledge of steelmaking were situated within the now closed plants. Without the transfer of sufficient skills and knowledge across the workforce, these cross-matched steelworkers would not be able to safely and effectively work within these different environments of the coke-ovens, wharf or power station. As such, and as *Boosbeck* highlights, the way that this transition was managed was through bringing back the retiring employees as temporary agency workers in order to train up the new employees, ensuring a continuity of skill and knowledge within the workforce. In this sense then, the boundaries of employment became mobile to allow those that wanted/needed to retire the scope to do so, but also to remain onsite in a training role in order to ensure that the plants could continue to operate effectively and safely, and thus the steelworks and workforce to retain the homeomorphism of its workforce.

7.2.2. Skills Retention

The process of cross-matching allowed those that wanted to retire and access their pensions to be able to do so, but also to allow for those that were not eligible to take such early retirement and needed to remain in employment to apply for the vacancies left by those retiring. However the sheer scale of the workforce – over 1800 employees – meant

that finding employment for all those from the mothballed plants unable to retire was always going to be very difficult to achieve. Faced with this challenge a skills retention programme was developed⁴¹ as a means of either retaining or up-skilling employees who had not been able to be redeployed within the steelworks. The scheme ran for approximately six months from June 2010 and at that stage hopes were beginning to rise and rumours circulate that a buyer might be interested in the plant. Indeed, as *Carlton* describes:

“so that 300 in terms of who was still at risk dropped down to about 200... and then it dropped down to 100, so we were left with about 100 people in, the June time, June July time maybe, June, yeh.. and... it was looking at what we could do with them and by then there was some inkling of the sale [...] it hadn't actually happened and I think, I don't think it was rumour as such erm.. and again I haven't got the exact time of when an official announcement was made.. so, that's when we looked at what we called the skills retention programme” (Participant M3 '*Carlton*')

We can therefore see from this quotation that by June 2010, the majority of people needing a job in the steelworks had been cross-matched into one of the operational plants, however there remained some 100 people at risk and without a cross-matched position. Yet, as *Carlton* highlights at this point there was some speculation that the steelworks might be bought by an outside company. As such, it became even more prescient that the steelworks maintain as much of its workforce as possible. Indeed:

“we had the possibility that once the once the er plant opened back up we'd lost all.. er knowledge skills experience, so it was really important to to, you know

⁴¹ Interviewees talked about a 'bursary scheme' and skills retention programme' interchangeably. As far as I understand these refer to the same thing and as such I shall refer to this process as 'the skills retention programme.'

retain the skills within the plant and I think there was roughly about 300 people, we've talked about, went on the bursary scheme, that might have been whittled down because there were several projects going on er, across the works, that we could put teams into as well, especially the er craft fraternity.. but it was really important that when we went back to starting that up that we weren't starting from scratch" (Participant M1 '*Boosbeck*')

And further for *Stokesley*:

"however we still did have a number of people who er were still at risk er.. and we devised a sort of skills retention programme, er which was a sort of bursary scheme with the help of Gateshead College where we thought we could you know, we looked at providing meaningful training for people, one to keep them on our site so we could utilise their skills when the more positive times come, but failing that it was about keeping the skills within our region as well so we didn't want unnecessarily, people having to leave the area to go and look for work and taking their value and skills out of the region so yeh yeh it was it was successful in that respect in that, one we didn't have to er, you know make people redundant, we could keep people, keep people employed, we could up skill people and we ran that sort of bursary scheme for 6 months whilst something was always on the horizon, and then we fully utilised them people, you know once once we had a bit more positive news that a transaction was going to take place" (Participant M2 '*Stokesley*')

Here then, *Stokesley* provides a succinct overview of the rationale behind the skills retention programme: firstly to make sure that they could provide jobs for people (to avoid having to 'make people redundant'), improving skills within the workforce ('up skill people') but also to keep a skilled steelmaking workforce not only within the company but also

within the Teesside area so that they could be 'fully utilised' when steelmaking was to be restarted. Thus the workforce had to be held together, if not within the company then at least within the area, in order to provide a skilled employment base that could be drawn upon should the steelworks be bought and restarted. The boundaries of retaining the workforce thus became mobile in that those that could not be found a viable position within the company were rather enrolled upon a bursary programme as a means of retaining their knowledge and skill in the local area and therefore reterritorialising their labour power, thus avoiding a crossing a trajectory of the loss of such skills and experience from the labour force within Teesside.

However, as the cross-matching was not simply a case of redistributing resources in different roles, the operation of the bursary programme was also more complex than a case of allocating employees a space within this scheme. As *Stokesley* describes this also involved a process of managing trajectories and expectations:

“a lot of people on the scheme I think felt.. that they were the ones that had been left behind, they hadn't been fixed up with a permanent job, they hadn't been cross matched into one of the satellite plants and they felt that they were the ones that were feeling, quite vulnerable at that time er.. you know quite worried about it, how long could we run this bursary scheme for, we kept trying to keep people positive, and that was another one of our functions and roles was to keep people positive in all this, it wasn't about building people's aspirations up you know er, too highly, it was about being honest with people being truthful er.. and keeping people focussed and trying to keep people positive, because then that group of people that were on the bursary scheme did at one, at many times, feel that they, there would be a moment in time when their notice would be served and they

would be unfortunately er, be made sort of hard redundant but you know, we managed to keep them focussed, they undertook the training which put them in good stead for the future when they were looking for alternative roles within the business, and again very pleased to say that throughout all this er.. you know nobody left this business that didn't want to leave the business" (Participant M2 '*Stokesley*')

Thus for *Stokesley*, the holding together of the workforce through this particular bursary scheme also involved the management of trajectories and 'aspirations'. Within his role as a Trade Union representative, he describes his role as one of keeping people 'positive' and 'focussed' through the training scheme. Again, for *Hemlington* the importance of maintaining these employees within the workforce is highlighted:

"I think we had we had the the, group of people who we didn't find, roles for I think there was a population of 80 to 90 people who.. they went onto a bursary scheme for a period of 3 months 3 to 6 months they went into courses at Gateshead College it was the erm.. or they'd go on placements in other areas of Corus and Tata and have a look out there, it, who were they probably didn't feel very well looked after I think they felt a little bit forgotten, but, because we knew there were companies interested, we did get very determined in not letting these people go redundant, because for a lot of them they weren't long serving, and their redundancy packages weren't amazing for them because of the minimum service that they had erm so.. other companies, you might have seen letting them go, because there weren't the jobs available so I do think them as a population were very well looked after, and at restart these were our priority really to get these guys redeployed onto plants where they could get back into their jobs that they'd been doing and, add the value at that point" (Participant M5 '*Hemlington*')

The assembled management of the steelworks therefore sought to hold together the aspects of the workforce that it could not find a viable role within its ongoing plants through enacting a bursary training scheme in partnership with Gateshead College. Particularly at a time when a possible sale of the steelworks was on the horizon, the importance of holding together the workforce and with it the skills and experience of these employees became increasingly important as a means of holding together the steelworks as a steel-making assemblage and thus also maintaining the presence of a trajectory of restarting steelmaking. By allocating workers that might otherwise have been made redundant to the bursary training scheme the management was not only making sure that these workers could continue to remain in some form of employment, but also that the skills needed to restart the steelworks remained within the company, albeit within extended boundaries that now stretched to include Gateshead College. In this sense, the homeomorphism of the steelworks as a steelmaking assemblage was retained as the essential knowledge required to restart steelmaking remained immanent within the steelworks through the continued retention of a steelmaking workforce.

However, implementing this skills retention scheme was not without challenges. As *Lingdale* highlights, the attempts by the assembled steelworks management to hold a future of steelmaking together did not take place within a vacuum, but within a wider local and national political context. In *Lingdale's* words:

“remember it was the time just before an election, and I don’t think erm, I think the incumbent Labour government were reluctant to commit to something at that time, they wanted to be seen to be doing something obviously, but putting money into it we kept and to be honest I don’t think it was the politicians I think it was the civil servants more that were an issue, as soon as you try to put, as you probably

know from your research, steel, funding to the steel industry is fraught with problems because of state aid issues come into it, but for me, this was training, this actually wasn't the steel industry" (Participant M8, '*Lingdale*')

There are two issues of note within this quotation. The first relates to the particular political context within which the mothballing was taking place: the 2010 general election. For *Lingdale*, there is a suspicion that there was little political will to get involved with an issue that could prove to be destabilising to a political campaign (particularly one whereby the incumbent Labour government looked to be losing in the polls). Such a sentiment is also echoed by *Carlton*:

"what made it difficult in that as well was when the election was on, so there was a period of time, I can't remember what they call it now.. erm, where you couldn't even really talk to MPs let alone agree anything whilst the election was going on" (Participant M3 '*Carlton*')

Throughout the early stages of the mothballing then, the general election meant that even if the political will might have been there for a strong central government involvement within these efforts to hold a future of steelmaking together, MPs and political parties would be less likely to take risks in making new commitments (and may not be in office to make good on such commitments following the election)⁴² and in *Carlton's* view also had

⁴² The initial government response presented by the then Business Secretary Lord Mandelson, promised an 'aid package' to Teesside of some £60m to be delivered through the Tees Valley Industrial Programme and ONE. However half of this money was to be diverted from existing ONE funding for the North East. As stated in a parliamentary report: "Mayor of Middlesbrough, Ray Mallon, pointed out that the £60 million is not directly targeted at Corus workers. He also pointed out that half of it is being drawn away from other projects within the North East rather than being entirely new money. The North East Chambers of Commerce, too, have expressed concern about the diversion of ONE resources. Cllr George Dunning, Leader of Redcar and Cleveland Borough Council, said that the money was welcome, but not enough, and being spread beyond the steel workers and to the chemical industry; the Council thinks another £40 million is needed." (North East Regional Committee No date). The aid package announced in December 2009 was intended to focus upon generating new jobs and employment within the North East rather than focussing upon TCP specifically (Business Innovation and Skills 2010) and half of this funding was a diversion of existing resources rather than new funding.

their attention placed elsewhere rather than on the situation within Teesside's steelworks. The second challenge that *Lingdale* highlights within the aforementioned quotation is the issue of 'state aid' regulations in regards to the EU. Simplistically speaking these regulations are designed to stop national governments financially supporting their steel industries in order to maintain fair competition within EU markets⁴³. *Lingdale* hints that in the absence of a political will to intervene at a national level, such regulations were used as something of an excuse to avoid central government involvement. *Carlton* elaborates further on what the assembled steelworks management, including the various agencies that it was working with, attempted to do to work through these challenges:

“One North East was involved, not, necessarily with Jobcentre Plus, Business Link was involved to a certain degree, and the Skills Funding Agency was heavily involved in terms of what the funding might look like an all of that, I mean [A] was involved and [B] was involved in terms of at a senior level of what that programme would look like and how it would be funded really, and, it was intriguing for want of a better word, it went up, to MPs and came back down saying it couldn't be done, I mean I'm of the opinion now you know, it's not about can't it's about won't.. certainly with funding and government money erm.. there's certain rules erm.. but you know, one of the rules, that was heavily mentioned then was state aid, and, you know, what we tried to do was get.. them so these guys were paid a bursary whilst doing training.. to be funded, what we got in the end was.. all the training

⁴³ That government intervention to keep the steelworks open, or 'state aid', would be illegal within the EU was a position taken by both Business Innovation and Skills and the Government Office for the North East according to parliamentary records: “Shortly before Christmas, in a parliamentary debate, the Business, Innovation and Skills Minister, Rt Hon. Pat McFadden MP, said both that Corus had not asked for Government aid to keep the plant open and that such aid would not in any case be possible under state aid rules. The Government Office for the North East says that EU state aid rules are stricter for steel than for other sectors. Aid is restricted to the purposes of research and development, environmental protection and implementing plant closures. The Government believes that any financial support aimed at keeping the plants open would probably be declared illegal by the European Commission.” (North East Regional Committee No date)

was funded.. and we contributed to, this bursary, it wasn't a bursary really but, but that's what we called it, and we were told you couldn't because the, but I know for a fact you can because we'd accessed it before, we'd accessed it in terms of universities in terms of where we sent some of our graduates to do a MSc and they were paid a bursary you know" (Participant M3 'Carlton')

Here then, *Carlton* highlights how a variety of agencies such as ONE, Jobcentre Plus, Business Link (and elsewhere Business Innovation and Skills), and the Skills Funding Agency became enrolled within the assembled management of holding together the Teesside workforce through the skills retention programme. However, as the previous quotation shows, initial suggestions for funding such a skills retention programme were rejected by MPs, and instead what was achieved was funding for the training provided through Gateshead College with the workforce still being paid largely in part by the steelworks - who contributed £1.5m to the bursary fund through which these steelworkers were paid (*BBC 2010b*) - however this money was delivered through the college rather than the steelworks itself. For *Carlton*:

"I think if I remember rightly and again I think they actually came off our books to a certain degree, so we didn't pay them.. they were paid via Gateshead College by this bursary but they still had this continuous employment in terms of what that looks like, erm, the holidays were slightly different so, during that 3 months we said these are the amount of holidays you've got to build it in with your training so, there were a lot of HR issues to deal with in terms of what that looks like, what the contract looked like, erm.. which was totally new, we'd never done anything like that before and I'd never worked anywhere where they'd done anything you know, it was almost like a secondment but to someone else and they were paid by someone else, so basically we zeroed their salary here, and they got paid by the

college which as it came brought its own issue around tax” (Participant M3
'Carlton')

Here then, the boundaries of employment become mobile for the steelworkers on the skills retention programme. On paper at least they appear no longer to be employed by the steelworks but instead enrolled within a bursary training scheme delivered through Gateshead College and funded through an assemblage of local and national government agencies with approximately £1.5m being invested in these bursaries the steelworkers received by Corus (*BBC 2010b*). Yet in doing so these employees could be retained within the company and held together within a trajectory of restarting steelmaking so that should the steelworks be bought (which was looking increasingly promising at the time of the skills retention programme) they could utilise their experience and knowledge within the new business.

In sum then, the management of the steelworks held together a trajectory of restarting steelmaking through a number of management and ordering practices, however key to this holding together was the retaining of a skilled workforce capable of restarting the steelworks. To lose these employees would be to lose the homeomorphism of the steelworks as a steelmaking assemblage, crossing a threshold of change whereby a trajectory of restarting steelmaking would become unviable. Therefore, through cross-matching employees into the positions left within the operational plants by those retiring or taking voluntary redundancy and by instigating a skills retention programme that would allow those who could not achieve a cross-match position to remain a part of the steelwork's labour force, the management of the steelworks were able to hold a steelmaking workforce together and therefore held a trajectory of restarting steel production together. These processes involved the deterritorialisation of aspects of the

workforce and then their reterritorialisation within new roles either on the remaining operational plants or within the skill retention scheme. Following from Law (2002) then, this process of holding a future together is a process of retaining homeomorphism whereby change and becoming are essential, yet must occur incrementally and within particular mobile thresholds of change, and the boundaries of the object must remain mobile.

7.3. Trajectories managed

A diverse assemblage of management practices, people and sites were assembled as a means of managing and ordering the mothballing process. This assemblage of management sought to hold together a particular trajectory of steelmaking on Teesside through a number of management practices and was thus a means of dealing with the uncertainty brought about by industrial change. A resource centre was set up within Steel House which functioned as a 'centre of ordering' (Law 1994) whereby steelworkers were invited to attend meetings with advisors from agencies such as Jobcentre Plus and also the HR department of the steelworks whereby particular futures and trajectories were represented to the steelworkers and discussions made regarding these options. Employees were also cross-matched into job vacancies left by those over 50 years of age retiring from the plants that were to remain open throughout the mothballing. Here then, the management undertook a process of deterritorialising the aspects of the workforce that were too young to retire but whose positions at one of the mothballed plants were untenable. This was therefore a practice of managing the trajectories of the workforce and reterritorialising them into these positions on the plants remaining open, and through this a practice of holding the workforce together. Similarly, for those who could not obtain a cross-matched position, the assembled management also sought to set up a skills retention scheme. In this way it was able to hold this aspect of the workforce together through

making the boundaries of employment mobile to include training programmes at Gateshead College. Thus the workforce and the skills and knowledges that they possessed could be held together and therefore the homeomorphism of the steelworks as a steelmaking assemblage that could be viably restarted was maintained. In this way then, this assemblage of management sought to hold a particular trajectory of steelmaking in Teesside together through this period of transition.

A resource centre, cross-matching, a skills retention scheme: all of these were strategies of an assembled steelworks management to hold a trajectory of steelmaking together and attempt to avert the crossing of a threshold of change which would render a future of steelmaking for Teesside absent. Yet this 'holding together' was a complex process which required an assembled effort from a range of actors including trade unions, Management and government agencies, which took place through different management practices such as the negation of potential conflict or antagonism between the workforce and the assembled steelworks management; the providing of support and advice to steelworkers experiencing disruption to their own trajectories; cross-matching steelworkers into job vacancies; and retaining skills within the steelworks. Thus, whereas chapter 6 focussed upon how trajectories come to be disrupted through industrial change, this chapter has highlighted some of the ways in which a particular trajectory – in this case one of steelmaking – can be held together throughout a transition brought about by such industrial change. However there is a third insight into the role of trajectories within industrial change that this thesis seeks to make: that of how new trajectories can be assembled and enacted. This provides the focus of discussion within the final empirical chapter, to which I now turn.

8. Assembling new trajectories: Economic regeneration planning in Teesside

The steel industry of Teesside, of course, sits within wider networks and assemblages of economies and governance and as such is enrolled within further trajectories and orientations towards the future at local (and also national) government level. The implications of the mothballing of TCP in 2010 extended beyond the steelworks and its workforce, and its effects were also felt within local and regional government. Whilst efforts to regenerate Teesside and reduce its reliance upon large heavy industrial employers predate the mothballing, the events of 2010 and the uncertainty that they enacted within Teesside further emphasised the necessity of creating new economic futures within Teesside in the eyes of many involved within local governance. Thus, whereas chapter 6 addressed how trajectories came to be disrupted and lived through by individual steelworkers during the mothballing, and chapter 7 attended to how a trajectory of steelmaking was held together through this period of transition, this chapter now turns to how new trajectories and economic futures have been assembled for Teesside and how a transition to these newly assembled trajectories is actively sought by two local government institutions. The first is Redcar and Cleveland Borough Council (RCBC), a local authority within which much of the steelmaking infrastructure of Teesside is located and where a large proportion of the steelworks workforce resides; the second is Tees Valley Unlimited (TVU), the Local Enterprise Partnership for the Teesside region and arguably the successor to the regional development agency One North East (ONE). Both of these organisations have assembled particular (and often overlapping) economic futures for Teesside through which they have sought to enact a transition from what they position as the current industrial trajectory within Teesside, to the enactment of this new trajectory of economic growth. However, these organisations in large part lack the resources to undertake the enactment of these futures in their own right, instead having to rely upon the facilitation of private sector investment and as such the assembly of these futures and

the attempting enactment of this transition has been diagrammed by an abstract machine (Deleuze and Guattari 2004; Gidwani 2008) that I come to refer to as that of 'flexible facilitation'.

Within the conceptualisation of the concept of assemblage, Deleuze and Guattari position the abstract machine as the functionality which draws an assemblage together. This does not serve in linear causal capacity, but rather as the diagramming of the potential functionalities of the assemblage which is itself assembled and subject to change and becoming through the assemblage itself (Deleuze and Guattari 2004). Abstract machines are therefore also assembled within trajectories and orientations towards the future. For many of the steelworkers in chapter 6, an abstract machine of employment or maintaining an income stream could be said to diagram their trajectories in the wake of the mothballing; for the steelworks management discussed in chapter 7, a functionality of steel production could be identified as diagramming the trajectories that the management sought to hold together. However, whilst these abstract machines are relatively established within the trajectories that they diagram in the sense that these functionalities have diagrammed the trajectories of these respective actors for a long time (and thus the banality of these machines render the concept of the abstract machine a less useful tool for exploring the role of futures within industrial change), the role of the abstract machine is of particular importance in the attempt to assemble a new trajectory. As discussed within chapter 2, in 1989 Ray Hudson critiqued the move within regional and economic geography to herald a new era of post-Fordist flexibility within industrial production (Hudson 1989a). Using examples from the UK's old industrial regions, Hudson claimed that this was not the case as the heterogeneous nature of labour and working practices within old industrial regions could not be fully considered 'Fordist' in the first place and that such a claim was

dealing in general trends rather than specifics within these regions. However, I want to reclaim this term of 'flexibility,' not in relation to a new regime of accumulation, but rather in terms of regeneration and the trajectories that TVU and RCBC are attempting to enact. Here these plans for regeneration and economic futures within Teesside equate to new trajectories of regeneration within which flexibility plays a key diagramming role as an abstract machine.

Both TVU and RCBC are attempting to enact a transition, albeit to varying degrees, from a trajectory of regeneration being provided by regeneration agency and local authorities towards an assembled trajectory of economic growth, diagrammed by a machine of what I term 'flexible facilitation.' Both of these organisations seek to develop a process of regenerating Teesside by working in partnership(s) with public sector bodies and the private sector with an aspiration to increase involvement from the latter, particularly given that RCBC are having to find over £30m of cuts from their budget by 2020. For TVU this is a transition from the previous trajectories of regeneration adopted by Teesside Development Corporation (TDC) and One North East (ONE) which were both able to deliver regeneration projects in their own right. TVU, as a result of government funding arrangements, must now deliver its regeneration plans through other actors, the private sector in particular. ONE spent £273m in 2008-9 (One North East 2009) and TDC spent over £400m over its 11 year lifespan (Robinson, Shaw, and Lawrence 1999; National Audit Office 2002), whereas TVU has an annual budget of £2m largely to cover staff costs and funded through the five local authorities of the Tees Valley. Whilst its 2013 annual report claims to have secured £34.5m of direct government funding in 2012-13 to deliver key projects (Tees Valley Unlimited 2013), such funding is contingent and not guaranteed year on year. Hence, whilst TVU is able to leverage some money into Tees Valley, this funding is precarious and not

guaranteed to the same extent that ONE and TDC's funding was. Similarly, RCBC, which has delivered some regeneration projects through direct investment itself, is increasingly looking to other actors to regenerate Redcar and Cleveland on its behalf in the face of having to find over £33.765m of spending reductions by 2020 (Redcar and Cleveland Borough Council 2013) on top of other cuts already made by the council and to other organisations that contributed to regeneration within the borough (such as the dismantling of ONE which provided a substantial amount of regeneration funding). Therefore both RCBC and TVU increasingly position themselves as facilitators of regeneration that must be flexible to fit in with the wishes and needs of the actors that they must engage in partnerships with.

Within this chapter I will present an analysis of the new trajectories of economic growth assembled by RCBC and TVU and their attempts to create a transition to the enactment of these new trajectories of growth, within which the steel industry of Teesside is notably absent, yet which remains present within the current trajectory of a perceived reliance upon heavy industry. This will be achieved through a documentary analysis of two key planning documents: RCBC's *Regeneration Masterplan* (henceforth to be referenced as *RM*) and TVU's *Statement of Ambition* (referenced as *SoA*) (Redcar and Cleveland Borough Council 2010; Tees Valley Unlimited 2012). This is supplemented with interview material from participants involved with the management of both TVU and RCBC. The chapter proceeds in two broad sections. Within the first I will attend to how particular imagined futures of economic growth are being assembled and rendered present within the planning discourse of both TVU and RCBC. Following this, the chapter will focus upon how such a trajectory of economic growth is diagrammed by an abstract machine of a particular approach to economic growth that I term flexible facilitation.

8.1. Assembling a trajectory

The regeneration planning of TVU and RCBC is an attempt to enact a transition to a new trajectory of economic growth within Teesside. A key modality through which this is achieved is the rendering present of particular imagined futures within the planning discourses of TVU and RCBC. Chapter 6 attended to how particular futures of steelworks closure were rendered present within the trajectories of the steelworkers of Teesside and the varied modalities through which these futures came to be related to. Similarly here, the two key planning documents of RCBC and TVU are both means by which these futures come to be 'presented' – in both the sense that they are representing these futures and also rendering them present and relatable within Teesside's economic trajectory. Through these documents, specific futures are positioned as the object or goal of regeneration within Teesside and function as a means of rendering a particular trajectory of economic growth as present within this regeneration discourse.

However, in assembling and 'presenting' a new imagined future for Teesside, both TVU and RCBC must also displace and make room for this new future within the trajectory of Teesside's economy. Within chapter 3, this thesis discussed the work of Barbara Adam and Chris Groves and their concepts of the embodied and contextualised future, and the commodified and empty future (Adam and Groves 2007). For these authors, this latter conceptualisation of an empty future is tied to contemporary economics and provides a useful tool for conceptualising the work that both TVU and RCBC's planning discourses had to do to render these new imagined futures present. Here the emptiness represents a space for conquest, colonisation and control through technological and economic progress,

and whereby the future's dislocation from any context, objects, actors or things renders it as a realm of endless and open potential for commodification. However, despite Adam and Groves' positioning of this in opposition to an embodied future, dealing with both of these representations of the futures in absolute terms obscures some of the complex relations that organisations such as TVU and RCBC have with the future and some of its embodied components, such as Teesside's industrial heritage. In this regard, I position both of these futures as poles on a continuum and instead of discussing an 'empty' future, an attention to a *process of emptying* is a more appropriate conceptual tool for understanding this assembling of regeneration policy. Here then, TVU and RCBC through their key planning documents simultaneously engage in a process of emptying the future of Teesside and then rendering present a particular imagined future of economic growth. Drawing from Deleuze and Guattari (from whom Adam and Groves have also been influenced⁴⁴) these practices of emptying and repopulating of the future are therefore processes of (partially) deterritorialising and reterritorialising or reassembling a particular imagined future within a trajectory. However, as the reader will recall from chapter 3, neither deterritorialising nor territorialisation deal in absolutes but rather operate upon a continuum in tension between emptying and embodiment. Aspects of an imagined future can be thus emptied and deterritorialised from this imaginary and reassembled and reterritorialised in novel formats within a different trajectory. TVU and RCBC deploy particular imagined futures as a means

⁴⁴ Adam and Groves draw from Deleuze and Guattari who position two modalities of participating in the world; as an architect or as an artisan. For these authors, the architect modality (drawing from Plato) has been an enduring feature of western thought, whereby the architect has a vision of what they wish to achieve and then mobilises passive materials to achieve this vision. The artisan on the other hand is represented as nothing more than passive wage labour to be instructed by the architect. However, Deleuze and Guattari (and also Adam and Groves) present the artisan in a different light, as a means of participating in the world and the creation of particular futures through embodied experience and knowledge of working with non-passive materials. The artisan must enter into an assemblage with the material that they are to transform (which in turn transforms them). Hence Adam and Groves use this model of artisan participation in the world to illuminate a model of future construction and enactment that rests on symbiosis in an active world.

of deterritorialising aspects of Teesside's economic trajectory through their planning discourses as a means to attempt to assemble a new trajectory of economic growth.

To begin this process then, both TVU and RCBC position a particular concrete representation of the future to be 'emptied' within their planning documents that serve to deterritorialise and reassemble aspects of Teesside's economy and render a particular trajectory of economic growth present. This future consists in large part of economic threats that must be mitigated against if the region's economy is to grow and living standards are to be maintained, and also economic opportunities that must be taken advantage of if Tees Valley is to 'unlock its potential.' Indeed for TVU:

"our existing economy is still based towards a small number of large scale employers, and the public sector in particular. There is a need for more diversity in our economy to offset the current dominance of production industries and the public sector, which contribute half of the area's growth and employment, and which have become vulnerable in the recent economic climate." (SoA, 21)⁴⁵

And further for RCBC:

"We have historically been over-reliant on a few large employers which makes us vulnerable when times are hard. Whilst we are working with our industry to support its growth, for example investing in the Borough's infrastructure, we are also broadening and diversifying the range of businesses located here by

⁴⁵ Tees Valley Unlimited's *Statement of Ambition* (SoA) (Tees Valley Unlimited 2012)

encouraging many new and emerging industries to make Redcar & Cleveland their home.” (RM, 10)⁴⁶

“Whilst business start up rates are encouraging and have been part of our economic strategy, we still remain dependant and vulnerable on a few large scale companies and have a higher than average percentage of public sector workers.”
(RM, 14)

Here then, both TVU and RCBC position the dominance of heavy industry and the public sector in the local economy as a threat to the growth of Tees Valley. Within both documents a language of ‘over-reliance’ and ‘vulnerability’ is deployed as a means of asserting the importance of the deterritorialisation and reassembly of Teesside’s current economic assemblage within the imagined future. The future that TVU and RCBC deploy deterritorialises this perceived over-reliance upon large employers and the public sector within Teesside and reassembles Teesside’s economy through a number of economic ‘opportunities’. The *Regeneration Masterplan* devotes pages 21-32 to discussing the varying planned initiatives and ‘areas of activity’ it intends to use to reassemble and reterritorialise Teesside’s economy such as through the Kirkleatham Business Park Enterprise Zone (p. 21), a ‘renewables centre’ (p. 22), improving transport (p. 25), superfast broadband (p. 28) and developing skills (p.31). Less concretely, TVU also identifies a number of opportunities through which Teesside’s economy can be reassembled:

“Increased environmental regulation, climate change and the need to secure energy supplies for the future, acts as both a threat and an opportunity to the Tees Valley.” (SoA, 3)

⁴⁶ Redcar and Cleveland Borough Council’s *Regeneration Masterplan* (RM) (Redcar and Cleveland Borough Council 2010)

“In Middlesbrough, as our major retail centre, there is the opportunity to develop the high level specialist retail services the Tees Valley needs and attract office development around the success of Boho Middlehaven and Teesside University” (SoA, 4)

“In Darlington, whose Town centre serves the western end of the Tees Valley and beyond, because of its locational advantages and its market town ambience, there is the opportunity for office development with minimal public subsidy. “ (SoA, 4)

“Stockton similarly has the potential to grow the office market, building on the success of Teesdale and Durham University. “ (SoA, 4)

“There is an opportunity for the Tees Valley to demonstrate how the industrial and environmental sectors can work together in true partnership as a model for other areas, reducing emissions and enhancing the natural environment.” (SoA, 13)

“Developing a range of low carbon technologies in Tees Valley will create at least 2,000 highly skilled jobs, 11,500 construction jobs, and 4,000 indirect jobs.” (SoA, 15)

Here then, TVU's *Statement of Ambition* attempts to reassemble and reterritorialize Teesside's economy through the presenting of a particular imagined future. Within this imagined object, Teesside's reliance upon 'large scale employers' and the public sector has been deterritorialized and reassembled within an economy that includes a developed renewables sector, specialist retail services, engineering and digital economies and further office development and job opportunities within low carbon technology and construction.

A particular conceptualisation of and approach to futurity is also assembled within this imagined future as a means of structuring how the future can be understood and conditioning what futures can be rendered present within a trajectory of economic growth.

For TVU:

“As the global economy recovers from recession, the UK can play a leading role in developing the new economy that will shape the next decade. It will be a decade of challenges, but also one of opportunities. It will be a decade to look forward, not back.” (SoA, 7)

Here then, TVU deploys a conceptualisation of futurity as on the one hand relating explicitly to economics (‘the UK can play a leading role in developing the new economy...’), however one which is also linear (‘It will be a decade to look forward, not back’). The temporality employed by TVU is explicitly situated on a linear timeline, with the past ‘behind’ and the future ‘ahead.’ The future is therefore positioned as something to move towards and the past something to move away from. In addition, this linear conceptualisation of temporality is not value-free in that there are clearly prescribed positive and negative connotations for both the past and the future. In the above sentence we are instructed to ‘look forward, not back’, with the suggestion that the answers to Tees Valley’s economic threats lie within the future rather than within its past. The *Statement of Ambition* positions Tees Valley’s past as something that has been useful, but aspects of which could also be potentially harmful and thus need to be emptied from the imagined future it presents and reassembled and reterritorialised in a new trajectory of economic growth.

However, this imagined future does not consist solely of the deterritorialisation and emptying of Teesside's past in its totality, but rather also consists of the concurrent reterritorialisation of aspects of its economy into new formations, and also the territorialisation or holding constant of aspects of the economy which are identified as desirable within TVU and RCBC's positioning of the future: hence the importance of attending to this as a *process* of emptying rather than as an entirely empty future. In attempting to enact a transition to a new trajectory of economic growth, some aspects of Teesside's economy remain held together within this imagined future by TVU and RCBC. Indeed, whilst the *Statement of Ambition* establishes that the past is something to be moved away from or from which the Tees Valley must extricate itself, it also expresses a need to build on the area's industrial past. This was a point that also came through in the interviews with TVU managers. For example:

“we've got steel industries, and we've got companies, doing things from engineering design to subsea which is supplying projects all across the world, leading industry players and names like Sabc or Deep Ocean or Heerema or Amec, really huge multinational, companies that are based here exporting products across the world and they're based here and they're doing that because of our industrial heritage, because of our legacy of iron and steel and, the kind of shipbuilding of the 80s, oil and gas platforms, it all ties back to this image of Teesside and Tees Valley as being at the centre of, export led advanced manufacturing which is where government wants to go, so I think we're very proud of our industrial heritage we do want to sort of the second aim of ours, we do want to diversify the economy, but we see the industrial erm, heart of Teesside as being fundamental to all of that, because it does underpin all these different industries across the UK.. erm, from as I say, automotive to defence to, life sciences, to offshore wind to renewables, so we see it as central to everything that we're doing, and then you get sort of service

sector jobs on the back of it with the steel and the process, and advanced manufacturing have such high economic multipliers that it has that knock on effect so we see our industrial heritage as key, to the future of our economy” (Participant G3 ‘Coatham’)

And further for *Warrenby*:

“we’re known for the process industry and we’re known for steelmaking, but we’re also known for erm.. oil and gas, fabrication and particularly our engineering skills and logistics, our engineering skills cross pretty much all our key industrial sectors and we have erm, perhaps one of the largest clusters erm, of engineering design erm, is as good as anywhere else in the UK to be brutally honest, much better than most areas, and they’re supporting our indigenous business, but they’re also winning contracts and working globally, so the likes of say K Home engineering, who are an SME but at the larger end of the SME scale, erm.. they erm, do engineering design work for some for the new chemical plants that are going up such as erm SNF who are building a new plant over in Billingham, K Home are doing the design work for that, they’re doing the design work for Mitsubishi Chemical Company’s er new battery plant over at Billingham as well, but they do work globally, in aluminium smelting in desalination plants etc., so there’s sort of erm, an engineering base here that that is historical, that erm, does conduct activity on Teesside as a result of the activity that we’re working and bringing in, but actually uses that reputation and that skill sets for global contracts” (Participant G2 ‘Warrenby’)

Hence TVU on the one hand positions Teesside’s industrial past as something to be moved away from, but also as being key to the future of the local economy. Whilst Adam and Groves position the emptied commodified future as an abstract concept, within the

practice of economic planning the future can never be fully emptied of context. Thus, TVU is not attempting to empty or erase Teesside's industrial context, but rather deterritorialise and reassemble aspects of it into new assemblages it sees as contributing to economic growth. Indeed, rather than emptying the future of Teesside's traditional industries in their entirety, instead what TVU would appear to be trying to achieve with their emptying of the future, is to remove Teesside's past *dependency* (or at least the existing scale of dependency) upon these large industries. Through a process of a partial 'emptying' of the future, the steel industry (for example) is therefore reassembled into a new Trajectory of economic growth within the Tees Valley; one where the success of the local economy is not entirely contingent upon the operation of the steelworks and other large industrial employers.

For RCBC's *Regeneration Masterplan* the links between the trajectory the council is attempting to enact and the borough's industrial heritage are made more strongly than within TVU's *Statement of Ambition*. Indeed for RCBC:

"If Redcar & Cleveland is to thrive and prosper in the 21st century, we will need to be open to new ideas and new business and industry opportunities. The ability to adapt to new thinking is part of our heritage and it has stood us in good stead over the years. Our progress so far is an excellent start in these difficult times, but we need to find ways to continue to secure our regeneration ambitions so that we can secure a lasting difference for our residents, businesses and the communities we serve." (RM, V)

Here then we can see how the imagined future positioned by RCBC at the same time emphasises the need for novelty and of being 'open to new ideas and new business and

industry opportunities,' whilst at the same time holding together a particular aspect of Teesside's heritage of innovation and adaptation to 'new thinking.' Whilst the prevalence of this characteristic within Teesside's heritage is itself a particular imaginary, what is of note here is the holding present of a particular aspect (whether imagined or otherwise) of Teesside's contextual past. Furthermore, the above statement also makes it clear that so far RCBC remains at the beginning of this process with much more to do in terms of ensuring economic regeneration within the area. As such this again deploys the linear understanding and temporal placement of this imagined future as outlined by TVU, towards which RCBC makes 'progress.'

Both TVU and RCBC position a particular imagined future within their regeneration discourses as a means through which to render a new future of economic growth present. This future features a number of threats and opportunities to the economy of Teesside which must be mitigated against and taken advantage of, respectively. Whilst Adam and Groves identify moves within contemporary economic discourses to present emptied futures for commodification, attending to this as a process, drawing from the work of Deleuze and Guattari, rather than in absolute terms of a future being 'emptied' allows for a more nuanced attention to how this particular imagined future is assembled. As such this imaginary is achieved through the deterritorialisation, reterritorialisation or reassembly, and holding together of particular aspects of Teesside's economic context and heritage.

8.2. Diagramming a trajectory

TVU and RCBC are therefore assembling a trajectory of economic growth within Teesside in part through the enactment of a particular imagined future within a discourse of

regeneration. The planning documents published by both of these organisations speak to the heterogeneity of how this trajectory is being assembled through various initiatives, ambitions, imagined futures and conceptions of futurity. However what I wish to focus on here is how this trajectory, as an assemblage, is also diagrammed by a particular approach to economic growth. For Deleuze and Guattari, assemblages are situated upon two axes: one which relates to the heterogeneous components assembled within the assemblage ranging from objects to enunciation, and another which places the assemblage in tension between deterritorialisation and territorialisation. However the assemblage is also diagrammed by an 'abstract machine.' For these authors:

“A true abstract machine has no way of making a distinction within itself between a plane of expression and a plane of content because it draws a single plane of consistency, which in turn formalizes contents and expressions according to strata and reterritorializations. The abstract machine in itself is destratified, deterritorialized; it has no form of its own, (much less substance) and makes no distinction within itself between content and expression, even though outside itself it presides over that distinction and distributes it in strata, domains, and territories. An abstract machine in itself is not physical or corporeal, any more than it is semiotic; it is *diagrammatic* (it knows nothing of the distinction between the artificial and the natural either). It operates by *matter*, not by substance; by *function*, not by form. Substances and forms are of expression “or” of content. But functions are not yet “semiotically” formed, and matters are not yet “physically” formed. The abstract machine is pure Matter-Function – a diagram independent of the forms and substances, expression and contents it will distribute.” (Deleuze and Guattari 2004, 156 *Original emphasis*)

Thus for Deleuze and Guattari, an abstract machine diagrams the assemblage, however it has no form in its own right - the abstract machine exists through the assemblage even as it functions to assemble and diagram the assemblage itself. This is a key moment within conceptualising the assemblage as Deleuze and Guattari are clear that such a diagram does not function as a determining causality that sits behind the assemblage or a form of destiny for the assemblage, but rather is integral to the process of assembling or '*agencement*' that defines an assemblage. Indeed:

“an abstract machine is neither an infrastructure that is determining in the last instance, nor a transcendental idea that is determining in the supreme instance. Rather it plays a piloting role. The diagrammatic or abstract machine does not function to represent, even something real, but rather constructs a real that is yet to come, a new type of reality.” (Massumi 2004, 157)

Thus this abstract machine plays a 'piloting role' in bringing the elements of an assemblage together, in particular formations and diagramming what potential futures are possible. This machine is the functionality which 'diagrams' and brings the elements of the assemblage into relation. However Deleuze and Guattari are emphatic that such a 'diagrammatic' machine does not constitute some form of essence or structure:

“An assemblage has neither base nor superstructure, neither deep structure nor superficial structure; it flattens all of its dimensions onto a single plane of consistency upon which reciprocal presuppositions and mutual insertions play themselves out” (Deleuze and Guattari 2004, 100).

Hence, the diagrammatic function of the abstract machine does not play a causal role in a linear sense. Rather this machine is seen by Deleuze and Guattari as an 'absolute deterritorialization' or 'line of flight' always immanent to the assemblage. Indeed:

“the abstract machine cuts across all stratifications, develops alone and in its own right on the plane of consistency whose diagram it constitutes, the same machines at work in astrophysics and in microphysics, in the natural and in the artificial, piloting flows of absolute deterritorialization (in no sense, of course, is unformed matter chaos of any kind). But this presentation is still too simplified.” (Deleuze and Guattari 2004, 62–63).

Following this, Deleuze and Guattari provide some qualifications relating to the operation of the abstract machine. Firstly they claim that such absolute deterritorialisation cannot be achieved through acceleration or an increase in speed: “its absoluteness does not hinge on how fast it goes” (Deleuze and Guattari 2004, 63). Yet the abstract machine should also not be thought of as somehow beyond the assemblage (or the ‘plane of consistency’ here). Instead, Deleuze and Guattari posit that such deterritorialisation is primary and that it is relative only after the components of the assemblage are brought into relation upon the strata. Hence:

“This absolute deterritorialization becomes relative only after stratification occurs on that plane or body: It is the strata that are always residue, not the opposite. The question is not how something manages to leave the strata but how things get into them in the first place” (Deleuze and Guattari 2004, 63)

This machine is not synonymous with the assemblage, but they are very much linked, since the abstract machine diagrams the assemblage in setting out the possible terms of the relations which come to form the assemblage. We can also see that for Deleuze and Guattari we should not ask how components of the assemblage become deterritorialised (i.e. how they are carried away by the assemblage, how they are shifting and ‘becoming’), but rather how they came to be stratified and territorialized (Deleuze and Guattari 2004). This echoes Dewsbury’s calls that research dealing with assemblage should be attentive to

the 'lines of articulation' within an assemblage, as well as 'lines of flight' (Dewsbury 2011). The implications of this theoretical point is that the relations between abstract machines and assemblages are not causal (in a linear sense at least) and as such we should not look for causal mechanisms or a kernel or deep structure to the assemblage (Gidwani 2008). Rather, these processes are engaged within a symbiotic relationship, whereby the abstract machine diagrams the possibilities of the assemblage, yet such a machine only exists relative to the assemblage. Indeed for Vinay Gidwani:

"Machines bring into relation - join - previously separate parts. These connections are not static; they are flows that transform the parts that are put into relation together (think of the wear and tear of a bicycle's parts after repeated use). Since relations *are* flows, it means that the parts in a machine can never be self-adequate, that is to say, identities in a Platonic sense" (Gidwani 2008, 70).

Thus, for Gidwani, an abstract machine diagrams the assemblage but is also itself changed by this process of bringing the elements of an assemblage into relation. Such diagrams are therefore also non-static and subject to change and flux. Indeed, what such a concept allows for is an attention to how a particular assemblage is enacted without positing structural causal mechanisms. Rather what diagrams the assemblage is a specific abstract machine, or functionality that is itself enacted through the assemblage. In terms of trajectories, what a focus upon the abstract machine can offer is an attention towards how novel trajectories come to be assembled and given a functionality.

TVU and RCBC are assembling a trajectory of economic growth within Teesside which is diagrammed by an abstract machine that I call 'flexible facilitation' based upon public sector flexibility and the facilitation of private sector investment. Whilst flexibility and

working with the private sector is not new within regeneration practice in Teesside – indeed, as mentioned above, the council has a long history of partnership working with numerous partners both private and public, as did the previous regeneration agencies ONE (Fuller, Bennett, and Ramsden 2002) and TDC (Robinson, Shaw, and Lawrence 1999)⁴⁷ – the extent to which this features as a diagram or abstract machine for regeneration is a novel development within regeneration policy. Both TDC and ONE were themselves assemblages of different funding arrangements, partnerships and both public and private assets, flexibly mobilised to achieve (or attempt to achieve) specific aims. Thus whilst this modality of flexibility is not new in Teesside, the extent to which it now forms the core means of achieving regeneration within Redcar and Cleveland and Teesside more broadly, is. TDC and ONE both had access to their own financial resources to spend upon regeneration in Teesside whereas TVU does not and RCBC's have been cut. TDC and ONE, whilst working in partnerships with other enterprises, were not limited solely to this form of operation whilst TVU largely is. In this sense TVU and RCBC's planning for growth represents a new assemblage of regeneration, whereby flexibility forms a key strategy of, and diagram for, this planning.

This move towards greater 'flexibility' is also consistent with the government's discourse surrounding 'localism' within local government and regeneration delivery. Indeed, one of the key aspects of the Localism Act (2011) relates to "new freedoms and flexibilities for local government" (Department for Communities and Local Government 2011, 18).

However this presents something of a contradiction as it is also the case that this flexibility

⁴⁷ Albeit ONE and TDC utilised partnerships in radically different manners. ONE worked together with RCBC to deliver regeneration projects such as the redevelopment of Redcar Seafront, very much a collaborative venture between ONE, the Environment Agency and RCBC, demonstrating the collaborative partnership working typical of ONE. TDC on the other hand often operated with little consideration of (and sometimes with open hostility towards) local councils, preferring to work in partnership with private enterprises instead (Robinson, Shaw, and Lawrence 1999).

has effectively been enforced upon the new regeneration agencies (the LEPs) through a reduction in regeneration budgets and also the removal of some powers and return of control of some aspects of regeneration delivery back to the central government (Bentley, Bailey, and Shutt 2010; Shutt, Pugalis, and Bentley 2012; Clarke and Cochrane 2013; Featherstone et al. 2012). Flexibility is thus necessitated by the lack of funding for TVU and RCBC to pursue concrete projects of regeneration in their own right, rather this must take place through partnerships with other public and private entities. Instead of increasing the ability of local authorities and the LEPs to make their own decisions regarding regeneration, localism thus enforces a flexible approach dependent upon partnership working. This echoes Hudson's claim in regards to flexible accumulation in that whilst it might mean flexibility for some, more traditional industrial relations were maintained in 'Old Industrial Regions' (Hudson 1989a). Similarly, this flexibility within regeneration may indicate a flexibility for some (e.g. the private sector), yet RCBC and TVU remain constrained in what they can do as a result of the resources available to them. Indeed, although drawing from their research upon management discourses in the 1960s and 1990s, Boltanski and Chiapello highlight the increasing focus upon flexibility within contemporary capitalism. For these authors:

"The mechanisms proposed by the authors in the 1990s to face the challenges they identify comprise an impressive miscellany of managerial innovations. We may nevertheless attempt to articulate them around some key ideas: *lean* firms working as *networks* with a multitude of participants, organizing work in the form of teams or *projects*, intent on customer satisfaction, and a general mobilization of workers thanks to their leaders' *vision*." (Boltanski and Chiapello 2005, 73 *Original emphasis*)

Despite the above extract pertaining to managerial discourses, TVU and RCBC's planning for economic regeneration within Tees Valley forms a discourse remarkably similar to these key points. TVU, especially when placed in comparison to TDC and ONE⁴⁸, could indeed be called a 'lean' organisation in having very little of its own money to spend upon projects, and RCBC is increasingly following suit as a result of cuts to its budget. This in turn necessitates both agencies to work through networks with a number of different participants to deliver their regeneration goals. Their operations are indeed structured around teams and projects, and as will be discussed in the following sections, within the discourses that both present, they are positioned as having the leadership and 'vision' for the regeneration of Teesside.

As chapter 2 discussed, within geography flexibility became widely deployed within debate surrounding economic and labour market changes from the 1980s onwards. Within this literature, flexibility was deployed as a means of describing a system of capital accumulation (Piore and Sabel 1984; Hudson 1989a; Harvey 1990; Gertler 1992); as a means of highlighting the flexibility of capital over space (Harvey 1987a; 1990; Lipietz 1993); and in regards to increasingly flexible labour practices (McDowell 1991; Beynon, Sadler, and Hudson 1994). Yet in the context of TVU and RCBC's planning for economic regeneration, flexibility features in a different role as an abstract machine or diagram which imparts a particular functionality of facilitating the private sector to the trajectory they are attempting to assemble. Utilising such an approach within the concept of trajectories allows us to attend to how flexibility assembles, and is assembled through, particular

⁴⁸ ONE spent £273m in 2008-9 (One North East 2009) and TDC received £364m in government grants and generated a further £116m (from activities such as sale of land and property) over its lifespan from 1987 to 1998 (Robinson, Shaw, and Lawrence 1999; National Audit Office 2002). TVU has an annual budget of just over £2m, largely to pay salary costs.

orientations towards the future, in this case through the planning for growth of RCBC and TVU. However, such flexible facilitation cannot be simply deployed within regeneration planning discourse with the expectation that this will diagram a form and function for this trajectory of economic growth. Such an abstract machine must be continually enacted within this trajectory if a future of economic growth is to be enacted by these organisations. The remainder of this chapter now turns to how this abstract machine enacts, and is enacted through, the planning trajectories of both TVU and RCBC.

8.2.1. "We work in the public sector we don't have that same flexibility": Redcar and Cleveland Borough Council

Flexibility is a key presence within RCBC's Masterplan and is overtly embraced within the document. Throughout the text the importance of RCBC taking a flexible approach to regeneration, particularly in its dealings with the private sector is a recurring motif. Indeed, on page one this message is emphasised in bold type:

"The Masterplan is, and will need to continue to be, flexible." (RM, 1)

The above sentence is also emphasised in bold as the last line of the introduction, which speaks to the importance that RCBC places upon flexibility within its regeneration planning. This message is further reiterated throughout the document such as within the following quotation:

"We will need to build in flexibility to respond and react quickly to enquiries and opportunities and to engage effectively at an early stage with landowners and interested parties in securing development of priority areas and ensuring that Redcar and Cleveland offers a compelling portfolio of sites and premises to investors." (RM, 36)

Hence RCBC positions flexibility and contingency at the heart of its planning. A key aspect of this is a focus upon attracting private sector investment as a means of delivering RCBC's regeneration goals, particularly in relation to the spending cuts the council seeks to make of £33.765m by 2020 (Redcar and Cleveland Borough Council 2013). Indeed, over the second phase of the council's regeneration planning (3-8 years) it is projected that through spending £51m of public money, RCBC will be able to leverage in £1.125bn of private sector investment (RM, 40). Of course it would be difficult to predict the exact forms that such investment will take as the private sector has its own goals, desires and expectations from its expenditure (although mostly relating back to making profit from such ventures). Furthermore, the opportunities to attract and generate are also positioned as being contingent and part of an unknown and uncertain future, which is reflected in the latter quotation whereby the council states that it must react quickly to such emerging opportunities. Hence the council must be flexible in order to accommodate the needs and requirements of prospective private sector partners.

The council therefore positions itself as a facilitator of investment within its planning document, mapping out a more flexible role for the council in the delivery of its regeneration aims. Within such an assembled trajectory, RCBC locates itself less as delivering its regeneration goals itself, but rather as facilitating private sector investment (and some investment from other public sector agencies) to achieve these aims. As the document states:

“We will facilitate investment by the private sector, as opposed to undertaking large developments ourselves, in response to the changing funding and monetary landscape but also the evolving role of the public sector.” (RM, V)

And further:

“We will therefore seek to play a greater enabling role, supporting businesses communities and local partners to bring forward proposals. Our role will be to encompass investment, commissioning, enabling and support combined with a greater use of our land and assets and other resources to bring forward investment.” (RM, 13)

Here then RCBC positions itself as facilitating investment through attracting and working with private sector investors⁴⁹. Such a facilitation role is diagrammed by an abstract machine of flexibility which assembles the role of the council and the resources available to it into a matter-function of working in partnership with the private sector. However, the enactment of such an abstract machine is itself necessitated through funding cuts to local authorities, the removal of the RDAs and their substantial regeneration budgets, (‘changing funding and monetary landscapes’) and also ‘the evolving role of the public sector’ within political discourse. RCBC is thus reassembled into a new assemblage of regeneration provision that diagrams a particular function for the council as playing an ‘enabling role’ rather than undertaking regeneration unilaterally.

The diagramming of such a role is also evident within how RCBC raised funds for the development of aspects of the first stage of its *Regeneration Masterplan*⁵⁰. *Margrove*

⁴⁹ There are echoes here of arguments regarding the ‘enabling state’ (see Elvidge 2012). Here the state, and in this case the local state, moves from the role of a supplier of services, to enabling service provision by other public and private sector bodies (Valler 1996). Within this thesis, RCBC is positioning itself in a similar way regarding its facilitation of regeneration investment.

⁵⁰ The first stage of the Masterplan was intended to be more capital intensive on the part of the council, involving investment in the building of physical infrastructure such as along Redcar Seafront. The second stage, which the council is now moving into, is positioned as less about council spending, but about facilitating the investment of others. It is no coincidence that the winding down of the council’s capital input also ties into the timescale within which it is to reduce its public spending. See Table 1.

elaborated upon how, in order to finance aspects of the first stage of the *Regeneration Masterplan* which in this case refers to a new leisure centre complex, the council had sold off assets to generate capital:

“the other thing that we've done is that we have very actively, sold off.. assets that were no longer fit for purpose so one of the ways that we're funding this new fantastic facility in Redcar is that we've demolished our old town hall, in Greater Eston which wasn't fit for purpose, it was falling to bits, and we've cleared the site and we're, we're actually in the process, we might have actually sold it, so we've we've been very strategic with our asset management and we have disposed of assets which were a drain on our resource and which weren't up to modern day standards” (Participant G5 '*Margrove*')

Such a point exhibits the means by which the council is now turning to in order to generate funds with which to deliver its RM. Indeed the Council's website states that four sites across the borough were put up for sale in 2012, with the Council hoping to raise £18m from the sale (Redcar & Cleveland Borough Council 2012). Of course, the selling off of council resources is not a renewable source of income, and the ability of the council to have helped fund the building of large infrastructure projects through such means is therefore finitely limited. In the face of increasing Local Authority belt-tightening, the selling off of spaces occupied by local government and its physical assets is a one-time source of revenue that will not be available to the council in the future. Here then, the assembling of a trajectory of economic growth is diagrammed by an abstract machine of flexibility that not only diagrams the role of RCBC as being a facilitator of private sector investment, but also the form of funding for such a programme as being ad hoc. This abstract machine connects RCBC, reductions in budgets and the selling off of council owned assets to diagram a functionality of regeneration funding based upon flexibility.

Yet this diagramming of flexibility within RCBC's regeneration planning extends further than how this is to be achieved to the actual spatial infrastructure of regeneration itself. *Margrove* describes how during the creation of a new multipurpose leisure facility, which includes council offices and business accommodation in the heart of Redcar, the council had also incorporated flexibility into the building's design:

“we've been very creative in how we've designed the buildings as well, [...] it is going to have two new swimming pools, a flow rider, which is a simulated surfing centre, and swimming pools as you probably know are very very expensive to run, so we've put an absolutely ginormous gym on the first floor which is going to bring in a lot of income, all of the rooms that we have created even our new council chamber is multi-functional, so it's not just going to be a debating chamber that gets used once every 6 weeks, it's actually going to be used for conferences, weddings, erm, and then on this side, we've actually created turnkey accommodation for business, so that this is actually going to be commercial er.. so there is a sound commercial side for each of these buildings, they have a clear business case and they are economically viable, they will not be, a huge drain on council resources in the future and by doing these buildings we are actually becoming more, more efficient rather than less..” (Participant G5 '*Margrove*')

In conjunction with the focus upon flexibly generating funding to develop the Regeneration Masterplan through partnership working with other government agencies and the private sector, and also by raising funds through other means such as the selling off of council owned property (although as a one-time source of funding only), the above quotation highlights how much of the infrastructure that RCBC wishes to create also incorporates degrees of flexibility in space and use. In regards to the above leisure complex, the cost-

intensive aspects such as swimming pools are mitigated by commercial gym space and business accommodation which will raise revenue. Even the new council spaces will be flexible in their function and externally bookable to accommodate weddings and functions as another source of income. Thus the abstract machine of flexibility provides a diagrammatic of not only the role the council can play within this trajectory of economic growth, but also the form of spatial infrastructure that can be constructed.

These examples of the council selling off publicly owned assets and incorporating flexibility into the spaces it is helping to create provide some indication of the multiple ways by which flexibility is incorporated into RCBC's regeneration planning and how it acts as an abstract machine to diagram a particular future for regeneration within Teesside. Yet the main means by which future regeneration is to be delivered is not primarily through funding from the council (whether raised through selling assets or through income generated by flexible use of council spaces), but through investment from the private sector⁵¹, especially as the council moves into the second stage of its *Regeneration Masterplan*. In this respect, the council must remain flexible to accommodate the private sector in making this investment; however such flexible partnership working is not without its challenges. For *Yearby*:

⁵¹ Of course, this process of facilitating investment by the private sector is not a novel means by which public sector bodies have attempted to achieve economic growth. As has been previously stated, both TDC and ONE also worked in close partnership with local businesses and private investors within Teesside, and within an American context authors such as Logan and Molotch have long highlighted the role of local government at facilitating private investment in and American context through their discussion of the city as a growth machine (Logan and Molotch 1987). However, what differs for RCBC and TVU in their attempt to assemble a new trajectory of economic growth is that the extent to which they must now rely upon this flexible facilitation of investment has been dramatically increased by the reduction of their ability to generate and spend investment in their own right as an alternative to private sector investment.

“I think the challenge is probably to find ways of collaborating with a number of partners, it’s not just necessarily about private public [...]

[...] I think it is, doable it's just... you know it's just means that we we you know, we’re not going to be able to pursue our own individual thing you know without bringing others into consideration and I think that’s maybe.. I think it was always nice to do that in the past, and when I talk about the past in the recent five or ten years and there was examples of places where that has happened but it was a kind of nice thing to do I think now it’s just not an imperative I don’t think you can do it without that kind of collaboration and I think that's the difference as we move into a slightly different environment where it's not an option anymore, it's a necessity, to do that” (Participant G4 ‘Yearby’)

Here then the participant is describing how working in collaboration, or in partnership, is increasingly now a necessity to deliver the council’s regeneration goals. A new trajectory of economic growth is thus being assembled here, which is diagrammed by an abstract machine of flexibility that constructs a future reality, whereby the function of the council within such a trajectory is one of collaboration rather than investing in regeneration unilaterally. Indeed such a stance is consistent with the Masterplan’s position that the council will: “facilitate investment by the private sector, as opposed to undertaking large developments ourselves” (RM, V). The participant expanded upon this further, highlighting how despite adopting a more flexible facilitation approach to regeneration, the council’s flexibility is ultimately limited:

“one of the main issues that I have to deal with its how do I develop these kind of alliances, partnerships and more so particularly how do I do that within a framework of public, procurement which doesn’t actually allow for strategic partnerships, it tends to, you know.. it tends to erm.. I was going to say force you

down well it does it forces you down a road of.. treating every project as a kind of standalone project going out to the market seeking bids, going through the whole tendering process and so on, erm.. whereas.. you know if you look at how the private sector operates, er, certainly at an international and national scale, you know companies quite frequently get involved in strategic partnerships they don't go out to tender for them you know, if you know if Google decide to team up with, I don't know IBM they're not going to go out to tender for that it'll be they'll work up something that they know that's going to help both of them they'll do that between themselves you know come up with a proposal, that it's a win win out of it for both companies, but you know, I don't think we've got, *we work in the public sector we don't have that same flexibility*" (Participant G4 'Yearby' my emphasis)

Therefore, whilst incorporating the role of a flexible facilitator of private sector investment in regeneration, pursuing alternative means of raising funds rather than from public spending and incorporating flexibility into its regeneration policy, the above quote highlights how RCBC's flexibility is still limited to some degree by its operation as a public sector organisation. Thus, whilst there are a number of means of flexibly generating investment for regeneration within Redcar and Cleveland such as the selling off of council held assets, creating flexible council spaces and facilitating investment by the private sector, the council's efficacy remains limited. What becomes evident here is how the abstract machine does not function as an all-encompassing destiny for the assemblage, but rather provides a diagram that is not all-determining. Here then, RCBC is connected to a function of flexibility by this abstract machine, however the ability of RCBC to perform this function is limited by its status as a public sector body. Thus, as for Gidwani:

“Diagrams [...] are not immune to mutation from the dense weave of (often banal, everyday) practices and micropolitics of concrete assemblages that actualize them.” (Gidwani 2008, 79)

The abstract machine of flexibility therefore has limitations within this trajectory of economic growth in that the actants it connects and diagrams are not always able to perform the functionality it maps out. The abstract machine is actualized through the assemblage of this trajectory of economic growth, however the political constraints upon RCBC prevent the council from performing the function it maps out in its totality. I am not claiming that the machine fails to diagram a function of flexibility for RCBC, as it clearly manages to achieve this within RCBC’s partnership working, funding and infrastructure of regeneration, but rather that in this instance RCBC is not able to fulfil this role as fully as the machine might diagram.

8.2.2. “We’re much more of a kind of facilitator for getting the environment right, and then it’s up to the industry and the bodies to deliver, to deliver that on the ground”: Tees Valley Unlimited

As part of the ‘localism’ agenda adopted by the coalition government ‘flexibility’ has been at the heart of LEP policy as a means by which these organisations can decide what their localities need and the best means to deliver this. However, there has been relatively little financial support directly to the LEPs (Clarke and Cochrane 2013; Shutt, Pugalis, and Bentley 2012) especially when compared with the RDAs and UDCs. I argue that this equates to the provision of flexibility without autonomy for the trajectories of LEPs as they are thus constrained to partnership working and cannot deliver regeneration in their own right. As put by Clarke and Cochrane:

“Already, there have been legislative moves towards freeing local government from central and regional control, making local government more accountable to local people, and devolving power beyond local government to a variety of other bodies thought to be local. Complicating this picture, there have been moves to reduce local government funding. *These latter developments may support the devolution of power beyond local government, but they compromise any potential autonomy for local government.*” (Clarke and Cochrane 2013, 12 *My emphasis*)

Providing LEPs the flexibility to choose how to deliver the regeneration aims that they set out to achieve without providing the funding for them to do so in their own right provides only the illusion of choice and autonomy. As for Clarke and Cochrane, the devolution of power in terms of regeneration is largely meaningless if this is not supported with adequate resources to deliver regeneration in the ways that the organisation sees fit. Whilst a counter point could be suggested that the LEPs have the power to work through partnerships with a range of public and private partners to deliver this regeneration, this rather negates the underlying principle of localism that such a move gives local people greater control over regeneration within their locality. Thus, the trajectory of economic growth that TVU are seeking to enact is diagrammed by an abstract machine of flexible facilitation in that whilst TVU as an LEP must be flexible in working with other partners to deliver growth, this flexibility is bounded by a particular role diagrammed for this organisation. TVU’s role in the enactment of a particular economic future in Teesside is diagrammed as a facilitator of investment rather than as a delivery body in its own right. Indeed, as TVU states:

“Tees Valley Unlimited cannot deliver the Statement of Ambition on its own. It needs to bring together the public sector at local, regional and national levels with the private sector to deliver the strategy.” (SoA, 5)

TVU positions itself as bringing together different actors from both the public and private sectors, rather than delivering outcomes in its own right. As such it occupies the territory mapped out for it within the assemblage of a trajectory of economic growth by an abstract machine of flexible facilitation as a facilitator of investment rather than the delivery body of regeneration investment. However, again this facilitation function must also be flexible in order to accommodate unforeseen opportunities and the arising needs of investors:

“The Statement is not an all-encompassing strategy for the Tees Valley – it does not need to be, nor should it be. It is specifically focused on improving economic outcomes for the area and the creation of a locality that contributes to this – it does not cover every topic of importance to the Tees Valley.” (SoA, 8)

Here then we can see that flexibility diagrams the form of the trajectory for economic growth that TVU is seeking to enact within the *Statement of Ambition*. It does not cover every minutiae of detail as that would be too prescriptive and only serve to either hinder the operation of TVU in responding to arising investment opportunities and needs, or quickly become redundant. Indeed, when asked whether TVU played the role of a facilitator, *Coatham* replied:

“yeh, I definitely think so, rather than us being able to claim that we have a real direct impact upon the whole of the economy, I definitely think that we’re more of a facilitator we’re here to attract investment, which can then yeh support supply chains in the Tees Valley we’re here to, to prevent major businesses leaving, here to support our businesses to try and grow, but I don’t think we can claim that we.. that we do it all, [...]

[...] but I think through things like City Deal, and responding to government consultations and lobbying for things, *we're much more of a kind of facilitator for*

getting the environment right, and then it's up to the industry and the bodies to deliver, to deliver that on the ground" (Participant G3 'Coatham' My emphasis)

The above quotation emphasises the points that TVU make within its *Statement of Ambition* concerning its role in regeneration delivery. Whilst I introduced the term 'facilitator' into the interview (intentionally to provoke a response), here we can see explicitly that as opposed to past regeneration bodies such as TDC and ONE, TVU positions its role not as in the delivery of regeneration, but as a facilitator for others to provide investment and take this regeneration forwards. The participant is clear that TVU's role is more about creating a favourable environment for regeneration investment and then for other organisations and businesses to deliver the "on the ground" regeneration. This also provides some indication as to the necessity of flexibility within its planning documents, as laid out above when TVU is claiming that their plan is not, and should not be overly detailed. Instead, in order to fulfil the function diagrammed for it within this trajectory as a flexible facilitator of investment, TVU must remain open to the arising needs, desires and the willingness to invest of other bodies.

Of course flexibility does not exist solely within the trajectory of economic growth being enacted within Teesside but is also situated within wider governmental discourses, which also factors into the diagramming of this trajectory. Whilst the coalition government's focus upon 'localism' has been heralded as returning power to local communities, we have actually seen the repatriation of some key financial powers to the central government.

Such a situation was described by *Lazenby*:

"I mean the RDA administered funds as well so in terms of businesses the RDA administered some national funds.. direct to businesses.. erm, since they got rid of

the RDAs the government have administered those funds directly themselves, for example, the regional growth fund, our role in that then is, facilitating working with the businesses, to help the business access the money” (Participant G6 ‘Lazenby’)

Here then, despite the LEPs being intended to signify a return of regeneration decision making to localities themselves, the central government has taken over some of the spending duties administered by the RDAs (in this case ONE). Again then, TVU’s function is diagrammed as a facilitator for firms to access these centrally held funds, rather than one of accessing and spending them directly. Clarke and Cochrane, in the aforementioned quote, differentiate between the power given to LEPs and the autonomy afforded to them to achieve their regeneration aims, claiming that whilst the LEPs may have been devolved some forms of power, their lack of resources and the repatriation of other powers to central government grant them little in the way of autonomy (Clarke and Cochrane 2013). I would differ here and argue that rather than viewing power as being devolved to LEPs, TVU’s role has been diagrammed as one of greater ‘flexibility’ which has been positioned as a form of power of efficacy in regards to regeneration delivery. Yet, as for Clarke and Cochrane, the relatively meagre provision of resources made available means that TVU lacks the autonomy that TDC and ONE possessed. Thus in this case localism actually means a greater centralisation of control over regeneration as the government has effectively negated any other form of regeneration provision by ensuring that TVU’s flexibility remains bound to the role of a facilitator of investment.⁵²

⁵² Furthermore, as highlighted by Lowndes and Pratchett, it is also notable that the Coalition largely ignored the normal consultative process for the passage of a Bill such as through White Papers and other such consultations (Lowndes and Pratchett 2012). Instead the Coalition announced the Localism Bill in the Queen’s speech in 2010 and then put the Bill to Parliament (where it was given its first reading in December 2010 and received Royal Assent in November 2011). It is thus somewhat ironic that Local Authorities for the most part were not consulted in the decision-making process to pass legislation to afford greater decision-making powers to Local Authorities.

8.3. Trajectories assembled

Tees Valley Unlimited and Redcar and Cleveland Borough Council are attempting to enact a transition to a trajectory of economic growth within Teesside, a key aspect of which is the assembling of a particular imagined future as a concrete object within their discourse of regeneration presented within their planning documents. Here a future composed of economic threats to be mitigated against and opportunities to be taken advantage of are presented alongside a possible future of a vibrant Teesside economy based upon a diverse range of industrial sectors, as opposed to a reliance on large heavy industries such as steelmaking. However this is also structured through a particular conceptualisation of futurity, and a particular linear timeline structures this imagined future as something that Teesside must 'move towards.' Such an imagined future functions here as a discursive device within the assembling and enactment of this particular trajectory of regeneration. However, such a trajectory is also diagrammed by an abstract machine. This chapter has argued that the trajectories of economic growth that TVU and RCBC are attempting to enact are diagrammed by an abstract machine of flexible facilitation. Such a machine does not function as a determining causality or destiny for the assemblage, but rather maps out the forms and functions that the assemblage can take through processes of connecting. For both RCBC and TVU this abstract machine connects these organisations within an assemblage of flexibility, private sector partnerships, the infrastructure of regeneration, the role of national government and funding arrangements to diagram a particular form and function that this trajectory of economic growth can take. The roles of TVU and RCBC are thus diagrammed as flexible facilitators of investment rather than as delivery bodies of regeneration in their own right. Hence, whilst flexibility functions as a key part of the abstract machine, this flexibility is limited by the facilitation role diagrammed by this machine.

Alongside the disrupted trajectories of the Teesside steelworkers following the mothballing discussed in chapter 6, and the attempts of the steelworks management to hold a future of steelmaking together through the same period addressed within chapter 7, this chapter has further explored how new trajectories can be assembled and transitions to new futures attempted within the empirical site of regeneration planning within Teesside. The steel industry of Teesside and the 2010 mothballing are never far removed from this process of assembling and diagramming new economic trajectories for Teesside. Within the RM and SoA it is both largely absent from the trajectory that RCBC and TVU are seeking to assemble, yet also present within the current reliance upon heavy industry that they position as a threat to Teesside's economic growth. However steelmaking remains a huge employer and contributor to the local economy within the Teesside region following the restarting of steel production, and thus whilst it might to some extent feature within the planning of RCBC and TVU as something over-relied upon, it can never be fully deterritorialised or emptied from the imagined futures laid out for Teesside whilst it continues to produce iron and steel.

9. Futures Research: A Conclusion

Rumours, news reports, conversations with friends and families, pensions, retirement age, machinery, skills, knowledge, experience, practices of management, economic growth, the private sector, investment, flexibility: these are just some of the many multitudes of components and actors that have come to be assembled within the varied trajectories of Teesside, which have been affected by industrial change. This thesis could have included many more, and indeed at times there was the temptation to branch out further to explore the trajectories of families, sub-contractors and businesses within Teesside. Alas, this text would have to be many times the size it is now to fully explore and do justice to these varied trajectories and therefore was beyond the capacity of this project. Having said that however, I believe that the exploration of the three different sets of relations with the mothballing included within this thesis – the steelworkers, the steelworks management and local economic governance – provides a valuable insight into the role of trajectories in how industrial change comes to be lived, experienced, and enacted. The overall aim for chapters 2 and 3 (and indeed the rest of the thesis) was to demonstrate that attending to futures matters. Across Teesside's history of industrial development and growth from a tiny hamlet to one of the foremost iron and steelmaking regions in the world, futures have always played integral roles. From decisions to build an ironworks, the discovery of minable iron deposits, investment plans and company mergers, ten year development plans based upon projected growth in steel demand, building blast furnaces, closing the beam mill, consortium deals and the mothballing of the steelworks, futures have always been central to how industrial change has been enacted within Teesside. However as demonstrated within chapter 3, academic work dealing with the lived experience of industrial change has rarely engaged with futures directly, and emerging areas of research into futures has also been somewhat hesitant in providing a conceptual framework for approaching futures. This is the goal of the concept of trajectories. Rather than focussing upon *the* Future as a realm

of temporality, this concept is instead focussed upon providing a conceptual framework that can attend to the specific orientations towards the future that are assembled and enacted throughout everyday life. As homeomorphic assemblages, trajectories are attuned to the multiplicity and heterogeneity of what comes to be assembled within these orientations and the multiplicity of the actors enacting them, as well as the constant change and becoming and the need for mobile boundaries of change within which such becoming must remain if these trajectories are to be maintained and 'held together.' In terms of industrial change, such as the mothballing of TCP in Teesside, what this concept allows us to explore are the experiences of those whose trajectories come to be disrupted and their relationships to objects that they had been working towards, such as pensions or retirement becoming problematic through relationships of cruel optimism (Berlant 2011) as futures of works closure become rendered present. It allows for an exploration of the attempts by the steelworks management to hold a future of steelmaking together and the processes of cross-matching and skills retention that were deployed to try to keep the steelworks and workforce in a state that maintained the homeomorphism of that future. This opens the potential for an attention to the attempted assembly of a new trajectory of local economic regeneration governance in the wake of the mothballing and restarting of steel production, including how this took place through a partial process of emptying and reassembling the future of Teesside's local economy and the assembly of an abstract machine of the flexible facilitation of private sector investment. Integral to all three empirical sites are specific relationships with the future, whether the living through disrupted trajectories, the holding of trajectories together in the face of change and the assembling of new trajectories. This is not to say that these sites and processes could not be explored using other theoretical and conceptual approaches, but rather that the role of futures within these sites should not be overlooked or ignored. The concept of trajectories has been designed to foreground these diverse and multiple relationships. This conclusion

to the thesis proceeds in three sections. The first provides a summary of the discussion within the three empirical chapters and provides some reflections upon how this meets the three research objectives laid out within chapter 1, the second addresses three themes that have emerged across this discussion and the third explores some of the potential implications for future research that this project has generated.

9.1. Disruption, Management, Assembly

Futures are always inherent to any process of industrial change as such change denotes a process of becoming and contingency that is variously planned for, managed and lived through. Thus, in exploring the role of futures within industrial change, how such change comes to be enacted and experienced through the disruption, management and assembly of futures are key moments within this process. The concept of trajectories developed in chapter 4 and applied within the three empirical chapters provides a conceptual framework with which researchers can approach and research different orientations towards the future and attend to how lived futures are disrupted, how futures are managed and held together and how futures can be assembled. Through its emphasis upon becoming, multiplicity and mobile thresholds of change and also in not making assumptions about the specific form or content of any trajectory *a priori* of research taking place, this concept is intended to be able to be used across a vast range of empirical sites rather than being tied to any specific site or form of trajectory.

This thesis has made the argument that futures play a key role in how industrial change comes to be lived, experienced and enacted. For the steelworkers of chapter 6, the industrial change of the mothballing of TCP came to be experienced and lived through

different relationships with futures, such as the rendering present of a future of closure and the making problematic of a future of retirement and a pension entitlement. Within chapter 7, for the steelworks management the process of managing the industrial change of the mothballing was one of managing futures and attempting to maintain and hold together a future of steelmaking in Teesside. Furthermore as discussed in chapter 8, within the wake of the mothballing and restarting of steelmaking, RCBC and TVU were both attempting to enact local economic change through the assembly of new futures of economic growth. Industrial change itself is a series of complex and multiple relationships with, and has impacts upon, different orientations towards the future. These complex relationships have offered several challenges for research, such as how to attend to sets of relationships that are constantly becoming and in a state of flux, how to account for the multiplicity and heterogeneity of what is being assembled within these relations and also how to identify intensifications of change that surpass and exceed the boundaries of specific futures. The concept of trajectories is one answer to these research challenges and in drawing from the concept of assemblage provides a framework for attending to change and becoming, along with heterogeneity and multiplicity. By drawing from the concept of assemblage and the concept of homeomorphism it provides a means of conceptualising and approaching how futures also consist of sets of mobile boundaries (or thresholds) within which change must remain, otherwise the trajectory loses its homeomorphism and undergoes a transition.

Of course, just as the concept of trajectories has particular attentions to specific aspects of different orientations towards the future (such as their heterogeneity, contingency and mobile boundaries), the concept is less attuned to others. For example, whilst not excluded by a trajectories-led approach to research, this conceptual approach is less attuned to pre-

existing sets of relationships and power relations within which different futures sit in relation, such as relations of capital. Although currently featuring within research as a descriptor of uncertainty rather than attending to futures in their own right, the concept of precarity (Ettlinger 2007; Gill and Pratt 2008; Waite 2008) has the potential to open up new approaches to futures research by attending to how uncertain orientations towards the future are situated within particular relations of capital. Furthermore, by drawing from the work of Lauren Berlant, precarity could also provide the means to conceptualise and explore the enactment and loss of particular affective 'fantasies' of employment such as the 'good life' of late 20th century capitalism (Puar et al. 2012; Berlant 2011b; Berlant 2011a). Thus, this concept could offer an alternative to a trajectories-led approach to attend to how orientations towards the future come to be assembled through and enacted by relations of capital. Alongside this, in focussing specifically upon orientations towards the future, the concept of trajectories is also less attentive to relations to pasts and how these come to be enrolled within such orientations. These are not precluded from a trajectories-led approach, however the concept of 'haunting' could offer a more precise focus upon how pasts are assembled and folded into futures through particular affective relationships (Edensor 2008; Edensor 2005; Meier 2013). Furthermore, the concept of trajectories also tends towards prioritising general orientations towards the future that include a multiplicity of different heterogeneous components as opposed to focussing specifically upon the orientating towards and planning for a specific event. Here research focussing upon anticipatory action offers an attention towards how particular responses and plans are assembled in relation to specific events (Anderson 2010; Adey and Anderson 2011). This would allow for a more precise exploration of the practices of governance, planning and predication that takes place in response to future events and how this generates particular orientations towards the future. Again however, that is not to say that anticipatory action and an attention to specific events cannot be accounted for within the

concept of trajectories, but rather that approaching these phenomena through different conceptual approaches allows for different emphases within research.

Within the empirical chapters, approaching the relations to industrial change through the concept of assemblage allowed for us to emphasise the sets of relations towards the future that constitute industrial change and also to explore in detail the specific form and nature of these relationships and the roles that they play in how industrial change comes to be lived, experienced and enacted. Chapter 6 explored how futures of works closure were rendered present for the steelworkers of Teesside through a range of different modalities including rumours, news reports, conversations, management announcements and even soundscapes. The chapter also explored how the making present of a future of works closure rendered many relationships with future pension entitlements problematic. Whilst these relationships with a pensioned retirement were rendered problematic by the mothballing, by drawing from the concept of cruel optimism (Berlant 2011) this relationship was shown to be somewhat more nuanced. Here these promised futures of a financially secure retirement continued to sustain these steelworkers yet at the same time kept them within a relationship of attrition or 'wearing out' through having to work longer for a smaller entitlement. Furthermore, this chapter also explored what had been lost through this transition and therefore attended to what had been rendered absent for these steelworkers through the making present of a future of works closure. For many this included aspects of a workplace and masculine identity.

Chapter 7 drew from the work of John Law to conceptualise the management of steelworks as a process of ordering rather than the imposition of a particular order upon the company. From this, the chapter further explored the process of assembling the steelworks

management whereby the company Management, trade union officials and local government agencies were all enrolled within practices of attempting to hold a future of steelmaking together within Teesside. Through the use of the sub-concepts of thresholds and transitions, this chapter was able to explore how this assembled management was attempting to maintain the homeomorphism of the steelwork's steelmaking trajectory in attempting to avoid the crossing of a threshold of change. A key threshold here was the need to retain enough of a skilled workforce so as to ensure that the steelworks could be restarted should a buyer be found. In order to maintain this level of skill and experience in the workforce the assembled management were engaged within two key processes. The first was the process of cross-matching employees who were too young to retire into positions vacated by those taking early retirement from the plants that were to remain open throughout the mothballing. Secondly, a skills retention programme was implemented as a means of retaining those steelworkers who could not be cross-matched into another position within the steelworks. These steelworkers were enrolled within a training scheme and paid a bursary and as such were retained by the company. Thus, the practices of assembling management, cross-matching employees and implementing the skills retention programme were key means through which a trajectory of steelmaking was held together within Teesside.

In chapter 8, the thesis explored how RCBC and TVU were both attempting to enact a transition to a new trajectory of economic growth in the wake of the mothballing and restart of steel production. Both of these organisations were attempting to assemble and render present an imagined future for Teesside, through the partial emptying (Adam and Groves 2007) and then reassembly of Teesside's current economic trajectory. This took place through the key planning documents of these organisations. However, this new

trajectory of economic growth for Teesside also assembled, and was also assembled through, an abstract machine of 'flexible facilitation.' Such a machine does not sit above or beyond this trajectory in a causal role, but rather serves as the functionality of this assemblage which is itself assembled within and through this trajectory. In this sense then, the trajectories of economic growth that both RCBC and TVU were attempting to enact were both diagrammed by these organisations adopting the role of facilitators of private sector investment rather than investors in their own right. Thus, in the assembly of a new trajectory, we can also see the importance that an abstract machine can play within diagramming the functionality of this trajectory.

Hence, in attending to the three key objectives outlined within the introduction, this thesis has illustrated the importance that futures have within the experience and enactment of industrial change, developed a conceptual approach to researching orientations towards the future and explored a range of specific relations to the future enacted through the industrial change of the mothballing of TCP. In attending to these objectives however, a number of key themes have also emerged through this thesis.

9.2. Uncertainty, Change/Stasis, Assembly

A theme of uncertainty and contingency has run throughout all three of the empirical chapters and is vital to both the concept of trajectories and to understanding how industrial change comes to be experienced and enacted. In terms of researching futures, uncertainty and contingency are central as futures always contain at least some degree of contingency and the unknown: no matter to what extent they are planned for, set-up or imagined a different future is always possible and present. As futures are, as this thesis has

argued, a central component of industrial change, uncertainty and contingency are also key to understanding how industrial change comes to be lived and enacted. This uncertainty and contingency within the futures of industrial change was one of the motivating factors behind the development of the concept of trajectories. Whilst industrial change literatures had addressed uncertainty to varying degrees, the lived experience of futures rendered uncertain was notably absent within this body of literature. One of the key aspects of the concept of trajectories reflects this commitment, ensuring that the concept remained attuned to the contingency of futures and how they come to be experienced within industrial change. Indeed, this uncertainty and its lived experience was a central focus within the empirical discussion. The steelworkers of chapter 6 experienced differing forms of uncertainty and related to this contingency through differing modalities. Here the making present of futures of closure imposed degrees of uncertainty into their own lived trajectories at the beginning of the mothballing period as the steelworkers came to terms with the possibility that the steelworks could close. Later, others came to relate to their pension entitlements through uncertain relationships of cruel optimism, whereby a particular pension entitlement existed as an object of promise within their trajectories but which appeared to recede before them. The assembled steelworks management of chapter 7 also operated in the face of uncertain futures. Theirs was a task of attempting to stave off the unknown and continue to hold a future of steelmaking together for Teesside, however throughout the mothballing period this future was far from certain despite these efforts. Similarly, within chapter 8 RCBC and TVU also sought to enact a new trajectory of growth within Teesside that could remove at least some of the contingency and uncertainty within the local economy in regard to the threat it identified of remaining to be over-reliant upon large heavy industrial employers within the region. In part, the planning of these two organisations can be positioned as a response to the uncertainty within the Teesside economy that was engendered by the 2010 mothballing of the steel industry, which had up

until that point been one of the mainstays of the local economy. However, following the period of intense industrial change of the mothballing, there now exist different forms of uncertainty within the steelworks of Teesside. Whilst the steelworks remain in operation, the mothballing of what had been seen as one of the core industries of Teesside will have brought with it a more pervasive uncertainty towards its future as a source of employment. Thus, future research might explore the wider uncertainty within Teesside's local economy towards a long term future for steelmaking, and how people live through this uncertainty. An example would be through a focus upon new apprentices taken on since the steelworks reopened in 2012 and how they position their selves towards a future that could include further steelworks closures during their working lives.

A further key theme across the thesis has also related to the tension between change and stasis inherent to processes of industrial change. Deleuze and Guattari would refer to this as the tension between territorialisation and deterritorialisation which they positioned as central to the concept of assemblage. Yet what is important here is not whether this is couched in the terminology of flux/stasis, the strata/the body without organs or territorialisation/deterritorialisation but rather the tension between these two poles upon which all assemblages (which includes trajectories) are situated. The processes through which futures come to be both held together and drawn apart through industrial change have featured as one of the key focusses of this thesis and the empirical chapters have attempted to highlight these tensions. RCBC and TVU for instance are at once attempting to disassemble (at least aspects of) Teesside's local economy and reassemble this within a new trajectory of economic growth, however it also must be careful to hold this deterritorialisation in tension with territorialisation. In brief it must change by increments rather than seek wholesale destruction and reconstitution. These tensions can also be seen

within the trajectories of both the steelworkers of chapter 6 and the steelworks management of chapter 7, both of whom are seeking to hold particular trajectories together in the face of radical change and deterritorialisation. Here, change and becoming cannot be denied yet these actors often sought to mitigate this deterritorialisation, whether through skills retention schemes or accepting early retirement and accessing a guaranteed – or territorialised - pension. Industrial change is a process whereby deterritorialisation exceeds territorialisation within this constant tension which often results in the very literal pulling apart of a particular industrial assemblage. Thus, there is the danger that deterritorialisation and change become the sole focus of attending to industrial change at the expense of territorialisation and continuity. The implications for future research exploring industrial change here then, is that an attention to what is static or territorialised through industrial change in addition to what is becoming or changing allows for a more holistic understanding of the processes of such change.

The final theme that I want to focus upon relates to what might be referred to as the assembly, process or the 'doing' of futurity. Indeed, it has been remarked that the translation of assemblage into English has lost something of the process inherent to the original French of *agencement* (Law 2004), and as such a more appropriate translation into English would be more akin to 'assembly' than 'assemblage'. It is this sentiment of process and 'doing' that forms this emergent theme of the thesis. The living, enacting and 'doing' of the futures of industrial change have been at the very heart of this process and the concept of trajectories. From the outset this thesis sought to explore futures as a process rather than as static objects; to explore how futurity is lived and experienced as opposed to describing a monolithic future. This again came to the fore across all three empirical chapters such as the assembly of the steelworks management and their ongoing attempts

to hold a future together in the face of change, the lived experience of losing a pension entitlement and having to plan for a longer working life as in the case of steelworkers like *Marton* in chapter 6, or the practice of attempting to enact a new trajectory of economic growth within chapter 8. Across these varied empirical sites the future was not an event that occurred to these actors, metamorphosing into the present and then slipping into the past along some arbitrarily divided linear timeline. Rather, here we must speak of futures and trajectories which were assembled, enacted and lived through varying processes and relationships. Futures here are created and lived, as opposed to simply imposed and reacted to.

This thesis has argued that futures are inherent to processes of industrial change and that to understand such change we must attend to how this comes to be enacted and experienced through different orientations towards the future. The above themes have three key implications for how we approach and research the futures of industrial change. The contingency and uncertainty of these futures means that we cannot approach industrial change as a teleological event or merely a series of planned developments. Rather it is a constantly becoming and uncertain process from which new orientations towards the future constantly emerge. Additionally, these futures of industrial change are also held in tension between change and stasis and as such what is held together throughout industrial change and the processes that render this possible should not be overlooked within research. Furthermore, the assembly of the futures of industrial change is an ongoing lived and enacted process. Industrial change should therefore also be approached as a lived process that is constantly enacted and assembled through relations to the future. Futures are therefore vital to understanding the processes of industrial change, as it is through these uncertain and contingent sets of relations which exist in

tension between being held together and drawn apart that industrial change comes to be lived and experienced.

9.3. Alternative Trajectories

This thesis has also stated throughout that the trajectories forming the focus of this research are by no means the only sets of trajectories enacting and being enacted through processes of industrial change within Teesside. Chapter 5 laid out the rationale for focussing upon the trajectories of the steelworkers, the steelworks management and of the regeneration governance of both TVU and RCBC as a means of exploring the most prescient examples of how orientations towards the future are central to how industrial change comes to be enacted and experienced and in developing the concept of trajectories through a focus upon their disruption, management and assembly. However all of these trajectories are composed of, assembled within and sit alongside other orientations towards the future. There are two such trajectories that this thesis has signposted at various points throughout its discussion, however which bear a greater moment of reflection here: that of the non-human and of politics and government.

Non-humans have been key actors throughout this thesis, and whilst the focus of discussion has largely been centred upon humans as a means of exploring the lived experience of industrial change, the role of non-humans within the enactment and experience of trajectories cannot be overlooked. Within Teesside we have seen throughout the thesis the role played by non-human actors such as the Redcar Blast Furnace. Originally planned as part of a series of huge blast furnaces, a truncated expansion plan left Teesside's steel industry dependent upon one huge blast furnace for its supply of molten

iron. Of course the blast furnace itself is an assemblage of multiple different components which also have key roles to play within steelmaking trajectories in Teesside. For example, the refractory bricks lining the walls of the blast furnace decay in response to the intense temperatures and chemical reactions taking place within the furnace and as such must be periodically replaced. The here the decay of these bricks and the reliance upon a single huge blast furnace as opposed to a series of smaller furnaces has meant that when a relining takes place, Teesside's iron production is interrupted, disrupting the steelmaking process at great cost. Additionally, as we saw throughout the mothballing process, great care and process had to be taken to ensure that the physical infrastructure of the steelworks was preserved in such a state that steelmaking could be restarted in the future. This involved more than just the steelworkers acting upon this machinery and infrastructure, but rather an assemblage of human and non-human actants. Here buckets of oil, cooling processes, molten slag, knowledges, skills, labels of how components fit back together, computer systems, and beyond all came to be assembled as part of the mothballing process. Within such an assemblage, non-humans had key roles to play within maintaining a trajectory of steelmaking within Teesside. Furthermore, it was also clear throughout my interviews with the steelworkers of Teesside that a steelworks is a 'lively' or vibrant (after J. Bennett 2010) environment full of more-than-human actors and processes. From descriptions of working with the molten steel which can be dangerous and unpredictable, to steelworkers describing their intimate relationships with particular plants as and the machinery they worked with, the liveliness of the non-humans which make up a steelworks was apparent at many points within the empirical research of this project.

Yet the role of non-humans within experiencing and enacting trajectories of industrial change within the mothballing period in Teesside is not limited to the infrastructure of the

steelworks itself. A vast range of non-human actants render these orientations towards the future possible and have a variety of influences and agencies over how these trajectories come to be assembled and lived. Indeed, this thesis has highlighted many such actors. Chapter 7 focussed in part upon how access to a pension entitlement was central to the trajectories of many of the Teesside steelworkers, and although the focus within this chapter was upon the lived experience of this relationship, the role of a pension as an actor in its own right cannot be overlooked. For example, a defined benefits pension which guarantees a particular level of income therefore enables a particular trajectory to be assembled. However a defined contributions pension, whereby the level of pension entitlement dependent upon further networks of non-human actors in the form of investment funds and the stock market, render particular orientations towards the future uncertain. Chapter 8's focus upon local and regional regeneration governance also highlighted the roles played by a number of different non-human actors. Perhaps the most obvious here would be the two planning documents discussed within the chapter: TVU's Statement of Ambition and RCBC's Regeneration Masterplan. However beyond this, it is clear that the future that each organisation is attempting to assemble for Teesside is dependent upon a range of non-human actors such as companies, technologies, energy, wind-farms, computers, buildings, leisure centres and far more. My intention here is not to single any one, or any group of these non-humans, out as being somehow essential to how trajectories come to be assembled and lived. Rather I want to emphasise here that whilst in telling the story of the mothball period of Teesside this thesis has focussed upon humans and the lived experience and enactment of industrial change, the roles played by non-humans and how these come to have different effects upon and are assembled within trajectories should not be forgotten.

Also running alongside and cutting across the trajectories discussed within this thesis has also been a wider political and governmental context. In this sense, wider national and central government trajectories and orientations towards the future have also played an important role in shaping the trajectories of industrial change within Teesside. Throughout the history of Teesside we can look back over various political decisions that have had significant impacts upon the futures of steelmaking in Teesside, such as the decision to nationalise British Steel in 1967, an emphasis upon the expansion of steelmaking capacity in the late 1960s and increasing hostilities towards trades unions in the 1980s. However within the story of the mothballing, we can also identify a number of moments within this thesis whereby trajectories of national government have cut across the assembled trajectories of steelmaking within Teesside. For example, despite numerous calls for the state to intervene in late 2009 and 2010 when the mothballing was announced, it quickly became clear that there would be no direct help from the national government to keep the plant open. Instead, only a somewhat limited amount of funding would be made available for retraining and the support of workers made redundant in this period (which was also for a significant part drawn from existing budgets being spent in the Teesside region and therefore not new funding) would be made available. Also whilst purely speculative at this point, it is probable that had the UK government intervened in this period through either renationalising the steelworks or investing in the plant to allow it to maintain operations, that a very different trajectory of steelmaking would have been assembled within Teesside and also for British industry more widely in the face of industrial change. However the lack of such support therefore contributed to the enactment and experience of trajectories being disrupted and having to be managed in particular ways as discussed within Chapters 6 and 7.

In addition to this, as highlighted in Chapter 8, following the 2010 election of the coalition government there was a move within UK regional governance towards a politics of 'localism'. Ostensibly this would allow local councils and local communities greater say in the decisions made on planning and regeneration at a local level. However, as this occurred alongside the coalition government's programme of austerity which saw the abolition of the regional development agencies such as ONE and cuts to public spending including the budgets of local authorities, it would appear that localities were effectively constrained in what they could achieve given the limited resources available to them. For local authorities such as RCBC this meant a greater reliance upon the private sector and therefore as such less direct input into regeneration in the borough. Chapter 8 explored how organisations such as RCBC and TVU were attempting to assemble a trajectory of growth for Teesside in relation to this wider government trajectory of austerity. Exploring further how the trajectories of a region such as Teesside come to be assembled within further assemblages of governmental power (for example through a further engagement with the work of John Allen, such as: Allen 2011, 2008, 2004; Allen and Cochrane 2010, 2007) could thus lend to a fuller account of the role of wider governmental trajectories in shaping local and regional policy.

Furthermore, whilst the impacts of direct government policy assembles wider trajectories which influence, exist alongside and come to be assembled within the orientations towards the future being enacted within Teesside, there are also wider political narratives and imaginaries which also assemble such trajectories. Here political narratives, government announcements and discussions within the media enact a particular set of orientations towards the future which render particular futures present and others absent from a public imaginary. An example here might be how austerity was presented following the 2010

election as the only solution to curb government spending and reducing national debt. Political discussion was here centred on the extent and speed that austerity cuts should take, and constructing a national political trajectory within which only austere futures of government spending could be imagined and whereby other alternative approaches to spending were rendered absent.

Thus, throughout the process of researching the trajectories of industrial change in Teesside, this thesis has highlighted the roles of a number of actors and trajectories beyond that of the steelworkers, the steelworks management and of local governance. The purpose here is not to single out the role of non-humans and wider political narratives as being somehow behind or as causal mechanisms for the enactment of these trajectories of industrial change. Rather, what I aim to achieve here within the conclusion of this project is to reiterate that the assembled orientations towards the future experienced and enacted throughout the mothballing of the steelworks of Teesside sit within, alongside and intersect with multiple other trajectories that come to be related to one another in multiple different ways.

9.4. Future Research

Alongside the above implications for how we think about and approach industrial change in general, attending to the futures of industrial change also opens up new ways of exploring different forms of industrial change. Trajectories are one, but by no means the only, way of exploring these industrial futures. There are multiple different forms of industrial change and whilst the concept of trajectories has been developed in the context of radical and dramatic change such as the mothballing of TCP, the roles of futurity within industrial

change extends beyond this empirical example. Thinking about the futures of industrial change in terms of uncertainty, change/stasis and assembly therefore also has implications for approaching the following three areas of industrial change:

1. Everyday industrial practice

The mundane practices of going to work each day, managing the daily operations of a company, being part of a household or family all enact relations with industrial futures. Thinking of these practices and their relations to futures in terms of uncertainty, change/stasis and assembly allows these futures to feature as key components of everyday life as opposed to being reduced to a the role of a background temporality. For areas of geographical work dealing with the lived experience of industrial change and everyday industrial practices (such as Bennett 2009; Bennett, Beynon, and Hudson 2000; Stenning et al. 2010; Walkerdine and Jiménez 2012; Walkerdine 2010), the implication of this is that it allows futures to feature explicitly as an object of research in their own right. The concept of trajectories would be one way to explore these more mundane experiences of orientations towards the future within the contexts of 'normal' day to day life and would provide a means of exploring how this everyday practice is constantly assembled within specific mobile boundaries or thresholds of change. Yet this concept is perhaps less attentive towards the minor perturbations and disruptions that punctuate the enactment of everyday industrial futures. Examples here might include minor illness necessitating time off work, the breakdown of a car and the temporary loss of transport or the scheduled shutdown and maintenance of a piece of machinery. Each of these provide moments of disruption and uncertainty to the assembly and enactment of the futures of industrial change and practice, however it is unlikely (although without further context it remains

possible) that these events would cause the crossing of a threshold of change in the terms of the concept of trajectory.

2. Long term industrial change

Industrial change occurs through many different processes and contexts of which the mothballing is but one example. This thesis has argued that futures are also central to understanding how industrial change comes to be lived and experienced and this includes longer term examples of industrial change such as deindustrialisation, disinvestment and the outsourcing and spatial division of core business practices. Thus, whilst this thesis has addressed how futures are disrupted, managed and assembled through the intense industrial change of the mothballing of TCP, attending to futures as uncertain, in tension between change and stasis and how they come to be assembled also offers new insights into other forms of longer-term industrial change. Examples here might include how workforces become frayed and fragmented over longer time periods, such as occurred within the steel industry of Teesside in the latter half of the 20th century, which saw massive reductions in staffing levels and a greater reliance upon subcontracting (Beynon, Sadler, and Hudson 1994). Thinking about this form of industrial change in terms of uncertainty, change/stasis and assembly allows for an exploration of how this change takes part incrementally through a drawn-out process of simultaneously continuing to assemble a workforce whilst also pulling it apart. A further example would be the wearing out of workers over a working life within a particular industry. Here industrial change is an embodied process whereby the working body changes over the years and decades it spends working within particular roles as part of a trajectory of employment. Thinking about the uncertainty, change/stasis and assembly of industrial change enables an exploration of the processes by which bodies adapt, become skilled, wear-out and are

potentially damaged are situated in relation with the performance of longer term futures of industrial change and a promised future of a 'good life' (Berlant 2011a).

3. Multiplicities of organisations and actors enrolled within industrial change

Moreover, whilst acknowledging that trajectories sit within complex sets of relations with other trajectories, this project has focussed largely upon three distinct sets of relationships with specific groups of actors. Industrial change as a process occurs through a multiplicity of organisations and actors which all enact their own relations to futures through such change. Addressing the futures of industrial change opens up the possibility of exploring this multiplicity of relations and how different orientations towards the future exist in relation to one another as part of this process of change. An example here might be the different trajectories enacted through business consortiums, such as that which signed the ill-fated ten year contract with TCP in 2004. Each member of the five companies party to this agreement assembled their own particular trajectory which was enrolled together with those of the other organisations within the trajectory of the consortium. This thesis has already explored how novel assemblages of actors can emerge in relation to particular futures within industrial change through a discussion of the assembly of practices of steelworks management within chapter 7. However, an attention to processes of assembly also opens new possibilities for exploring how industrial futures come to be assembled through multiplicities of different organisations. The building of business partnerships and agreements are predicated upon particular imagined and planned for futures that are assembled through various practices and relationships. Trajectories-led research would allow for an attention towards the interplay of these different orientations towards the future and how they sit in relation to one another, as well as within relations to other futures and trajectories such as local and national governments. However, whilst such an

approach would emphasise the assembly of particular futures of industrial change and their mobile boundaries of change, approaching these relations through a reading of Actor-Network Theory (see Latour 2007; Latour 1993; Law 2004) would serve to emphasise to a greater degree how the relations between different orientations towards the future exist in relation to one another and come to be co-constituted through these relations.

In addition to using the concept of trajectories as a means to exploring futures across the above empirical sites, continuing this future research also offers the possibility of developing this concept further through a range of different research methodologies. As laid out within Chapter 5, this project has largely been conducted through a methodology structured around semi-structured interviewing (supplemented with documentary analysis in Chapter 8), however this is by no means the only methodological approach with which trajectories can be researched. Indeed, researching trajectories through different methodologies offers further new and exciting insights into futures research. For example, exploring the trajectories of industrial change through and Actor-Network Theory-led methodological approach of following the actors would allow for the multiplicities of heterogeneous components assembled within trajectories to be brought to the fore of research and furthermore would also allow for the roles and agencies of non-humans to be further explored within the trajectories of industrial change. Furthermore, conducting research into the trajectories of the lived experience of industrial change through a more longitudinally focussed Participatory Action Research (see: Kindon, Pain, and Kesby 2007; Kinpaisby 2008; Pain 2004) style project would enable the personal and emotional aspects of these trajectories to be emphasised within research. An example of such a project could be working with a series of families affected by industrial change and working with them to research their own experiences of orientating their selves towards the future both as

individuals and as part of their family unit. This could also provide a series of insights into the more mundane and everyday aspects of living trajectories. Furthermore, whilst much of the research within this project was conducted retrospectively in that the mothballing had already taken place at the time of the interviews, conducting an ethnographic account of a company or institution as it undergoes radical change would also allow for a more nuanced account of the managing and holding together of futures as they occur. Within such an account, the researcher may be better placed to account for the affects and atmospheres present within the management of futures and perhaps better account for the everyday practices of managing the futures of industrial change as they occur as opposed to recollections of the large-scale actions taken such as cross-matching and bursary schemes.

9.5. The Trajectories of Industrial Change: Disrupting, Managing and Assembling Futures in Teesside

Overall, this thesis has sought to explore the role of futures within industrial change through the development of a conceptual apparatus that I have come to call the concept of trajectories. It began with three overall research aims:

1. To explore the role of futures in industrial change particularly in relation to the mothballing of the steelworks in Teesside and the industrial and local economic change that it brought about;
2. To develop a conceptual apparatus to approach and research different orientations towards the future;
3. To apply this conceptual approach to a range of futures enacted within Teesside following the mothballing of the steelworks.

The first of these aims has been addressed throughout Chapters 6, 7 and 8 which have shown how throughout and after the mothballing of TCP futures were disrupted, held together and assembled by various actors within Teesside. Running throughout this discussion three key themes came to the fore: uncertainty, change/stasis and assembly. Approaching industrial change through these themes has implications for how we might think about other forms of industrial change such as the mundane activities of everyday industrial practice, longer terms industrial change and also how industrial futures come to be assembled through complex multiplicities of organisations. This therefore highlights how futures are central to understanding how industrial change occurs through these processes.

The second research aim was addressed within Chapters 3, 4 and 5. Here, chapter 3 provided an overview of previous engagements with futurity within research dealing with industrial change and further outlined what a conceptual approach to futures would need to consist of. Here it was outlined that any conceptual framework for researching futures had to be able to attend to (1). futures across different empirical sites to explore how these futures come to be assembled from multiple heterogeneous components, (2.) how these futures are constantly changing through their enactment, and (3.) how futures can endure and be held together (or fall apart) through such change. Within chapter 4 this thesis answered this challenge through the development of the concept of trajectories. Through conceptualising different orientations towards the future as homeomorphic assemblages this thesis was able to maintain a focus upon how futures are constantly changing, yet also endure and are held together across a range of different empirical sites and heterogeneous components. Chapter 5 saw the methodological application of this concept, the results of

which formed the basis for the three empirical chapters which therefore attend to the third research aim.

The thesis can therefore be considered a success in the sense that it has achieved its three stated research objectives. However I would argue that this description can only be used tentatively as to label this project a success also brings something of an implication of finality and completion. Rather I consider this project to be a modest contribution to what remains the beginnings of a wider engagement within futurity within geography. It is my hope and ambition that the concept of trajectories continues its own future within geographic research and comes to be further refined and developed through future engagement and that the modest success of this project can be used by myself and other scholars to further how we understand and research the futures of industrial change.

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