

**Labour, Work, and Automation: Reconsidering**  
**the Future of Work in Light of Automation**

Joseph Alan Jones

Department of Philosophy

University of Kent

Thesis submitted in fulfilment of the requirements

for the degree of Doctor of Philosophy

28/03/2022

Word Count: 92,207

## **Declaration**

I, Joseph Alan Jones, confirm that the work presented in this thesis is my own.

Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

## **Acknowledgements**

I am deeply grateful to my supervisors, Dr. Edward Kanterian and Professor Simon Kirchin, for their guidance, support, and engaging and lively discussion during my PhD study, and to Dr. Todd Mei for his support and expertise at the beginning of the project. Their immense knowledge, active engagement, and endless generosity has inspired and encouraged me throughout my PhD. I am also indebted to CHASE DTP for funding my research, and to Clare Hunt for her professional guidance.

I would like to thank my colleagues across various departments at Kent, particularly Dr. Ben Turner and Dr. Jon Winder, for their support with my thesis and for being irreplaceable academic allies. I am also grateful to the Philosophy Department at the University of Kent for providing a lively, welcoming, and open community, and particularly to Dr. Will Levack-Payne and Dr. Daniel Aucker-Howlett for their difficult questions and supportive friendship over the years.

Finally, I express my eternal gratitude to Sarah Shepherd, and to Kirstie and Idie Marshall-Jones. Their endless support, unquestioning love, and bottomless generosity have made me the person I am today, and without them this thesis would not have been possible. I dedicate this thesis, and any future successes, to them.

## **Abstract**

The future of work is one of increasing precarity and uncertainty. The continued implementation of automation has been further problematised by the difficulties brought about by Covid-19 and its resultant lockdowns, the growing popular desire for better work/life balance, and continued economic upheaval. Accounts of the future of work vary across the academic literature and mainstream media: for some, increasing automation is an emancipatory political moment that promises more free time and social justice; for others it is an insidious social force that will bring more harm than good to society.

However, although these opposing accounts of automation might appear to employ the same unproblematic terms and concepts, I argue that they are reified through a focus on specific limited examples which scholars attach to those terms without explicit acknowledgement. As a result, accounts of automation make generic claims regarding the nature of automation by narrowly focusing on one of its given contingent functions, and rely on common sense and incomplete conceptions of work. There is a need to reduce the tension between opposing accounts, and to avoid overtly dystopian and utopian narratives about futures of work, in order to develop an accurate picture of automation and work that reflects the reality of automation today. This thesis performs a phenomenological reduction of automation, and redefines intuitive notions of 'work' as two distinct modes of activity, *labour* and *work*. I will develop three ideal type definitions of automation, labour, and work, which can then be applied to make better sense of real-life case studies. While discussions of automation and the future of work can naturally tend towards emotional or polemic predictions of thoroughly technologised societies, both positive and negative, offering such predictions in advance of a rigorous analysis of each term results in incomplete accounts of the phenomena at stake. I will strip back these reified notions, and offer a novel evaluative framework for considering the automation of work, using novel definitions of automation as the enclosure of tasks from further human intervention, and *labour* and *work* as distinct modes of activity, comparing these ideal definitions to real and proposed case studies to ensure their practical applicability.

In the first chapter I offer a definition of automation as a means of enclosing a task from further mediation, and in the second I compare this definition to those found across the literature, paying particular attention to the reified accounts of automation offered by scholars, including Aaron Bastani, Nick Srnicek, Martin Ford, and Erik Brynjolfsson. In Chapter 3 I define *labour* as a mode of activity primarily intended towards biological necessity, and discuss potential Marxist critiques to this conception. Chapter 4 sees the introduction of a number of case studies, including self-driving cars and sex work, which will serve to test my definitions of *labour* and automation in practice. Chapter 5 introduces the correlate definition of *work*, and considers a comparable notion of work offered by Hannah Arendt, before Chapter 6 concludes by returning to the case studies

offered in Chapter 4, comparing them to the mode of *work* rather than *labour*. I will conclude that while pressing, questions surrounding automation and the future of work cannot be fully or accurately answered with a narrow and reified understanding of either term, and will instead offer a novel evaluative framework in response.

The future of work may well be an automated one, but at this early stage it is vital to properly define and understand the dominant notions at play, and to not get lost in emotive speculative predictions of the future that are not aligned with the reality of work today.

## Contents

Labour, Work, and Automation: Reconsidering the Future of Work in Light of Automation .....	1
Declaration.....	2
Acknowledgements.....	3
Abstract.....	4
Contents.....	6
0. Introduction .....	8
0.1. Automation and the Future of Work .....	12
0.2. Chapter Breakdown .....	17
0.3. Methodology.....	22
0.4. Clarification of Key Terms .....	28
0.5. A Note on Arendt and Marx.....	34
Section 1 – What is Automation? .....	37
1. Defining Automation.....	37
1.1 Automation and the Future of Work .....	37
1.2. Three Terms in One.....	40
1.3. Posing the Problem .....	51
1.4. Defining Automation.....	57
1.5. Framing the Definition in a Historical Context.....	79
1.6. Addressing Marx and Automation .....	85
1.7. Restating the Definition .....	92
2. Reviewing the Literature Concerning Automation .....	95
2.1 From Essential Definition to Contingent Function.....	95
2.2 Historical Accounts of Automation .....	97
2.3. Automation as a Tool for Saving Time .....	101
2.4. Automation as a Tool to Increase Productivity.....	113
2.5. Automation as a Tool for Redressing Social Issues .....	119
2.6. Utopian and Transhumanist Accounts of Automation .....	125
2.7. Hybrid Models of Automation .....	135
Section 2 - What is <i>Labour</i> ? .....	140
3. Labour .....	140
3.1. From Automation to Labour .....	140
3.2. Why Not Just Work? .....	142

3.3. Modes of Activity, rather than Categories of Action .....	146
3.4. Defining <i>Labour</i> .....	153
3.5. A Debt to Hannah Arendt .....	173
3.6. The Enclosure of Labour .....	177
3.7. Problematic Instances of Enclosure .....	188
3.8. A Marxist Response.....	191
4. Automating Labour .....	200
4.1. From Theory to Practice.....	200
4.2. Case Study 1: Self-Driving Cars .....	202
4.3. Case Study 2: The Automation of Manufacturing.....	226
4.4. Case Study 3: Interpersonal Care Labour.....	242
4.5. Towards <i>Work</i> .....	262
Section 3 – What is <i>Work</i> ? .....	264
5. <i>Work</i> .....	264
5.1. From <i>Labour</i> to <i>Work</i> .....	264
5.2. Defining Work .....	267
5.3. Against Post-Work Imaginaries.....	293
5.4. Enclosing <i>Work</i> .....	297
6. Automating <i>Work</i> .....	321
6.1. Revisiting the Case Studies .....	321
6.2. Case Study 1: Self-Driving Cars .....	324
6.3. Case Study 2: Manufacturing.....	340
6.4. Case Study 3: Interpersonal Care.....	353
6.5. Reconsidering the Case Studies .....	365
7. Conclusion .....	367
7.1. Summary .....	367
7.2. Recommendations for Future Research .....	375
Bibliography .....	378

## 0. Introduction

*As always, machine's triumph was a human triumph, something we tend to forget when humans are surpassed by our own creations (Kasparov 2017, 3:59).*

In 1996 and 1997 Russian chess Grandmaster Garry Kasparov played two six-game matches against IBM's chess supercomputer *Deep Blue*. Kasparov, the human World Champion of chess at the time, won the 1996 meeting 4 games to 2, which set a record for the first time that a human Grandmaster was ever beaten in a *game* of chess by a machine but, despite 2 losses, it still seemed that automated machines were a long way from surpassing human capacity. However, at their second meeting in 1997, *Deep Blue* beat Kasparov 3½-2½, signalling the first time a Grandmaster had ever lost a whole *match* to a machine. This was a watershed moment, and prompted some at the time to believe that the age of human superiority (in chess and beyond) was over: "be afraid," one journalist wrote (Krauthammer 1997). However, 20 years after the event, Kasparov does not agree with the pessimism expressed at the time. He reflected that "doomsaying has always been a popular pastime when it comes to technology" (Kasparov 2017, 8:22), and that instead of invalidating human chess players, the inclusion of chess engines and computers has transformed how humans play the game, but ensured that humans *still do*. Indeed, some engineers at the time have said that developing Artificial Intelligence (AI) with the intention of eclipsing human skill is a "diversion", and we should instead use these machines to learn

new skills, and reflect on our own behaviours, rather than seek to replace ourselves (Somers 2013). Kasparov himself is very much of this mindset, arguing that a computer alone cannot fully encapsulate the game of chess, but also that human players alone will never be able to reach the fullest potential of the game: for Kasparov, the game of chess is best approached within a “human plus machine” framework (Kasparov 2017, 11:12).

The implementation of automated chess computers is not indicative of automation as a whole, but it does demonstrate the intuitive and immediate responses with which newly automated technologies are often met: on one hand, automated machines can be optimistically celebrated as they push the limits of possibility forward; on the other hand, they can be met with fear and resistance as the limits of human capability are tested by newly technological means. This can be seen across society: the automation of manufacturing creates the possibility for post-work societies of endless freedom and fairness (Srniczek and Williams 2015; Bastani 2019), but at the same time threatens mass unemployment and a loss of human meaningfulness (Carr 2014; Ford 2015); in much the same way, humanoid robots in healthcare might democratise knowledge and provide high standards of care (Susskind and Susskind 2017; Topol 2019), but might also remove something intrinsically and necessarily human from the process (Coeckelbergh 2015; Bertolaso and Rocchi 2020). The effects of automation are perhaps most explicitly felt in the world of work, with the development of automated technologies threatening employment in many industries, for better or worse (Autor 2015; Danaher 2017a), and calling

into question many longstanding working practices, such as working hours and working from home (Brynjolfsson and McAfee 2014; Soojung-Kim Pang 2020a). The future of work is one that appears to be inevitably automated, but deeply uncertain.

Importantly, the uncertainty, precarity, and upheaval facing the world of work today is not **all** caused by automation, and indeed automation is even purported to remedy some of the issues in work. The state of working practices today has undergone global fluctuations in aspects including employment rates, wages, and working hours, and many industries have seen radical growth or decline. This is historically emergent, with working practices not remaining static for prolonged periods of time, but changing in unison with other social, economic, and political factors (Skidelsky 2020). Perhaps the most obvious and urgent factor affecting work today is not automated at all: the onset of Covid-19 and the subsequent national and international lockdowns have sharply problematised working practices. During the height of the pandemic, the move towards working from home called practices, including commuting and holding standardised inflexible hours, into question (Soojung-Kim Pang 2020b). As the pandemic ebbs and flows, discussions continue about the future of work, the types of jobs workers want to engage in, and the role of work in our lives (Jones and Winder 2021), against the backdrop of ever-increasing automation. Is this the moment to achieve a radically shorter working week, spending more time outside of work and gleaning more meaning from the work that we are left with? (Stronge and Lewis 2021;

Hester and Srnicek 2023) Or should we be demanding full employment, resisting automated technologies, and reclaiming work as a human right? (Attfield 2001; Mueller 2021)

These questions are important, and provide the current focus for many scholars across the literature, in philosophy and beyond (Turner and van Milders 2021). The literature is sharply divided between scholars advocating for ‘full’ automation (Bastani 2019; Danaher 2019) and those warning instead of its more negative implications (Ford 2015; Eubanks 2019). In order to properly approach the future of work in an effective, expansive, and inclusive manner, and to parse the two opposing sides of the literature, it is pertinent to first establish precisely what is meant by the central notions at play. Endemic in the current literature is the use of the term ‘automation’ in a distinctly contested manner, with each scholar focusing on different contingent functions of automation and specific examples, without necessarily giving explicit or critical qualification, resulting in the reification of automation in a very specific way each time. This leads to opposing conclusions, and diametrically opposed predictions of automation and the future of work, through the use of the same terminology. Scholars use terms such as ‘work’<sup>1</sup> and ‘labour’<sup>2</sup> in common sense ways, but often without explicitly detailing precisely what is meant

---

<sup>1</sup> I will draw a distinction throughout this thesis between intuitive and commonplace uses of the term ‘work’ and my own technical definition of *work* as a mode of activity. To clarify this, I will italicise my own usage, and will refer to commonplace uses as either work or ‘work’.

<sup>2</sup> Similarly, my own technical definition of the term *labour* will be italicised, to differentiate between it and other, more common or intuitive, uses of ‘labour’ or labour.

by the term, instead relying on (often opposing) intuitive understandings. For some scholars, work is therefore a limiting and demeaning activity that we should escape at all costs (Graeber 2018), while for others it is precisely the means by which to reclaim and protect our humanity (Bowie 2019); just as automation is the process by which to achieve full freedom and social equality for some (Bastani 2019), but is the cause of many of the problems facing contemporary society for others (Frey 2019). To properly answer the question of automation and the future of work, we first need to establish a more ecumenical and open evaluative framework to consider what is at play in the question itself.

### **0.1. Automation and the Future of Work**

It is precisely this novel evaluative framework that I will develop in this thesis. Investigations into the future of work, specifically the role that automation might play in such futures, are pressing, timely, and important, generating interest across the literature. While there is much discussion across the literature surrounding automation and the future of work, many of the conclusions drawn and predications made are narrow, offering a specific and incomplete picture of automation while making generic claims regarding the future of work. Additional political, economic, and social value judgements are included in many arguments in an implicit manner without explicit acknowledgment or specific terminological definition: ‘post-work’ theorists argue that automation is an overwhelmingly positive

process because it removes meaningless work from society, but in doing so they may implicitly rely on narrow conceptions of work and overly optimistic conceptions of technological development, without fully exploring any emergent implications (Aguilar-Millan et al 2010; Pilsch 2017; Danaher 2019). Conversely, scholars who decry automation as removing something fundamentally human from society, or as leading to unintentional unemployment and social ills, are basing their arguments on assumptions regarding the ontological role of work, without explicitly clarifying such ideas (Blanchflower 2019; Ford 2021).

Where such arguments are clarified as relating to narrow or specific cases of automation, these types of approaches are not inherently problematic, and may indeed be the very point of discussion. Confusion arises when narrow and incomplete critiques of automation that relate only to a specific facet of automation and work<sup>3</sup> are extrapolated to affect *all* instances of automated work, in a generic sense beyond the narrow examples given. ‘Post-work’ theorists provide perhaps the clearest example of this, because the implementation of automation and resultant unemployment in industries including manufacturing and service work are held to demonstrate the implications of automation *across society as a whole* (Rifkin 1995; Bastani 2019). Rather than limiting the analysis to specific industries or jobs, theorists including John Danaher, Alex Srnicek,

---

<sup>3</sup> I draw a distinction between *labour* and *work*, but commonplace discussions of ‘work’ often do not make such a distinction. When I discuss ‘automation and the future of work’, I will offer conclusions regarding ‘automation and the future of *labour* and *work*’, with intuitive uses of the term ‘work’ being divided into the two terms later in the thesis.

and Aaron Bastani argue for a generic trajectory in working practices, and make assumptions regarding the future formulation of *all* society based on the data from a *very limited* subset of cases. Conversely, theorists on the other side of ‘post-work’ debates, who decry automation and demand the protection of work against replacement by robots and machines, often move from the automation of manufacturing plants and automotive factories to assumptions about *all jobs* (Marx 1867; Ford 2015). While the threat of unemployment in a factory or robotic supervision in a warehouse is very real (Gunther 2005; Moody 2017), it is a mistake to extrapolate from such limited cases to predications of the end of work as we know it.

There are two pivotal questions which can be asked of all scholars in the literature investigating automation and the future of work today: what is meant by the term ‘automation’ and what is meant by the term ‘work’? Such questions might seem overly simplistic, intuitively answered, or downright unimportant, but approaching the issue from this fundamental position reveals the limits of the arguments offered across the literature thus far. When a ‘post-work’ theorist is asked what they mean by the ‘work’ that is being overcome, it becomes clear that paid employment and meaningless jobs are often at the heart of their analysis (Stiegler 2016; Jaffe 2021). However, this only accounts for a portion of the activities that might fall under the term ‘work’. If all such jobs are automated, what happens to the unpaid labours of cleaning, cooking, and childcare, which don’t fit into such a picture of work-as-employment, but equally are not *always* the types of activities that scholars cite as

‘meaningful’?<sup>4</sup> Conversely, the scholars who resist automation might do so on the grounds that work plays an important and ontologically-central role in human life, referring to ‘work’ as a meaningful and self-articulatory activity in which human beings ought to engage (Carr 2014; Mueller 2021). Does the rejection of automation also extend to repetitive, meaningless wage-labour, the type that demeans and damages those who partake in it? These reified accounts of automation and the future of work are narrow because they only relate to the cases that align with the value in question, and ignore the cases that do not fit into such conceptions. By beginning from a reified position, based on a narrow set of examples, without first considering the essential qualities of the process in question, an accurate and complete picture of automation and the future of work *can never be achieved*.

What is required is a stripping back of the debate from its contested state, to reveal the un-reified central concepts at the heart of the issue: automation and work. To do this, three questions are pivotal in the literature:

1. Precisely what is meant by the term ‘automation’?
2. What is meant by the term ‘work’ as it is commonly used?
3. How might, can, and do these two terms interact with one another?

---

<sup>4</sup> Although some scholars certainly do cite these types of activities as meaningful, including Albert Borgmann (2010), who argued that these types of activities are ‘focal things and practices’, whose value is neglected in contemporary technological life.

The importance of technology in contemporary society is undeniable, and the growth of automated technologies is a key feature of both academic literature and popular discourse. Given that work continues to occupy a large portion of our lives, the intersection of the two requires close attention. Because of the importance of work and the exciting potentials of automated technologies, it is easy to become lost in tempting speculative narratives of utopia and dystopia, despite such predicted futures not necessarily reflecting the current realities experienced around the world. In stripping these terms back to their essential, un-reified cores, and removing any narrow or specific conceptions in the first instance, it is my intention to offer a novel evaluative framework that is not based on any particular set of examples, and instead better reflects automation and work *on the whole*, thereby allowing for far-reaching practical applications.

Simply analysing the terminology used across the literature is insufficient to properly account for the role played by automation in the future of work. Work is a fundamental facet of contemporary life, for better or worse, and conceptual analysis alone cannot fully account for the automation of work in its entirety. In conjunction with the conceptual, linguistic, and philosophical analysis, I will offer three case studies to explore the validity of my research. The intention of this thesis is to produce a novel evaluative framework which can be applied to further case studies, both now or in the future, in a very real way.

The issues regarding individual cases of automation and the future of work are undoubtedly important, but cannot be properly approached with narrow, incomplete understandings of either term, regardless of how intuitive they might seem. I will offer a novel definition of automation, as the process of enclosing a task from further active human intervention, and ‘work’, as two distinct modes of activity, *labour*<sup>5</sup> and *work*<sup>6</sup>, to offer a novel interjection into the fractured and contested literature surrounding automation and the future of work. Some potential futures of work at the hands of automation will be considered after a rigorous set of notions has been properly defined and explored.

## **0.2. Chapter Breakdown**

The core aim of the thesis is to offer sufficient answers to the three central research questions: what is ‘automation’? What is ‘work’? How can, might, and do these two terms interact with each other? To develop a sufficiently robust account of automation, *labour*, and *work*, and to offer sufficient practical consideration for how these terms can, might, and do interact with each other, the thesis will be broken into three sections and six chapters.

---

<sup>5</sup> Again, *labour* here denotes my technical definition of the term, rather than a more general usage.

<sup>6</sup> Similarly, *work* denotes my technical definition of the term, rather than a more general usage.

The first section of the thesis will offer an answer to the question ‘what is automation?’ Chapter 1 will begin by further exploring the tensions within intuitive uses of the term ‘automation’, and outlining the ways in which the literature is currently poorly equipped, due to imprecise and contested terminology, to properly account for the role played by automation. In response, I will introduce the novel definition of automation, as an ideal type, defined in paradigmatic terms as the process of *enclosing a task from further human intervention, interaction, or mediation*. This definition is an essential and technical term, and will be formulated in a novel evaluative manner that can be applied to *all* instances and cases. I will couch this definition in a historical context, and will also defend it from a set of potential Marxist and Marxian critiques.

Having outlined the definition of automation being developed in the thesis, Chapter 2 will focus on the current literature. I will begin with a note on historical accounts of automation and highlight the ways in which my own definition is in line with historical narratives. I will then divide the literature according to a number of automation’s contingent functions which, I argue, do not wholly account for the essential nature of automation. These conflated contingent functions are: automation as a tool to save time, and the opposing view of technological unemployment; automation as a tool for increasing productivity, and the extended or opposing account of post-scarcity economics; automation as a tool for redressing social issues, and the opposing account of automation as the cause of further social issues or injustice; the diametrically opposed

utopian and dystopian futures of work through automation, and particularly the transhumanist and posthumanist projects; and finally, a note on hybrid models of automation. Throughout this chapter I will critique the various positions, and highlight the unintended consequences of each narrow view, further advocating the utility and necessity of the novel evaluative approach I am developing. I will conclude this part by restating the definition of automation from Chapter 1, and by summarising my novel approach to automation.

Building from the definition of automation established in Section 1, Section 2 will offer an answer to the second core research question, “what is work?” Following the phenomenological reduction in Chapter 1 that revealed a single ideal type of automation as the process of enclosing a task from further human mediation, I argue that the reduction of common sense notions of work does not reveal a single resultant notion: it reveals two distinct notions, and the space to investigate further notions. Rather than offering a single stripped-back definition, I will present a novel account of what we intuitively call ‘work’ as two distinct modes of activity, *labour* and *work*. Section 2 will offer an analysis and defence of the first revealed notion: *labour*. Chapter 3 will present a definition of *labour* as a mode of activity, rather than a set of actions, which is *primarily intended towards the biological welfare of the affected agent/s*. I will define *labour* in relation to three key elements: biological necessity; its cyclical temporal quality; and its universal presence in the human condition. Using the term in this way requires a clarification of my debt to Hannah Arendt, which will

be stated after the completion of my definition. This definition offers a notion that is useful practically, and the second half of the chapter will explore how this definition might be applied to real-world cases. I will outline the ways in which such a mode of activity is enclosed in practical cases, including but not limited to automation, through three forms of enclosure: spatial enclosure; temporal enclosure; and social or interpersonal enclosure. To conclude the chapter, I will outline problematic instances of *labour*, and offer a further defence from Marxist critiques regarding my use of the term 'labour'.

Chapter 4 will further develop the definition of *labour* by combining it with the definition of automation developed in Section 1. In order to answer the third research question, of how the two terms 'automation' and *labour* interact with one another, I will consider three case studies and explore the literature and approaches currently surrounding them, before outlining how the approach offered in this thesis is more suited to accurate and open investigation. The three case studies are self-driving cars, manufacturing, and interpersonal care, within which I am including healthcare, familial commitments and parenting, and sex work. I will argue that current problem-focused discussions surrounding these areas are important, but either focus on narrow facets that cannot fully encapsulate the issue as a whole, or extrapolate the implications of a narrow facet to the issue in its entirety, thereby making generic and inherently limited claims. In response I will apply the definitions developed previously and

suggest alternative approaches to the cases, which yield more open and applicable conclusions.

Finally, Section 3 will explore the concomitant definition revealed in the phenomenological reduction of 'work'. Having previously defined *labour* as a distinct mode of activity, in Chapter 5 I will offer a novel definition of *work*, distinguished from intuitive and commonplace uses of the term. I will define *work* as a mode of activity, rather than as a set of actions in their own right, but will distinguish *work* as the mode of activity primarily motivated towards the meaningful expression and engagement of included agents. In a similar structure to Chapter 3, I will focus on three central elements of this definition: the meaningfulness of *work*; its determinate temporal condition<sup>7</sup>; and the universal capacity for expression and articulation. Using my novel definition of *work*, I will also offer an argument against 'post-work' accounts of automation, citing their incomplete and fractured definition of 'work' as rectifiable with my account. I will then explore the ways in which *work* emerges in practice, outlining three central conditions under which practical cases of *work* can be enclosed: the spatial condition of enclosure; the temporal condition of enclosure; and the enclosure of meaningful engagement and articulation, concluding the chapter with a consideration of problematic instances of *work*.

---

<sup>7</sup> Determinate here refers to the condition of definitive finality in acts of *work*, which is opposed to the continuous cyclicity of *labour*.

To conclude Section 3 and the thesis as a whole, I will return to the case studies offered in Chapter 4, but examine them in light of the mode of *work*, rather than in the mode of *labour*. Chapter 6 will restate the conclusions drawn in Chapter 4, before outlining the distinct and opposing ways in which the cases appear in the alternate mode of *work*. I will explore the ways in which self-driving cars, automated manufacturing, and automated interpersonal care reflect the mode of *work* as well as the mode of *labour*, and present approaches in which the issues respect and acknowledge both modes simultaneously.

Throughout the thesis I will present a number of technical terms, and will employ a specific methodology. Before embarking on the analysis, it is necessary to first outline the methodology that will be employed, and some of the foundational and fundamental terms that will be used.

### **0.3. Methodology**

At the heart of this analysis of automation, *labour*, and *work* are a number of important methodological commitments, and the general methodological process of the thesis is twofold. The first methodological process I will undertake is to clarify the central notions of automation, *labour*, and *work* by stripping away the specific, contingent, and common sense conceptions presented across the literature. I argue that the discussions of automation and ‘work’ across the literature are based on imprecise and limited definitions, and consequently only narrow

conclusions can be drawn. I will employ a phenomenological reduction to strip away the constraining conceptions and limited accounts often implicitly included in contemporary discussions of automation and the future of work, to reveal an essential notion of each term. The second methodological process will translate these essential notions into three heuristic ideal type definitions (of automation, *labour*, and *work*), which will outline a paradigmatic case of each, to which real cases can be compared. While these two methodologies might appear to be contradictory, I argue that a phenomenological reduction is necessary to properly understand the precise notions being employed across the literature, and that real-world cases of automation require an openness to diversity and divergence that a heuristic ideal type definition can facilitate. Metaphysical or objective concerns regarding the reality or actuality of automation, *labour*, and *work* are therefore of secondary importance, because my definitions function primarily as heuristic standards for investigating cases of automated work, in light of the shortcomings in the contemporary literature which I identify. Let's now briefly define each methodological commitment, before clarifying some key terms.

### 0.3.1. Husserl's Phenomenological Reduction

The first significant methodological commitment I will make in the thesis is that of a phenomenological reduction. Many of the discussions across the literature about automation and the future of work rely on common sense understandings, narrow conceptions, and implicit assumptions regarding the nature of both automation and work. In some

cases these are political, with specific notions of work and automation performing specific teleological goals in a political narrative; ontological, with conceptions of the human being and the nature of technology as a whole forming an implicit foundation to any analysis; economic, with critiques of capitalism built in; and so on. With each overly narrow and incomplete conception of automation, *labour*, and *work*, qualities and cases that fall outside the given purview will be missed or ignored and any prediction regarding the future *as a whole* will consequently be narrow and generic. In order to avoid these limitations, and to offer as broad and applicable model of automation, *labour* and *work* as possible, I will draw on the methodology of phenomenological reduction advocated by Edmund Husserl (1859-1938). At his time of writing, Husserl noted a trend towards relying on scientific forms of understanding and investigation *in all facets of experience*, and warned that scientific descriptions were inherently limited in their scope, often neglecting the experiential role of the human subject (Schmitt 1959). Husserl called for these empirical standards and approaches to be omitted from phenomenological research, along with “geometry, phronomy, and the ‘pure’ physics of matter”, because they offer little indication regarding the phenomenology of experience (Husserl 1913, p.138). That an act of work is governed by certain physical laws, or that an automated machine must follow certain mathematical principles, does not fully explain the phenomenological experience of work or the phenomenological implications of automation. Husserl advocates for the reduction of experience to its phenomenological core, so that the subject

of an experience can transcend understanding purely in terms of natural laws, while also accounting for their own place in a given case (Bernet 2016). It is this form of ‘stripping-back’ that I will employ in the first instance, to parse and remove the implicit judgements included in commonplace uses of automation and ‘work’, with the intention of revealing a central core or essential notion.<sup>8</sup>

### 0.3.2. Max Weber’s Ideal Types

Max Weber’s (1864-1920) notion of an ‘ideal type’ was also developed in response to the growing objectivity of scientism at his time of writing in the late 19<sup>th</sup> and early 20<sup>th</sup> Century (Aspalter 2021). Weber was concerned by the trend in the social sciences towards the objectivity of the hard sciences, and argued that *all* analysis will contain implicit contextual value judgements if it involves a human author or human language (Goddard 1973). Weber argued that trying to describe concrete realities of complete objectivity was the wrong path for social sciences, and instead argued that social scientists should compare the reality of a given case or situation to an ideal type, and explore the ways in which the real case differs or falls short (Hekman 1983). An ideal type is therefore:

...not a description of concrete reality... it is not a hypothesis; it is not a schema under which a real situation, or action, is subsumed as one instance; it is not a generic concept or statistical average. Rather, it is an ideal limiting concept with which the real situation or action is compared, so that it may be properly appraised in line

---

<sup>8</sup> This type of approach to understanding technology has been utilised more recently by Stuart Russell in his discussions of AI, in which he presents a similarly ‘stripped back’ and novel conception of AI technologies (Russell 2019).

with the categories of objective possibility and adequate causation (Cahnman 1965, p.269).

This is precisely the manner in which I am defining automation, *labour*, and *work*. I am not arguing that one example of each term perfectly encapsulates the entirety of that term in practice, nor am I setting unrealistically high standards for judging real-world cases. Instead, I am offering paradigmatic definitions of each term as an ideal form in Chapters 1, 3, and 5, and then exploring the ways in which both the literature and real case studies align with these ideal types, and the ways in which they do not. My approach is therefore heuristic in nature, allowing readers and policymakers to critically reflect and reveal implications of given case studies without establishing a scientific-style set of standards. I will not conclude by advocating for an automated future that meets these ideal types: indeed, a world in which all cases of automation ‘meet’ my defined ideal type would be a world in which there is *no room left for human beings*. Instead, I seek to use these paradigmatic examples and ideal types to critically reflect on the reality of current automation, to explore the tension within certain jobs and activities, and to problematise the types of futures imagined across the current literature.

### 0.3.3. Combining These Methodologies

While I am not necessarily outlining the phenomenological experience of workers or of automated machines, I will employ Husserl’s methodology of reduction to strip back the overly narrow and specific theories and inherently limited approaches found across the contemporary

literature. The intention is to reveal an essential notion of each term (automation, *labour*, and *work*), which can be translated into an ideal type, to which real cases can then be compared. The intention is therefore heuristic, with the ideal types offered in Chapters 1, 3, and 5 providing grounds for comparative analysis: these definitions therefore have practical utility and value, even if the precise confines of the definition itself (or its metaphysical or phenomenological objectivity) are disagreed with. Precisely because I am arguing that the contemporary literature is burdened with conflicting implicit, narrow, and limited conceptions of automation and work, the definitions I am offering in response are generally applicable, being formulated as an evaluative framework that can interject into the contested literature regardless of the case in question. The resultant terminology might therefore seem somewhat novel, with my uses of the terms *labour* and *work* in particular being deliberately distinct from commonplace usage.

This removal of additional value judgements extends to the language used, and as a result I will generally avoid relying on scientific or materialistic phrases such as ‘the expenditure of energy’ when discussing activities and agents operating in the modes of *labour* and *work*. On the surface, phrases such as this (and generally scientific descriptions of *labour*, *work*, and automation) **can** capture an important facet of each term, but such approaches can also include an inadvertent and unintentional set of assumptions and value-judgements and can neglect the role played by the actor as a phenomenological subject. *Labour*, *work*, and human agential

action in general, cannot be wholly reduced to a unit or quantity that can be defined by objective comparative standards: different activities and tasks might require comparable ‘amounts’ of expended effort or time, but to say that cooking a meal and writing a poem are comparable because they both take an hour and utilise the agent’s hands misses something fundamental about each act. By introducing novel uses of intuitive terms, and defining them as ideal types after first stripping them of the specific contested usages content in the literature, I intend to develop a heuristic account of automation, *labour*, and *work* that can be used to engage in real-world cases in a practical way that does not succumb to the limited discussion I argue is present in today’s literature. While novel, I believe that such an approach is necessary to properly consider the issue at hand.

#### **0.4. Clarification of Key Terms**

In addition to these methodological commitments, there are also a number of key terms that I will rely on throughout the thesis, but that require definition and exploration prior to any explicit analysis.

##### **0.4.1. Agent**

Perhaps the most fundamental term that I will employ in the subsequent chapters is that of the subject of *labour*, *work*, and automation: the human agent of the act. All acts of *labour* and *work* either include or refer to a human agent, whether this is the worker who performs each sub-task through their own power, or the recipient of an

automated process whose only engagement is to receive the automatically produced object. The involvement of the agent can be minor, and can only relate to specific parts of a task, such as the instigation and the completion, but a human agent will be involved *at some point* and *to some degree*.

Even fully automated futures in which human beings no longer need to do *anything*, are intended toward human subjects: the automated processes that replace them are intended *toward* human agents and their newfound freedom. For this reason, I have chosen to use the more neutral term of 'agent', but additional terms might be relevant and related: actor, subject, or actant might also be useful terms to describe the role played by human beings in acts of *labour*, *work*, and automation. In specific cases, additional terms might become useful, such as labourer or worker, but these terms are somewhat narrow and specific, and are more difficult to reduce to the evaluative framework I am developing, given their additional conceptual baggage. The term 'labourer' has historical political connotations in Marxist thinking, and is inherently diametrically opposed to the capitalist, just as the term 'worker' might also contain additional economic or ontological valuations, being distinguished from 'non-workers', for example. The term 'agent' therefore describes a human being operating in a given task to some degree, utilising their capacities in a given mode for a given purpose, without necessarily relying on a reified or common sense understanding.

#### 0.4.2. Activity/task/sub-task

All actions involve an agent to some degree; all cases of automation relate *to something* and always occur as the automation *of something*.

Human agents have the capacity to act in a wide and diverse set of modes, but in the following chapters I will focus my investigation on acts of *labour* and *work*, along with their automation. The term *activity* or *task* therefore denotes one given example of *labour* or *work* in practice, or one such case of either mode that is being automated. An activity is distinct from the mode in which it takes place, meaning my definitions can be applied to **any** activity or task. Rather than one example **always** belonging to either *labour* or *work*, I will instead consider activities as they appear in **both** modes. I will use the two phrases ‘activity’ and ‘task’ interchangeably to denote the example in question: grammatically, the term ‘task’ rather than ‘activity’ applies more aptly in some cases, and vice versa. In the example of manufacturing, manufacturing as a whole is considered as an activity, but the production of a specific object, such as a car, is considered to be a task. Both describe the practical case in question, but denote specific goals, lengths of time, or processes in their own right. The use of the term ‘task’ also allows for the consideration of ‘sub-tasks’, or the individual movements, motions, or actions that are required to complete a given task. All three terms (activity, task, and sub-task) can be performed by either an agent or an automated machine: a human being can chop vegetables, cook a meal, and be said to be ‘cooking’ just as a sophisticated automated robot can be imagined performing the same movements. By using these three terms, there is a rejection of any implicit limitation that might arise with other more intuitive terms. Elsewhere in the literature or in popular culture, terms including ‘job’, ‘employment’, or ‘vocation’ might be used to

define the tasks of *labour*, *work*, and automation but such terms can contain value-judgements and unintended exclusions, the most obvious being the inclusion of economic value, and distinctions between paid work and unpaid work. The ideal types of *labour*, *work*, and automation are therefore actualised by a human agent to some imperfect degree in an activity, task, or sub-task.

#### 0.4.3. Mode of activity

In describing agents and activities, I am not characterising automation, *labour*, and *work* in terms of a set catalogue of activities that intrinsically display the tenets of each definition. Rather than describing an activity that has eternal paradigmatic examples, I am describing *labour* and *work* in terms of a *mode of activity* and the same activities, tasks, or sub-tasks can occur in different modes. The motions and movements of the task do not distinguish its analytic importance for this thesis: the fact that a task is strenuous, boring, or necessary is not sufficient to categorise the act as inherently or eternally belonging to *labour*, for example. Participation in a given task does not therefore necessarily commit the agent to a given mode. We might think that factory work is paradigmatically an act of *labour*, as a thinker such as Marx might suggest (Marx 1867). On my account, the tasks of a factory **can** occur across modes. The key areas of interest for this analysis are the movements and motions of an activity *as they appear in a wide contextual horizon* (which will be defined next). Describing *labour* and *work* as modes of activity include a greater concern for the intentional purpose of the act, as well as its wider context. This

means that the necessary motions and movements of an activity might not actually change between modes, but the driving motivation, additional conditions, or desired result might differ. Because of this move away from the task in isolation, it might become more difficult to precisely locate in which mode an act is taking place. In line with the phenomenological reduction, this approach seeks to inform critical reflection from the agents involved in an activity, be it those enacting it or those overseeing and designing it, rather than creating a scientific basis for cataloguing activities. Importantly, automation is not a mode of activity in its own right, but is instead one means by which an activity can be enclosed, which has specific conditions and intends towards a specific goal.

#### 0.4.4. Contextual horizon

The picture I am developing is of human agents who can engage in a myriad of activities across a varied set of modes. Each individual formulation of an agent engaging in an activity in a given mode therefore also occurs within a wider set of contextual conditions, which I define as a contextual horizon. The mode of activity in question will define the governing motivations, the task itself might have a number of specific enclosing conditions, and the actor might have a specific desired outcome but all of this is occurring within a wider contextual horizon. We must also therefore consider any conditions specific to the historical epoch, religious or political influences, economic conditions, forms of technological mediation, and so on. As a result, all activities occur within a contextual horizon, and that horizon can be pushed in certain directions, at the cost of

'eclipsing' or foreclosing other possibilities. Automation of a task in a specific mode might affect the contextual horizon by foreclosing other possibilities brought about by automating in a different way, just as removing certain economic or political conditions might affect the overall process. The contextual horizon is therefore the larger picture of all significant conditions that affect the way a task proceeds. Automation is one such condition in an act's contextual horizon, the alteration of which can radically change the shape of the task as a whole. Regardless of any changes to a task's contextual horizon, it will still occur within a contextual horizon of some sort; investigating the contextual horizon as a whole can better equip the analysis to consider hidden or unseen facets of the task that cannot be accounted for in overly narrow intuitive conceptions.

#### 0.4.5. Automated artefact

The final term in need of clarification is that of an automated artefact. As discussed above, I am moving away from categorising tasks in terms of set definitions, and am instead keeping the analysis open to activities appearing in different modes. This openness applies to automated artefacts, and I am not defining automation paradigmatically in any one artefact: all automated artefacts will demonstrate some quality of automation in relation to the ideal type defined in Chapter 1, but cannot fully encapsulate the process as a whole. Automation is therefore distinct from an automaton, and no set of automata can entirely explain automation: an example of a problematic or dangerous automaton does not render automation dangerous or problematic, just as a socially just and

desirable technology does not render the whole of automation problem-free. Moreover, automated technologies appear within an activity's contextual horizon, and therefore have reciprocal and mediating effects on activities and an agent's experience. This is a somewhat postphenomenological view of automation (Rosenberger and Verbeek 2015), that posits technologies as neither wholly neutral nor wholly deterministic: my interest in automated technologies is to explore the ways in which automated technologies mediate and affect activities, and how specific instances compare to the ideal definition offered in Chapter 1. Automated technologies cannot be blamed for all the world's ills, but equally cannot be held as a panacea to solve all of society's issues: what is required of automation, and labour and work in turn, is close, dynamic analysis that can account for the divergences between examples, and can explain automation's role in the future of work accurately, without becoming prematurely committed to an overly narrow picture of either term.

### **0.5. A Note on Arendt and Marx**

Before beginning, it might be clear to the reader that my choice of subject is reminiscent of the phenomenological anthropology presented by Hannah Arendt (1906-1975), particularly in her 1958 book *The Human Condition*. She too offers a distinction between labour and work, with labour relating to necessity and work relating to utility, but also presents a

third category, 'action', in which meaningful articulation and engagement occur (Arendt 1951; 1958). Moreover, Arendt's interest in labour and work was also in relation to radical technological development, and the predictions of the future of humanity in an increasingly precarious and technologically mediated world (Arendt 1963; Dietz 2000). An earlier version of this thesis was a more focused attempt to investigate the automation of work through a distinctly Arendtian lens: this proved to be impossible, because reclaiming automation in an ecumenical manner through an Arendtian framework directly contravenes Arendt's own ideas and approaches (Schwarz 2018). Not only is Arendt explicitly distrustful of technology, and particularly automation, but her introduction of a third category of activity, *action*, in which meaningful political expression takes place completely distinct from any utility or necessity, results in a conceptual model that is impractical in real-world case studies (White 1997)<sup>9</sup>. The interconnected modes of activity presented in *The Human Condition* become unwieldy and unclear when applied to professions, particularly those of doctors, lawyers, and academics (Canovan 2008; Lindman 2015). Although I share some similar terminology and analysis with Arendt, which will be highlighted and discussed further as they arise, this thesis should not be read as a piece of Arendtian scholarship.

---

<sup>9</sup> Although I do not employ Arendt's mode of 'action' in relation to automation and work, the novel evaluative framework being developed here deliberately leaves room for additional modes of activity to be considered. One that aligns with Arendt's 'action' might be an interesting avenue for future research: something akin to 'transformative experience', or even a specifically political mode of activity, is a possible inclusion in future investigations of this framework, and while I do not discuss them here, I deliberately leave room for such further modes.

A similar comparison might strike the reader between my interest in labour and the extensive and important writings of Karl Marx (1818-1883). Marx's interest in the automation of labour as an inherently political force and his concern for the future emerging at the hands of an increasingly automated society might seem to dovetail with my own concerns. Indeed, a number of scholars investigate automation and the future of work through an explicitly Marxist lens (Nayeri 2018; Neilsen and Rossiter 2019). Given Marx's political and social value commitments, embarking on an analysis of automation through a strictly Marxist or Marxian lens is limiting, and is precisely the type of approach that I argue is restricted to offering a narrow understanding of automation and the future of work. I will discuss Marx in some depth in Chapter 3, but am not committing to a wholly Marxist framework, and this thesis should not be read as a piece of Marxist scholarship.

With these clarifications, commitments, and key terms outlined, let's begin the thesis in earnest.

## **Section 1 – What is Automation?**

### **1. Defining Automation**

*Don't give yourselves to these unnatural men - machine men with machine minds and machine hearts! You are not machines! You are not cattle! You are men! You have the love of humanity in your hearts! (Chaplin 1940)*

#### **1.1 Automation and the Future of Work**

For better or worse, the future of work is intimately tied to automation. Whether we arrive at an emancipated utopia of full automation in which we no longer need to work to earn a living and can instead spend our free time as we see fit, or whether the dystopian vision of an oppressive, unequal, and sterile planet becomes reality where human beings no longer occupy the same position of authority, this much seems clear: the future of work will be an automated one. A picture of an automated future of work, whether utopian or dystopian, is generally accepted across the contemporary literature, regardless of the contingent assumptions made regarding the precise nature of such a future. Some scholars are advocating resistance to automation's formative force in the future of work (Hancock 2014; Zoller 2017; Danaher and Nyholm 2021; Mueller 2021), while others have accepted automation's influence, and are instead trying to steer its development in the right direction. Interestingly, the types of automated futures imagined across the literature differ widely, from endless free time and a truly free and fair society (Bastani 2019; Danaher 2019), to unchecked exploitation and inhuman living conditions if proper systems are not put in place (Norton 2017; Eubanks 2019;

McGaughey 2021), and yet it appears to be the same set of artefacts and processes that are driving both the blissfully utopian and worryingly dystopian predictions of the future of work. A general definition of automation seems to be intuitively understood across the literature: at first glance, automation seems to naturally refer to a process or artefact that replaces human labour power for digitised, mechanised, or generally technological power, with the aim of increasing productivity, standardisation, saving time, and so on (Nof 2009). But built into each scholar's usage is a specific reified understanding of automation, often built on narrow and specific examples, that does not necessarily reflect the process as a whole: for emancipatory left-wing scholars, including Nick Srnicek and Alex Williams (2015), the process of automation inherently creates the opportunity to radically reformulate political engagement by reducing the necessity of, and time spent in, paid employment, redistributing work more fairly and allowing us to spend our time in more fulfilling activities; for more sceptical thinkers, including Martin Ford (2015), automation inevitably reduces the need for human workers, and will therefore create mass unemployment without proper preventative policy, such as Universal Basic Income (UBI).

It might therefore be inferred that automation is *always* and *essentially* the process of replacing human workers with technological labour power, and therefore these contested judgements regarding automation's desirability stem from opposing accounts held by the scholars. It is generally agreed that automation will reduce the amount of

work required by human beings, either by distributing work more evenly across society or by replacing human workers with automated technologies, and that as a result there will be more free time for human workers to spend outside of work. Scholars disagree about how the resultant saved time appears, with some predicting increased free time for politics and leisure, and others predicting unwanted and unfulfilling forced unemployment. However, I argue that this is a particularly narrow view of automation, one that reflects neither the ubiquity of work beyond paid employment nor the complexity of automation. Moreover, such pictures of automated futures are extrapolated from limited examples, particularly those of automated factories and offices, and generalised to work as a whole. There are two main responses to this. The first is to dive headlong into a debate regarding the various uses and misuses of automation, and to pick apart the specific examples of automation and the future of work as they arise, but this is precisely the sort of approach that I argue is implicitly limited and inherently narrow as a result. My favoured response is to offer a clear and robust definition of automation itself, before considering how this might affect expanded notions of *labour* and *work*, instead of focusing on specific examples and subsequently creating a picture of automation. In doing so, I will create a set of definitions that can be applied to all cases of automation, without implicitly adopting the value-judgements related to a few. Chapters 3-6 will offer definitions of *labour* and *work* beyond paid employment, but in this and the following chapter, I will develop an essential account of automation that is stripped of value-judgements

regarding the desirability or undesirability of its specific functions in relation to specific examples. The definition I will develop here is an essential understanding of what automation is in its own right, distinct from its imagined future uses, formulated as an ‘ideal type’ to which real cases can be compared. I will therefore give less attention to how automation will affect the future of work in the first instance, and develop a notion of automation that can then be applied to real cases. Indeed, we must strip away these concerns for what automation will or might do in the future, in order to reveal the core of what it actually *is*, aside from what functions it can or may have.<sup>10</sup>

## **1.2. Three Terms in One**

One of the key complexities in the contemporary literature surrounding automation is that the singular term ‘automation’ is being used to describe varied and often opposing instances of technological development, and is also prevalent in the discussions regarding other related technologies’ developments, such as AI (Artificial Intelligence) and machine learning (Husain 2018; Cave et al 2020). The single term ‘automation’ can be used in a contested manner to describe radically different processes, and often refers to specific examples or contingent

---

<sup>10</sup> The phenomenological reduction offered here is by no means comprehensive, but intends to demonstrate a different approach to automation which is currently missing from the contemporary literature. Rather than being a panacea to ‘solve’ the complexities of automation and the future of work, this phenomenological reduction aims to develop a more nuanced and accurate method for the analysis of automation.

functions beyond simply making a task proceed automatically. In a very general way, these three uses of the term 'automation' can be separated into a positive, 'utopian' usage; a negative, 'dystopian' usage; and a neutral, 'intrinsic' usage.<sup>11</sup> In each, there is an assumption that the same physical, technological, or technical process is occurring, usually some semblance of the replacement of human labour power with mechanised or technological labour power. Within each usage, there is a tendency to focus on specific functions or narrow examples, and to include implicit value-judgements regarding the desirability of this function and its wider social and economic effects. It is therefore inevitable that confusion and disagreement will arise, given that each approach to automation employs the same terminology but in very different ways. Before offering my own definition, let's first consider the three general uses of the term, to demonstrate precisely why a phenomenological reduction of the term is needed.

The positive, 'utopian' usage of the term holds at its core that automation is a good thing, or at least contains a focus on its positive and desirable effects. When advocates of this view discuss automation, it is often in relation to political or teleological claims regarding free time (Kay 2020), equal redistributions of work and wealth (van Hoorn 2021), and social change towards equality and social justice (Srnicek and Williams

---

<sup>11</sup> These readings are generalisations, and do not fully encompass the specific arguments given by each scholar, but instead demonstrate general assumptions made across the literature, and common shortcomings in the technical definitions of automation presented in contemporary discourse.

2015; Danaher 2019). Such views reflect a host of assumptions regarding the value of free time, the natural disposition of human beings towards how they spend their free time, the possibility and efficacy of UBI or related economic policies, the limitations of capitalism, and so on. The focus of these discussions is often on the functions of automated technologies to save time in work, or to redistribute work across society, serving an overarching notion of the 'social or political good'. Implicit in such approaches is a valuation of automation as a process which is inevitably (or inadvertently) positive for human society and workers because it breaks down pre-existing barriers, inequalities, and constraints which prevent human flourishing. Of course, it is often acknowledged that the adoption of automation might incur a period of stagnation, inequality, and unemployment (Frase 2016), but ultimately it is hoped or predicted that the development of automation will lead to the emancipation of human beings across the globe from gruelling, demeaning, and boring work, and into a future in which work no longer plays the fundamental and inescapable role in life as it has throughout history (Veltman 2016). Further assumptions regarding the continued dominance of the human race are also prevalent in this approach to automation because these newly developed 'emancipatory' technologies are not seen to exceed their position as tools subservient to human control, ensuring that "humans will not go the way of horses any time soon" (Gries & Naudé 2018, p.23). Critiques of capitalism often cite this approach to automation, with post-scarcity economic models relying on the fair and public distribution of

goods from automated machines (Bastani 2019). This approach to automation therefore fits into an overarching narrative of progressive politics and economics, and the use of the term denotes a tool to radically overhaul national and global political structures, while also ensuring a positive impact on the affected human workers. While the investigation does relate to the transference of productive power from humans to machines, these additional value-judgements are also included, sometimes implicitly, into the picture of automation and the future of work that emerges as a result.

Contrary to these hopeful approaches to automation are the more negative, somewhat 'dystopian', uses of the term. Automation discussed in such ways generally refers to the detrimental effects that automation has, the potential harmful conditions created by a fully automated society, or the ways in which automation propagates current issues, rather than solving them (O'Neil 2017; Eubanks 2019). These approaches to automation are teleological and political in nature, but are somewhat ontological, with fears regarding whether human beings will in fact "go the way of horses" in fully automated societies, foregoing authority and dominance for easier, less strenuous lives (Carr 2014). In transferring productive labour processes to machines, this form of automation creates unemployment, stagnation, and hardship, rather than fulfilling free time (Peters 2017; Susskind 2022). Scholars who take this general approach therefore often focus their discussions on the negative functions of automation, those that deskill human workers or exacerbate capitalist

exploitation and poor working conditions, rather than the more positive functions or predictions discussed previously. A range of embedded assumptions can also be read into the use of automation in this way, particularly regarding the enduring solidity of capitalism, the natural predilection of human beings towards distraction and consumption, the uncaring and selfish attitudes of technological developers, and so on. Moreover, conceptions of automation as a panacea for many of the issues plaguing contemporary working conditions (inequality, exploitation, meaninglessness) are rejected in this usage, with these issues enduring in an automated world, rather than being solved by it. The inclusion of automated processes in industries beyond manufacturing and production is also resisted, with the automation of leisure signifying a creeping dehumanisation in contemporary society (Alter 2017; Kotis 2021). When advocates discuss automation in this way, there is a primary focus on the shift from human labour power to automated labour power, but there are also additional implicit valuations of automation as a tool for creating forced unemployment, meaningless consumption, and greatly increased economic inequality, one that threatens to foreclose historically and culturally meaningful human activities by forcing human beings to be passive in the face of increasingly dominant automata (Carr 2016).

However, these are not the only two uses of the term that are common across the literature, and I am by no means the first to argue for the necessity of a more ecumenical approach to automation that is not based on narrow intuitive conceptions of the term. This thesis could be

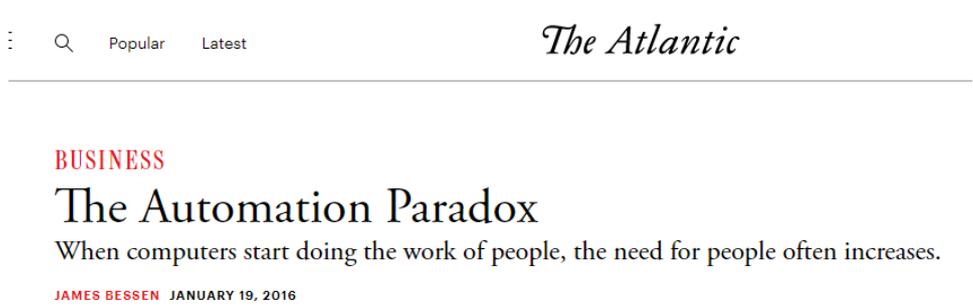
said to belong to the ‘continental philosophy of technology’, a field in which other key figures have also argued for an essential or transcendental understanding of technology that can inform practical analysis.<sup>12</sup> Bernard Stiegler argues that human beings are co-constituted by technology, and that the human subject is therefore one that is inherently conditioned by technology (Kouppanou 2015; Stiegler 1993; 2016; 2019). These ideas have been further developed by critiques of Stiegler including Ben Turner, who further applies these reflections on technology to the world of work (Turner 2016; 2021; Turner and van Milders 2021). These ideas are further extended more wholly into empirical directions within ‘post-phenomenological’ approaches to technology, such as those offered by Don Ihde (Ihde 2001), Andrew Feenberg (Feenberg 1993), and Peter-Paul Verbeek (Verbeek 2005; Rosenberg and Verbeek 2015). Dominic Smith is another prominent ‘continental’ philosopher of technology who argues for a similar expansion of our understanding of technology, one that reclaims a transcendental notion of technology that structures **all** instances thereof, including failed and exceptional technologies (Smith 2015; 2018; 2020; 2021). While my approach is therefore novel in content, it is not alone in approach or motivation.

---

<sup>12</sup> Continental philosophy is often opposed to analytic philosophy, but the philosophy of technology is one generally divided historically by the ‘Empirical Turn’, when the focus of enquiry shifted from transcendental and essential notions of technology to practical, empirical case studies (Achterhuis 2001). In a similar manner to Dominic Smith, who reclaims a transcendental notion of technology which can be applied to practical case studies, I too am trying to bridge this (somewhat artificial) gap, offering an essential heuristic notion of *labour* and *work* which is still informed by empirical case studies.

Furthermore, some scholars neglect conceptual considerations of automation on the whole, and instead discuss automation in a purely factual or practical manner to investigate the replacement of human workers for technological artefacts. Investigations into employment rates, technological development, industrial productivity, and social trends can consider automation simply as a process or set of artefacts, without being drawn into concern for its imagined future implications (Ramaswamy 2017; Carbonero et al 2020). This is often built on past and current trends in economic and social data, and traces the historical and contemporary implications of automation from empirical facts. Such accounts are somewhat speculative in their teleological commitments, and soft predictions can be made regarding the future of such trends, given that many such investigations are also intended to answer questions regarding the future of work. While all positions in the contemporary automation literature rely on empirical data sets to some degree, I would distinguish these neutral intrinsic uses of the term 'automation' from their dystopian and utopian counterparts, because the additional assumptions regarding the implications of automation *are not* embedded in the process itself, but appear as a result. Automation is therefore not posited as inherently good or bad, and conclusions are not drawn from limited examples and then extrapolated to the process as a whole. Instead, investigations are qualified as inherently limited, focusing on specific examples, and automation is more likely to be held as a process that produces both desired and undesired effects depending on the example in question. Imagined futures

of work can still be developed from uses of automation in this manner, but are not based on narrow and specific examples in the first instance. It might be argued that these accounts are less strictly philosophical and instead belong within economic or social studies, or in mainstream news media rather than academic research. They do, however, hold philosophical value when considered within the entire picture of automation literature.



**Figure 1.** A selection of newspaper articles relating to automation and/or the future of work (Bessen 2016; BBC News 2020; Partington 2020).

It is of course true that the uses of the term 'automation' cannot always be entirely reduced to the three accounts discussed here, and that the generally accepted conception of automation as the replacement of human workers with technological artefacts is not universally used across the literature. However, what is highlighted by viewing the literature in this way is that the single term 'automation' can be understood and used in radically different ways *without changing the term itself*. A scholar or journalist who uses the term 'automation' to denote a politically emancipatory historical process (Keohane 2015) may be referring to a completely different process from another scholar or journalist who discusses automation as the greatest threat to human social dominance we have ever seen (DeBord 2017): both writers are using the same word, and without critical reflection the difference might not be immediately obvious. Such implications are contingent to the use of the process, rather than belonging to its essential character. Rather than offering valuations of automation as *inherently* good or bad, the arguments could just as easily be reframed as the claims that "automation is bad *when/if* it threatens our capacity to act" and "automation is good *when/if* it allows us to better flourish as human beings." While scholars claim to offer investigations of the state of a given economic, political, or technological development with relation to automation, the use of the term is often implicitly accompanied by a milieu of additional contingent or extraneous value-judgements that fundamentally change the concepts at play and resultant claims, and necessarily do not wholly represent automation in its entirety. I am not

therefore claiming that scholars conflate contingent functions of automation with its essential nature, but rather than often scholars *neglect* the holistic picture of automation in its entirety, with all its multiple and varied contingent functions, in favour of a narrow focus of specific functions. This is precisely where my novel evaluative framework interjects into the literature.

This is further complicated by the enduring prominence of certain historical examples of automation. When automation is discussed in both academic literature and mainstream media, a few common examples are often cited: whole factories entirely populated by autonomous robot arms; offices staffed by inhumanly effective computers; and hospitals assisted by humanoid automata (*The Telegraph* 2017; Blake 2019; Collinson 2019). Statistics relating to the proportion of jobs lost to automation, alongside hopes and fears regarding the implementation of ethical and moral maxims to these machines, shape economic and policy decisions but are often taken from the implementation of automation in specific industries (Rifkin 1995; Cellan-Jones 2019). Reactionary social and political campaigns, be they ‘grassroots’ or institutional, have historically been undertaken by specific sets of workers, and the futures proposed by many scholars extrapolate from current specific and conditional trends to general claims regarding the future of work as a whole. Artefacts that displace hard, dangerous, and unfulfilling labour onto machines are the lynchpin in many ‘post-work’ imaginaries, whether positive or negative, but such futures encompass *all* workers, not only those actually affected. The standard of an

automated automotive or manufacturing factory is one that grips both contemporary and historical thinking, but is one that cannot fully encapsulate automation in its entirety.



**Figure 2.** Inside a Tesla automobile factory, showing some of the automated machines employed there (DeBord 2017).

A more nuanced understanding of the term is required, one that describes the central process of automation in its own right, and is not narrowly embedded in limited, intuitive, or commonplace historical examples. Why is such an understanding not commonplace across the literature? Most scholars tend to agree that automation denotes the replacement of human workers for technological artefacts, so why not simply refocus attention on automation toward this more nuanced definition, and build up to the futures that might appear from it?

### **1.3. Posing the Problem**

The starkly different uses of, and approaches to, 'automation' as a contested term can be partially explained by an overly narrow focus on specific cases of what automation *does*, rather than an ecumenical notion of what automation *is*. The term 'automation' refers to actual and potential events, changes, processes, and effects, which elicit radically different value judgements, but underneath these different actualities must be a uniform and consistent notion or quality, or some shared similarity between cases. When scholars become fixated on a particularly negative or positive effect of automation (what it *does*), there is a risk of conflating this specific narrow example with the general state of automation as a whole (or *what it is*), and the resulting claims will be inherently generic. There is therefore a need for additional clarification: automation is an expansive process that encompasses a wide range of cases, and so any account of a particular negative or positive example of automation must be clarified as only relating to a particular facet or portion of the entire process. As a result, we can only ever arrive at a partial, incomplete, and generic picture of automation by approaching it through examples in the first instance: by defining automation in terms of what it *does*, and then focusing solely on its negative or positive effects we are, by definition, only obtaining a part of the picture. Automation, *like any other technology*, will produce both positive and negative cases, whether in actuality or potentiality (Wertenbroch 2021). It is precisely the contingent facets of specific cases that determine it one way or the other, but in generalising from these

specific cases to accounts of automation on the whole (as either being wholly bad or wholly good), there is a risk of conflating a specific example of automation with its essential nature. Taking all the emancipatory cases of automation as the basis of a definition of automation *as a whole* will inevitably result in a partial, and unrealistically positive, general definition thereof, and vice versa.

This does not mean that we are left at a position in which automation should not be generalised, and that instead we must always consider individual cases as they arise, without a central definition or notion of the process as a whole. Automation is a process that *can* be simply defined in an essential manner, but it must be acknowledged that it also has a huge number of contingent functions that emerge within a wide contextual horizon *that cannot account for the process as a whole when taken individually*. Any attempt to capture the simple definition within an evaluative framework focused on one of these contingent functions is inherently partial and inaccurate (or incomplete, in this sense). A utopian account might make claims regarding the emancipatory nature of automation, and base such claims on automation's contingent function of time-saving or displacing repetitive labour, for example. Such a view neglects the contrasting examples of automation which increase the pressure on a worker or demand further repetitive labour as a result. In the same way, a dystopian account that warns of automation's sterilising effects on politics and human expression might cite the contingent function of automation to displace human labourers. Again, in doing so, cases of

automation that radically extend or improve human expressive capabilities will be ignored. In either case, the scope of discussion is limited to the example at hand, and perhaps to related examples from further afield, but *not to automation on the whole*. Drawing the conclusion that “automation saves time in the manufacturing industry, and should therefore be adopted across other industries” is fallacious because it conflates a specific contingent case with a general standard for the process as a whole. In the same way, concluding that “automation costs jobs in one industry, and should be resisted in all other industries” is guilty of the same unfounded movement from a contingent case to general view. Where generic claims are based on specific real or predicted cases, but judge the ‘goodness’ or ‘badness’ of automation *as an entire process*, the result will inevitably be incomplete.

To separate approaches to automation into positive and negative, utopian and dystopian, might be too reductive. Automation has a wide range of specific contingent functions that are discussed across the literature, including increasing productivity; increasing value generation; saving time; improvement of regularity and accuracy; easing of complexity; standardisation of a productive process; removal of danger or pain; displacement of human labour power; and the creation of new technical opportunities. Regardless of the additional specificity, any approach to automation that focuses solely on a contingent function but makes claims to the general nature of automation is guilty of the same conflation and lack of necessary qualification. This conflation is not unique to one side of

the political or social debate, however. Left-leaning and Marxist thinkers, including Aaron Bastani (2019), who posit a post-scarcity economy by adopting full automation across all industries, can be seen to focus on the specific contingent function of increasing productivity or reducing economic scarcity, and yet make a general claim regarding the nature of automation as being emancipatory or anti-capitalist. It could be suggested that in Bastani's view, the adoption of automation *in any sense* will lead to this imagined utopia, which neglects to consider the detrimental and problematic instances of automation limiting freedom, rather than providing it. Conversely, Martin Ford (2015) warns of a jobless future of mass unemployment and meaninglessness at the hands of automation, in which the state must provide UBI to prevent mass poverty. For a holder of libertarian or conservative political beliefs, this overgrowth of government into citizens' lives might be completely antithetical to desirable future imaginaries because it poses a significant constraint on individual liberty (understood in the explicitly libertarian manner), but is again guilty of moving from a contingent function of automation to a claim regarding its general nature.

Indeed, this narrow focus on contingent functions of automation is perhaps most clear in the field of 'post-work' research, to which Bastani and Ford can be said to belong. 'Post-work' scholars hold that while there is virtue in performing acts of work, contemporary working conditions are not conducive to meaningful work, therefore efforts should be made to overcome current formulations of work in order to better allow human

agents to engage in meaningful activities beyond work (Rifkin 1995; Srnicek and Williams 2015; Bridle 2019; Hester and Srnicek 2023). This is distinct from ‘anti-work’ accounts, which hold that work has *no* meaningful content or virtuous qualities, and should be removed from society entirely (Weeks 2011; Frayne 2015): on both accounts there is a removal of work from society, but the methods and ultimate outcomes remain distinct from one another. Both the ‘post-work’ and ‘anti-work’ accounts can focus on a number of automation’s contingent functions, for example, the increasing of productivity and the concurrent increase of wealth generation or free time. Yet there are additional assumptions being included in the definition of automation itself, most clearly that it has an inevitable and unavoidable effect on working practices. Moreover, additional assumptions and valuations regarding work<sup>13</sup>, capitalism, and history are built into the foundations of such arguments, but rely on a narrow and limited set of automation’s contingent functions to produce an argument for or against automation and work as a whole. If automation is touted as bringing about the political means to overcome capitalism, a number of functions will be accounted for, *but others will not*: a ‘post-scarcity’ account of automation neglects automation’s function of increasing capital; whereas a ‘de-humanising’ account fails to recognise the function of automated technologies on the creation of human meaning, for example.<sup>14</sup> A ‘post-work’ view of automation takes automation’s function of replacing and

---

<sup>13</sup> Or *labour* and *work*, as I will discuss in Chapters 3-6.

<sup>14</sup> My definitions of *labour* and *work* distinguish this thesis from ‘post-work’ ideologies, as will be discussed in Chapter 5.

displacing human workers, relying on a limited set of examples and a common sense understanding of work, and then forms a definition of automation as *inherently* relating to the end of work. This is not to say that these positions are *wrong* or that evaluative judgements regarding the future of work in view of automation cannot or should not be made. In order to properly, accurately, and effectively form an account of automation, one that can be actively utilised in developing approaches to the future of work, a 'value-free' definition of automation is required (Sharlin 1974), which cannot be achieved by focusing on narrow contingent functions of automation. It is precisely this approach to automation that I am developing through my novel evaluative framework.

There is a difficulty in distinguishing between *automation itself* and one of automation's *many contingent functions*, while still using limited language to denote the same category, process, or term. One solution might be to distinguish specific terms; perhaps substituting 'automation' for the relevant contingent function ('automation-as-time-saving', or 'automation-as-displacement-of-human-labour', for example), and clarifying the specific usage in a given example. A more varied set of terms is something I will advocate for in relation to *labour* and *work*, but is not something I will promote in relation to automation: it is my view that *labour* and *work* are distinct modes of activity that should not be confused with one another, but that automation operates as a singular process with various contingent functions. The same essential process of automation will be found in all cases of automation, regardless of how diverse or

divergent they are. By qualifying the contingent function at play in our use of the term, we risk regressing into unusable terminology, and arriving at a position where each instance of automation requires its own highly qualified term (“automation-to-save-time-and-increase-productivity-but-also-to-protect-meaningful-expression...” and so on). By stripping away the case-specific examples and contingent functions of automation, we are left with the simple, essential process, and, in revealing the simple process, we can build back up to considerations of the desired contingent functions and cases, without committing to an incomplete and narrow picture of automation on the whole, in a novel evaluative way. Let us now consider such a definition of automation.

#### **1.4. Defining Automation**

Automation does a lot of things, and can be seen in a wide range of technological artefacts. From robotic arms increasing regularity and productive output in automotive factories, to intangible algorithms greatly outperforming human prediction and understanding through targeted content on the internet, automation is easily evoked in many day-to-day examples. What unites all these cases of automation? The majority of immediate cases of automation are likely to involve some level of human absence, increasing standardisation or productivity, and saving time. Even the most intuitive cases of automation require human creation, maintenance, and updating. Productivity and standardisation might be

increased in some cases of automation, such as the automotive factory, but the productivity is a matter of sharp debate. A self-checkout machine certainly saves time in some instances, but when it malfunctions, or encounters a problem that would be easy to solve with human intuition but difficult to calculate by machine logic, the process might become slower than when previously performed by a human agent. Automation therefore seems remarkably more complex and diverse than is often allowed in the intuitive, received understanding employed across the literature and mainstream media, as simply being the process of replacing humans with machines.

As previously stated, what is required is an account of automation in terms of what it *is*, rather than what it *does*. The definition I will offer here is: automation is, at its core, the process of *enclosing an act or task, or sub-act/sub-task, such that once set in motion it needs no further necessary interaction, intervention, or mediation by the instigating agent*. This is an ideal form, the perfect encapsulation of the essence of automation that might never be realised in an actual act, but is instead a standard to which all cases of automation can be compared, highlighting the similarities and differences, and allowing for exploration in relation to this artificial ideal. On my definition, an act can therefore be set in motion, and the initial agent need only reconvene with it when it is completed. In its ideal form, this would also include all resultant further necessary actions, such as maintenance, repair, and restocking, and would also reflect the different forms of involvement required by different tasks: the idealised automation

of a self-driving car would be one that fuels and repairs itself, and automatically completes the travelling whims of its owner, perhaps also being linked to calendar or diary system that automatically understands where the owner wishes to go; just as the idealised automation of a manufacturing plant is one set in motion by its owner for a specific task, that would then also deal with its own maintenance, logistics, and repair, producing goods indefinitely, and shipping them to their destinations. As such, this definition is a heuristic ideal, and not a threshold that actual cases need to meet in order to qualify as automation. It is clear that today there are *no* cases of automation that meet this standard: even when a sub-task is wholly automated, such as in a self-driving car, there is a need for the initialising agent to be actively involved in its repair, maintenance, and operation to some degree. The benefit of approaching practical cases of automation in comparison to this ideal is that we can begin to highlight the ways in which a case tends *toward* this ideal, and the ways in which it falls short or does not conform to this definition. Moreover, it might also highlight previously underappreciated examples that do not traditionally fall into discussions of automation, allowing us to broaden our conception of automation beyond the parameters of the intuitive understanding.

There may be fringe cases when this quality is found in an act, but that act can't be called automation: the claim here is that *all cases of automation* will be formulated in this way, but not that all such formulations are necessarily automation. Indeed, such fringe cases might create productive tension between our intuitive understanding of the term

and its implementation in practice. The most obvious example would be the use of human force to complete an act: an employer can set an act in motion by paying another human being to complete it, and then collect the finished product. This is not automation as I am describing it, precisely because a human being is still required to complete the act, even if it is not the instigating agent. Automation is therefore specifically technological, requiring the use of technological artefacts and devices that operate without direct and continuous human intervention to complete the task at hand. This too may limit the inclusion of animals in the mode of automation, because there would seem to be a clear distinction between animals and machines. Using a horse to pull a wagon is distinct from a self-driving tractor, and so my definition of automation is not intended to extend to any biological, living creature, be it human or animal. The involvement of *any* human (or by extension animal) labour doesn't perfectly fulfil the essential definition developed here because it is not free from further intervention in the truest possible sense: the necessary movements of the task are still being completed by a human agent, even if not the instigator. Only when an act is fully free from human intervention can it be said to be fully and perfectly automated. Of course, this freedom from human intervention will look very different depending on the act: in some cases, the ideal form of automation would be pushing a button or speaking a command, and then letting the machine run indefinitely; whereas in others, the intervention *in certain sub-tasks* might be wholly enclosed, but the process as a whole might still require human

involvement. An example here might be the difference between an automated manufacturing technology and the automation of childcare: in the former, the owner might simply push the button and leave the machine to do its work; whereas in the latter it might only be that certain sub-tasks are automated, such as bathing or soothing in the night, while other acts that involve emotional or developmental importance remain firmly in the hands of the human parents. Such examples are still wholly artificial, but should demonstrate the dynamic nature of automation in relation to the essential nature I am defining here.

To complicate this matter, the historical development of automated technologies is rarely immediate and isolated, and often technologies are developed in conjunction with the use of human power. It might therefore be useful to ask the question: precisely when does my definition of automation kick in? If I am disallowing any human (or animal) intervention in a task from qualifying it as perfect automation, when does an act become automated? If there can be *no* human intervention *at all* in a task, then it might be argued that there are zero actual cases of automation today. If my definition is a perfect one, how do we deal with imperfect cases?

My response is to reiterate that defining automation as the enclosing of a task from further human intervention is an ideal type, one that is artificial and entirely perfect (which is to say unreal). Rather than a standard that real-world cases need to meet, the intention is to compare

real-world cases of automation with the essential definition to explore the ways in which cases both do and do not meet this standard. If an automated tool completely negates the intervention in a given sub-task, but as a result creates a huge number of additional tasks relating to the maintenance, repair, and operation of the device, then there is a clear failing in regard to my definition. Manufacturing practices are a good example of this. A 19<sup>th</sup> Century canning factory demonstrates *imperfect* automation, precisely because some sub-tasks were wholly enclosed from human intervention, but other tasks (particularly maintaining, repairing, and restocking/reloading the machines) still fell to human beings. In contemporary factories, the role of human beings is further changed, with some industries only requiring human beings to attach small parts to an endless line of objects, or to move pieces from one part of an assembly line to another. There is a clear development of automation here, as we see the task becoming increasingly enclosed, and the intervention of human agents changing and decreasing over time.

Moreover, the overarching tasks of supervision and management might also become increasingly automated, with fewer human supervisors being required as the role of management is increasingly deferred to machines. By approaching these examples through the lens of perfect automation, we can clearly see the ways in which they both do and do not meet the standard set in my definition. Employing human beings to perform menial, repetitive, and machine-like tasks while they are digitally monitored is an imperfect example of automation, precisely because

human intervention is still being relied upon throughout the process but it also shows how the task can be fully enclosed, and perhaps also suggests that such a task *is* becoming wholly enclosed, with the human agents eventually being replaced or displaced by automated technologies.

Productive tasks can be simplified and scaled up to huge proportions, and function in a highly mechanised manner, with the human agents either behaving like machines, or in a symbiotic relationship utilising human intuitive with mechanised productive power (Krüger et al 2009; Teiwes et al 2016). Investigating the ways in which human agents are still required, the types of acts that they are having to undertake, and the ways in which the task could (or could not) be completely enclosed can allow for new ways of approaching the example in question. In practice, the more ecumenical definition I am offering here might be applied to some examples that are embedded in a specific, particular context, thereby losing something fundamental if they are fully enclosed (perhaps such as parenting); while others might be more clearly in need of *full* enclosure due to danger (perhaps such as mining). By approaching cases of automation through the novel evaluative framework I am proposing, we can account for *both* cases simultaneously, without having to predict the future of automation as being wholly good or bad: we are not trying to eliminate the consideration of specific cases from the literature, but rather to approach them in a way that can be undertaken with *all* cases, without succumbing to reified and narrow common sense understandings.

Another important clarification is the development of automation over time, because it occurs as a continuum. Consider the automation of communication: in its most simple form, an agent can speak to another agent, or use local resources to write or convey a message. The inclusion of additional technologies and techniques, such as a letter or a carrier pigeon (even if we do not immediately think of a carrier pigeon as an automated artefact (Reeves 2016)), can extend the scope, ease, and efficacy of the task. The role of the human agent might change from speaking to writing, and additional tasks might become necessary, such as feeding or training the pigeons. In isolation, we might not think of these acts as displaying automation in their own right, but as the task develops over time, the letter that was previously written with paper and pen might be undertaken on a computer connected to the internet, and the carrier pigeon might give way to a social media platform like Twitter. This again changes the role of the human agent, but is not completely automated as I describe it. However, when a machine can be trained to write emails and tweets without any further human intervention, then we have a clear case of automation: the important point here is that on my account, we can directly trace the development of automation through the cases in line with the definition I am offering.

Such an example might seem somewhat problematic, because the human agent would have to be directly involved in a more active manner than, for example, the owner of an automated factory. Communication implies both an instigating writer and a resultant reader, both of whom

would be human beings: the automated technologies can reduce intervention in the necessary tasks of transmitting a communicated message, but if the same devices are also writing and receiving the messages, then we have perhaps delved into a post-humanist ideal, rather than remaining within the framework of automation that I am describing. Equally, such cases also reinforce a further clarification of my definition: that the use of automation in acts of work is always *for* a human agent, and initially instigated *by* a human agent. The automation of work will rarely be pursued for its own sake, outside of an art installation or a technological demonstration. As such, by employing my definition of automation as the process of enclosing an act from further necessary human intervention, we can see clearly where each case fails to reflect the definition, where it does meet the definition, and the development of the task *towards* the definition.

This account of enclosing a task might seem alien or novel upon first reading. However, I argue that *all* tasks are enclosed within a contextual horizon to some degree, and so automation is the re-formulation of a task's enclosure with the specific intention of removing the human agent from its necessary movements. Any act that occurs in the physical world is enclosed by a set of rules and conditions: at the most basic level, all acts occur in time, in space, and will have some sort of effect, no matter how mundane or insignificant.<sup>15</sup> If a human agent pushes a rock down a hill,

---

<sup>15</sup> The use of the term 'enclosure' in this way might strike the reader as being somewhat Heideggerian. However, this is not deliberate, and I am not explicitly tying my analysis to a

they are enclosed in a condition of linear time and physical laws, so that the rock rolls down the hill when pushed, and not upwards, or rolls before it has been pushed. Such enclosure is universal and, at least to some degree, inconsequential: I am not arguing that automation should seek to reverse causation or temporality, but simply that all acts are enclosed by these, and other, conditions, even if they are not as determinant as causality or temporality. The manner in which an act is enclosed can be altered: the rock can be pushed harder so that it travels faster, or the hill can be swept to remove unwanted obstacles. Equally, the way in which such an act is enclosed might prevent the task from being completed in such a way: if pushing rocks is made illegal, socially unacceptable, or religiously impermissible, then the space of action might be *foreclosed* by the conditions that enclose it. If the intention of pushing the rock is to hit another person at the bottom, then the rock can be shaped to roll better, or swapped for a more effective tool to achieve the desired outcome. Altering the conditions of task and the way that it is enclosed can radically alter the outcome, the requisite movements and motions required to complete it, the time frame in which it takes place, and the effects that it creates. This is not unique to automation, but the way in which I am describing automation directly relates to the manner in which a task is enclosed.

---

Heideggerian account of technology or human nature. Any comparisons or additional analysis might therefore be interesting, and grounds for further research, but are not deliberate or central to my own arguments.

This again demonstrates the development of automation in a progressive manner over a continuum of conditional changes to a task. If we consider the task of killing another human being, then perhaps using a rock is the least automated example, other than using the agent's bare hands. The task can be increasingly mediated by technological artefacts: a rock can be shaped or sharpened in the first instance; it can be attached to a stick and thrown in a further form of mediation; it can be shot from a bow in a third mediated form, and so on. As the task becomes increasingly mediated by technology, and the effort required by the instigating agent develops and changes, we can see that the example begins to reflect more closely the ideal type that I am defining. The agent can forego the rock completely, and can instead swap it for a gun: the required involvement in the task therefore changes from finding and shaping a rock, learning to throw it, and training the agent's body to be strong enough to use it effectively, to simply buying the gun, properly maintaining it, and firing it. Both are intending towards the same outcome, but in the second case the task is far closer to the enclosure of automation as I describe it than in the first. Moreover, the use of a gun also allows for the almost complete enclosure of the task if that gun is attached to a robot or drone, and the instigating agent no longer needs to actively involve themselves in its firing (Schwarz 2018). At each step of the increasingly enclosed task, the level and severity of automation grows, but we can still trace it back to its unautomated form: indeed, doing so can shed important and interesting light on the task in question.

Let's consider a prototypical form of automation as I define it. A perfect case of automation is one that negates the need for any human intervention in the necessary movements of a task. The agent need only press a button, say a command, or think of a desired outcome and the automated machine will complete the necessary task, producing the desired result. This might happen instantly, or take a variable amount of time to complete; it might mimic the movements of a human agent, or behave in a completely mechanical manner; it might follow a logic that is understandable to the instigating human agent, or might operate according to incomprehensible and "alien" logic (Fazi 2019). However the task is completed, the automated technology is set in motion *by* the agent, the task is undertaken and completed *without* the agent, and the outcome is produced *for* the agent. Because I am considering the automation of work in this thesis, and because acts of *labour* and *work* always occur between human beings, instances of automation will always occur for and by human beings, and therefore occur within a normative framework. By this, I mean that automation is always deployed *for something*, and *by someone*, but this does not dictate the normative *content* of the act, only that it is occurring within a minor framework of human intentionality and desire. Indeed, the importance of approaching automation through the novel evaluative frame I am offering is that as a result we can better consider *all* contingent functions and values that surround examples of automation, instead of becoming transfixed with a certain narrow set of normative conditions beyond those of an instigator and a desired goal. My rejection

of overly narrow or reified accounts of automation through the novel evaluative framework proposed here does not eliminate normative considerations, but rather interjects in contested and conflicting cases in a much more applicable and inclusive manner, without succumbing to generic statements regarding automation as a whole based on specific set of cases.

The prototypical example of automation, as I define it, could therefore be a sophisticated boiler. If the agent's house is fitted with such a boiler, and the boiler has a set of feedback mechanisms governing temperature and water levels that respond accurately and promptly to environmental information, plus a host of self-maintaining and self-repairing capacities so that it never needs further human intervention, and perhaps even the capacity to reflect the desired temperature and water levels of the human agent as they change over time, then we would be dealing with perfect automation. In such a case, the human agent would set the perfect boiler in motion when they first move into the house, and it would fulfil the task of keeping them warm in winter, cool in summer, and sufficiently provided with water as required. It would repair itself, maintain itself, and perform any updates and improvements as they became available. The desired outcome of such a technology would be both immediate and continuous, because the warmth of the house is a constantly evolving desire. Such a case of automation itself emerges from a continuum of other technologies and practices, including fire-building and the insulation of the house.

Of course, in practice such technologies are (unfortunately) only imaginary. In reality, most technological artefacts require some level of human maintenance, although the capacity of diagnostic machines has also gone some way to automating the sub-tasks required of the human engineer. Moreover, human beings are still required to build, ship, install, maintain, and remove such technologies, meaning that real-world cases of automation remain firmly distinct from the ideal form I am developing. It becomes clear that my offering of an ideal type of automation will not result in a tangible device that satisfies its deliberately high standards. However, my definition of automation is still useful for investigating contemporary case studies, and might push us to think about how *individual sub-tasks* can be enclosed from further intervention, while also highlighting ways in which the implementation of automation can create additional tasks that need completing. The automation of diagnostic machinery in engineering demonstrates the reactive and reciprocal development of automation, and its continued need for human interaction. Rather than thinking only in terms of one act or task, automation interacts with a huge range of sub-tasks, and might create further sub-tasks that need to be completed by human hands before they are automated. The boiler negates the need for a human being to build a fire, or to fetch and heat water, or to actively respond to external changes in temperature, but, in doing so, might require the owner to engage in its maintenance, its replacement, or its installation. The desired outcome of heating a house is therefore completed automatically, but incurs additional sub-tasks that are

not yet automated. Moreover, we might also have to consider additional conditions surrounding the task, such as energy prices or the company supplying the boiler. Rather than simply talking about the perfect automation of a task, we can begin to question which facets of a task are enclosed from further human intervention, which are not, and what (if any) additional human action is required.

We might therefore view automation and the tasks that it is being employed for in a hierarchical manner that is subject to gradation and teleology. On the broadest level, there is an automated tool and a task that it is intended to complete. Using the example of heating, the automated tool is a boiler and the intended task is the heating of a house. Such cases themselves emerge from non-automated beginnings: the boiler is an extension of fire-making and water-gathering technologies and techniques, and the desire to heat a house develops from a biological need to stay warm. If the automated tool of the boiler fulfils the desired outcome of keeping the agent warm, then we can say that successful automation has taken place. The process can also be seen in terms of its sub-acts: the boiler responds to a set programme to come on at a certain time; to environmental factors if there is a sudden drop in temperature; to the desires of the human owner, if they want to be warmer than they currently are; as well as to its own necessities, as it requires maintenance and repair. If the boiler is perfectly automated, then all of these sub-acts will require no further human intervention – but in reality the overarching successful automation will still require human intervention for some of its sub-tasks.

Such newly emerged sub-tasks might not be required in the making of a fire, despite fire-building being completely un-automated, because it is operating within different enclosure conditions (not having any software to update, for example). As automated technologies become increasingly sophisticated, more and more of these sub-tasks might become completely enclosed from human intervention, until we eventually reach the perfect prototypical form imagined above.

A transhumanist scholar might argue that further technological mediation is possible, if the heating technologies are incorporated into the human agent's body, rather than into their house, or that the internal biological functions regarding temperature are technologically mediated. The transhumanist project is one that embraces revolutionary technologies, and seeks to push the limits of what we comfortably call "being human" under contemporary technological and ecological conditions (Bostrom 2005; Pilsch 2017; Ross 2020). However, this raises normative, moral, and political questions regarding the distinction between human agents and technological artefacts (Fukuyama 2003). A posthumanist scholar might further argue that the need to maintain an internal temperature is itself something that can be overcome, and that we should instead develop technologies that overcome humanity as a whole, rather than extend it (Weinstone 2003; Braidotti 2019). On such a posthumanist account, it might be argued that a sophisticated boiler is only solving the symptom of the issue at hand, and instead we should develop cybernetic or digital 'bodies' that no longer require warmth or water at all.

The transhumanist and posthumanist projects are certainly interesting as an extension of my discussion, but seek very different investigations to what I am offering here, and so will be largely bracketed out. My definitions of automation, *labour*, and *work* require human agents to be reciprocally conditioned in a mediating manner by technological artefacts, but to remain distinct, ontologically speaking, from them (Feenberg 1993). This distinction endures between an automated technological artefact and its human instigator, and the activities of *labour* and *work* remain firmly in the realm of human action, rather than transhuman or posthuman imagination. Where more specific responses from transhumanist and posthumanist scholars arise, they will be addressed, but at this stage it is sufficient to say that my view of automation is not a transhumanist or posthumanist one.

In reality, cases of automation, particularly in view of their required sub-acts, can take three key forms, all of which might result in one of the contingent functions discussed above: replacement, displacement, and augmentation or extension. The *replacement* of human agents for machines is perhaps the most intuitive sense in which the term 'automation' is used. In such cases, the automated machinery is deployed in such a way to mimic or reflect the movements and motions of the human agents that it is replacing. The enclosure of the task from further human intervention still takes place, but the requisite sub-tasks that occur between instigation and desired outcome remain comparably similar. The robotic arm used to build cars in an automotive factory is a good example

of this, because the process is still completed in a way that *could* be done by a human being: parts of the car are picked up in a hand-like manner, attached in a way that a human being *could* achieve with a screwdriver or welding apparatus, and the factory floor still resembles a similar formulation as when the assembly line was populated by human agents (Krüger et al 2009). In such cases it is possible, even if only in theory, for the replaced human agents to retake their positions in the process, because the task is still occurring in a comparable manner. The newly replaced human agents might then also be tasked with the maintenance, repair, creation, or installation of the automated tools that are replacing them. The task holds a similar shape as when it was completed by human agents, and so if all the automated devices suddenly stopped working, it would be *possible* for human agents to re-engage with the task.

When automation occurs as a *displacement*, however, the movements and motions of the task are radically changed through the inclusion of an automated machine, so that the human agent can no longer engage with them because the shape of the task has radically changed. The enclosure of the task from further intervention overhauls and radically alters the sub-tasks between instigation and desired outcome, leaving no further space for the displaced human agents to retake their old positions. This can happen as a progression, with the inclusion of technological artefacts gradually making the task increasingly inhospitable for human agents. Where a *replacing* technological artefact still follows a similar logic or set of movements to the replaced human agent, an automated

technology design to *displace* human agents changes the shape of the task to no longer facilitate human engagement. An example of this is the mechanised processing of huge volumes of metadata that involves algorithmic processing and machine learning (Bainbridge 1983; Cadwalladr 2018). While the initial task might be one that was originally completed by human agents, such as developing advertisements to better target consumers, when completed by *displacing* technological artefacts the shape of the task changes, and there is no way that a human agent or group of agents could complete the task in the same way: there is simply too much data for a human to compute in the case of algorithmic processing of metadata. A satirical extension of this is in the factory floor scenes in Charlie Chaplin's 1936 film *Modern Times*, that depict Chaplin attempting (and failing) to operate in the manner dictated by the newly implemented machines. A more contemporary example might be the conditions inside an Amazon warehouse: the speed, consistency, and productivity required of human agents in order to meet their quota in an Amazon 'fulfilment centre' is almost impossible, requiring the human workers to skip toilet breaks and put themselves in dangerous positions to keep up (Moody 2017; Del Ray 2019). The enclosure of the tasks in an Amazon 'fulfilment centre' are already highly mediated by technologies which supervise human workers and guide their movements, but ultimately the space is one of displacement, designed around automated machines performing inhuman tasks but still employing human agents. Unfortunately, while such technologies remain imaginary, it is left to

human workers to operate within increasingly inhuman conditions (Onetto 2014). Even when such technologies are realised, human workers may still be required for their creation, installation, and maintenance. The examples of *Modern Times* and Amazon might be heavily laden with specific connotations and values, with Chaplin making a clear social statement regarding the historical period he was living in and Amazon being a deeply political topic today, but both cases can be understood in terms of automation operating in a manner that *displaces* human workers, changing the shape of the task such that it no longer ‘fits’ human beings.



**Figure 3.** A still from Charlie Chaplin’s *Modern Times*, demonstrating the experience of a human worker on an increasingly automated assembly line (Chaplin 1936).

Finally, when automation is employed to augment or extend a task, the human agent remains present in the task, unlike replacement or displacement. The enclosure and negation of human intervention will only occur in a sub-task, or in a portion of the required movements of a task, rather than in the task as a whole. An example of this type of automation might be that of automated accounting software, or mechanical beds in

hospitals. Such technologies deal with a part of a task, but allow for human agents still to engage with other facets: the accountant must still interact with customers and review the general spending of the company, just as the carer must still care for the patient, but a part of their task has been enclosed to no longer require their direct intervention. This will not completely remove the human agent from the entire process, and might still incur additional sub-tasks (of maintenance and supervision), but can remove difficult, dangerous, or boring parts of a task, and allow the human agent to better engage with the remaining sub-tasks. An automated computer program might be able to achieve computations at a much higher level, and with much more success than a human being, but cannot currently interact with clients to a sufficiently friendly or personable standard. Similarly, a mechanical bed can help a patient get in and out of bed, but can't help with other caring tasks, which still require the initial human agent (Parks 2010; Lancaster 2019).

Of course, all of the examples above and all cases of automation in general will result in a contingent effect. In all cases of automation some enclosure has taken place, and some human intervention has been altered, whether through replacement, displacement, or augmentation/extension (or a combination thereof). However, automated technologies are rarely developed and deployed merely for their own sake. A tangible contingent effect is desired, be it the production of automobiles, the distribution of goods from a warehouse, or the caring for patients in a hospital. All cases of deployed or imagined automated technologies will display the enclosure

I define as automation itself, but some will display contingent effects that others do not. This is fundamental to my definition of automation: any single imperfect, specific usage of automation does not reflect or encapsulate the essential quality of automation in itself. Automation can be, and is, implemented in different ways for different goals, and will produce different effects and issues, but none will comprehensively demonstrate automation as a whole. The automation of an automobile factory demonstrates the process of enclosing a task from further human intervention, but cannot be held as *the* standard by which *all* automation should be judged. No matter how convincing or tempting it may be, automated imaginaries based on the automation of a specific industry or social structure do not give a comprehensive accurate or complete (non-partial) representation of automation's entire potential. Rather than extrapolating from one limited example or set of examples, we must instead investigate the ways in which automation, as the process of enclosing a task from further human intervention, appears in specific tasks and sub-tasks, and how this appearance is shaped and can shape the specific goals and conditions *in the specific task*. Automation, as I am defining it, is broad applicable and not based on any one example, but allows for the investigation of specific goals *within their specific contextual horizons*. We cannot develop an all-encompassing model of automation based on a specific example or set of examples, but can instead compare specific examples or sets of examples to the ideal, evaluative, and essential definition I have given here.

### **1.5. Framing the Definition in a Historical Context**

The definition of automation I have offered above might seem somewhat novel, but I believe it has support from the historical context surrounding the development of automation. The clearest and most important point in the history of automation is the Industrial Revolution, when huge strides were made in steam-powered productive machines (Rosen 2012), which in turn saw a huge shift in employment rates from rural agriculture to urban manufacturing, completely changing the social and economic landscape of the United Kingdom (Griffin 2014). Automated technologies develop in a comparable manner from this point, with new artefacts and industrial practices creating some jobs and replacing, displacing, and augmenting/extending others (Hobsbawm 1968). Many of the intuitive and commonplace examples of automation that remain pivotal for contemporary discussions, such as the automation of manufacturing, can be traced back to the Industrial Revolution (Schwab 2017; Bastani 2019), and it is clear how the technological changes made during the Industrial Revolution fit into the definition of automation I am developing here. Prior to the Industrial Revolution the enclosure of tasks in agriculture and manufacturing was technological to some degree, but still required active and skilled human interaction. Many of these tasks were spatially enclosed in rural areas, or home-based workshops, and took place temporally in a much less rigid manner than today, changing with the seasons and religious holidays. With the Industrial Revolution,

manufacturing and agricultural tasks, as well as the related service fields, became much more heavily conditioned by the technologies that were developing at the time, and were enclosed spatially and temporally in factories with set working hours (Hutchins and Harrison 1911). Time was saved and productivity increased in some aspects of factory work, but human intervention was far from negated; indeed, one of the crowning features of the Industrial Revolution was the vast amount of human labour-power required to run a factory. While automation can largely be traced back to the Industrial Revolution, it certainly wasn't wholly perfected at that time.

This was not the first time in history that automated technologies were developed, of course. The newly developed technological artefacts that populated and transformed 18<sup>th</sup> and 19<sup>th</sup> Century European factories were themselves hundreds of years in the making. In particular, the feedback control mechanisms that facilitated the huge factory machines can be traced as far back as Ancient China and Ancient Greece. Tools that automatically measure time in a mechanical manner, housed in a technological artefact of sorts, and thereby demonstrating automation as I define it, can be seen in water clocks from 4000 BC in China (Landels 2000; Lu 2015). The Greek inventor Ctesibius is attributed with advancing the form of a water clock by including the first proper feedback control mechanism: a stopcock that prevented the overflowing of water in an inflow water clock, created in Ptolemaic Egypt in 270 BC (Guarnieri 2010). The device responds to the water level, preventing any more water being

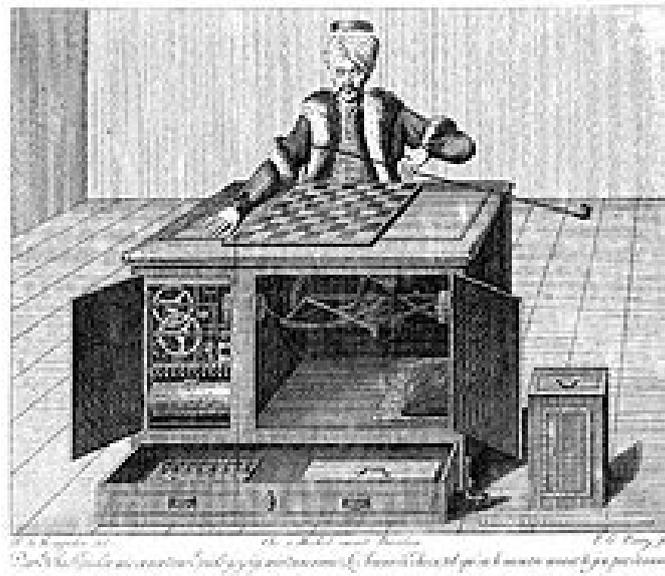
added to the clock before it overflows, and then re-allowing water when safe to do so. Devices of this sort remain a common facet of modern plumbing systems, which themselves are imperfect instances of an automated system. Ctesibius is also attributed with initiating developments in pneumatic technologies, but this feedback control device is one of the first instances of an automated technology in its essential form: a device that negates the need for further mediation in a specific task, enclosing it from additional necessary intervention. Development of feedback control devices continued throughout history, particularly outside the Western world, with a huge number of similar feedback control devices being noted in the Persian Banū Mūsā brothers' *Book of Ingenious Devices* in 850 AD (al-Hassan and Hill 1986). The devices being developed in Islamic countries brought about an incredibly busy period in "the Middle Ages of Christian Europe... [which saw] an epoch of extraordinary technological creativity" (Mayr 1986, p.3), and the development of mechanical and automated devices in agriculture, time-keeping, and heavy industry. While contemporary automated devices are significantly more sophisticated, the enclosure of tasks from further human mediation by use of technological artefacts has been a facet of human development for thousands of years.

Indeed, some of the most sophisticated and paradigmatic examples of contemporary automation have predecessors in historical artefacts: automata. Today, the term 'automata' conjures images of animatronic robots housed in museums and amusement parks, rather than advanced robot machines, but they can still be described as self-contained and often

novel devices, built to be self-directing in a limited capacity. While far removed from fully automated humanoid robots, automata demonstrate a limited and somewhat banal form of the enclosure of a task. However, they are often omitted from the teleological description of automation when it is considered primarily in terms of the Industrial Revolution, or contemporary automation in manufacturing and heavy industry. An undoubtedly automated artefact like an automatic vacuum cleaner seems to have more in common with a 17<sup>th</sup> Century automaton than it does with the type of automated machinery found in an automobile factory.

Automata hold a place in mythology and history across the world. First recorded by Homer, using the Greek term “αὐτόματον” meaning “acting or moving on its own” (Evangelou 2017, p.202), *The Iliad* describes self-opening doors, self-directed wheels and tripods, and bronze assistant automata in Hephaestus’ workshop (Homer 762). Automata in the form of clocks, artificial animals and birds, and even analogue computers have been discovered and recorded across Ancient Greece, China, and the Middle East. The creation of such devices continued across the Islamic world and Medieval Europe, expanding into anthropomorphised automata that could play music, write letters and sentences, and help with handwashing and other basic hygiene activities (Rosheim 1994). Interest in and development of automata reached a peak in Renaissance Europe, when automata turned from being novelties and gimmicks into spectacles, commonly found in city-centres, churches, and public parks. So prevalent were automata in Renaissance Europe that they feature heavily in René

Descartes' writing, influencing his views on animals and his approach to the problem of other minds. Descartes gave famous comments on both fields with reference to automata, first when looking out of the window, wondering "but what do I see apart from hats and coats, under which it may be the case that there are automata hidden?" (Descartes 1641, p.29), and then when considering the mechanical nature of animals (Harrison 1992). Jessica Riskin notes that "European towns and villages were positively humming with mechanical vitality, and mechanical images of living creatures had been ubiquitous for several centuries" (Riskin 2010), suggesting a much greater influence of automata prior to the Industrial Revolution than today. As such, the imagined humanoid worker "Optimus" proposed by Tesla and the fictional humanoid robots in *Star Wars*, along with the actual automated artefacts found today, share an equal history with the mythical automata of Hephaestus' workshop, and the spectacle-turned-hoax of the Mechanical Turk. All these examples demonstrate the enclosure of a task that I define as automation, regardless of the actual task that is being enclosed.



**Figure 4.** A sketch of Kempelen’s original chess-playing automaton *The Mechanical Turk*. (Standage 2003)



**Figures 5 and 6 (L-R).** The image presented by Tesla of the proposed humanoid robot worker “Optimus”; the *Star Wars* humanoid robot C3PO. (Shepherd 2016; Sparkes 2021)

Even if we bracket out the wide history of automata and other ‘automated’ artefacts, the radical transformations of 18<sup>th</sup> and 19<sup>th</sup> Century factories were indebted to the creation of automated mechanical controllers, regulators, and prime-movers since the 1600s, which reached the form still found and improved upon today between 1930 and 1950 (Bennett 1979; 1993). With these developments came radical and substantial alterations to the formation of labour processes, together with the replacement and displacement of human labourers, the significant

alteration of job roles, and the creation and propagation of industrial capitalism (Hobsbawm 1962; 1975; Noble 1984). However diffuse or specifically intended, all of these developments have the essential quality of enclosing tasks from further human interference to some degree, albeit with particular impetus on the contingent function of reducing (and often removing) human labour from these processes. As David Noble claims, “N/C [numerical control technology] was an abstract synthesizer of skill, circumventing and eliminating altogether the need for the machinist” (Noble 1984, p.84, my bracketing). For this reason, a range of scholars cite this as a distinctly political period of time, one that cannot be wholly or sufficiently explained simply in mechanical terms.

### **1.6. Addressing Marx and Automation**

One scholar who politicises this time period, and indeed automation in general, is Karl Marx. Marx is an enduring figure in the history of philosophical considerations of automation (and *labour/work*, as will be discussed later), and so requires some attention at this juncture (Mei 2009; Bonifati 2019; Mason 2021). For Marx, automation is inherently political, because it is a key moment in the historical class struggle between labour and capital, one which promises to radically transform the landscape of work and the relation of labour to capital. Marx saw automation as a tool to redistribute labour, save time in productive acts, and to deskill labourers, with automated machines performing in a

radically different, inhuman manner compared to human labourers (Adler 1988; Hughes and Southern 2019). Moreover, automation continued capital's tendency to alienate labourers from their labour, further pushing the class distinctions that Marx saw across history to new levels (Cotgrove 1972). However, his judgements regarding this transformation are somewhat fragmented.

In Marx's early thinking, particularly in the posthumously-published *Fragment on Machines* from *Grundrisse*, written 10 years prior to *Capital: Volume 1*, Marx claims this of automation:

Capital employs machinery, rather, only to the extent that it enables the worker to work a larger part of his time for capital, to relate to a larger part of his time as time which does not belong to him, to work longer for another. Through this process, the amount of labour necessary for the production of a given object is indeed reduced to a minimum, but only in order to realise a maximum of labour in the maximum number of such objects. The first aspect is important, because capital here – quite unintentionally – reduces human labour ... to a minimum. This will redound to the benefit of emancipated labour, and is the condition of its emancipation. (Marx, 1858, p.701)

Marx accepted that the increasing implementation of machines reduced the skill of jobs in a factory, transforming them into machine-like tasks, and acknowledged that the conditions of capitalism under which he was writing took the simplicity created by automation and reapplied it to human workers as pressure and long working days: within this, Marx saw a hope that the newly found productivity of automated machines would actually be the key to the liberation of the working class, because their labour could be redistributed, and more time and energy could be spent in other pursuits. His famous dream of being able to “hunt in the morning, fish in

the afternoon, rear cattle in the evening, [and] criticise after dinner” (Marx, 1847, p.54) was obtainable if we fully adopted automation in the factory, and allowed machines to do all the labour required by society (as long as those factories were eventually owned by the working-class). In removing the economic incentive or force to engage in meaningless productive labour, and by redistributing labour across society, it is Marx’s belief that the social and economic structures surrounding capitalist employment will disappear, and the power that capital draws from these structures will equally dissipate. This will be a key moment for political organisation, with the working-class now able to organise and overthrow capitalist systems because they are no longer beholden to wage-slavery. Other scholars have extended this Marxist hope, arguing that the full adoption of automation will result in there simply being enough of everything for everyone, and our necessities will all be met as the world enters an age of post-scarcity, and even “fully automated luxury communism” (Bastani 2019). Other thinkers have taken notions of post-scarcity economics and the end of capitalism in other political directions, including post-scarcity anarchism (Bookchin 1971), and the more generally optimistic view that the coming years will end economic and social inequality (Giddens 1996; Aguilar-Millan et al 2010).

However, in the 10 years between privately writing the *Grundrisse* and publishing *Capital: Volume 1*, Marx’s optimism tempered slightly. Rather than automation being an inevitable and immediate key to the

liberation of the working class, he reflects that capital maintains an important hold of its development and deployment, writing that:

... machinery in itself shortens the hours of labour, but when employed by capital it lengthens them; since in itself it lightens labour, but when employed by capital it heightens its intensity. (Marx, 1867, p.568-569)

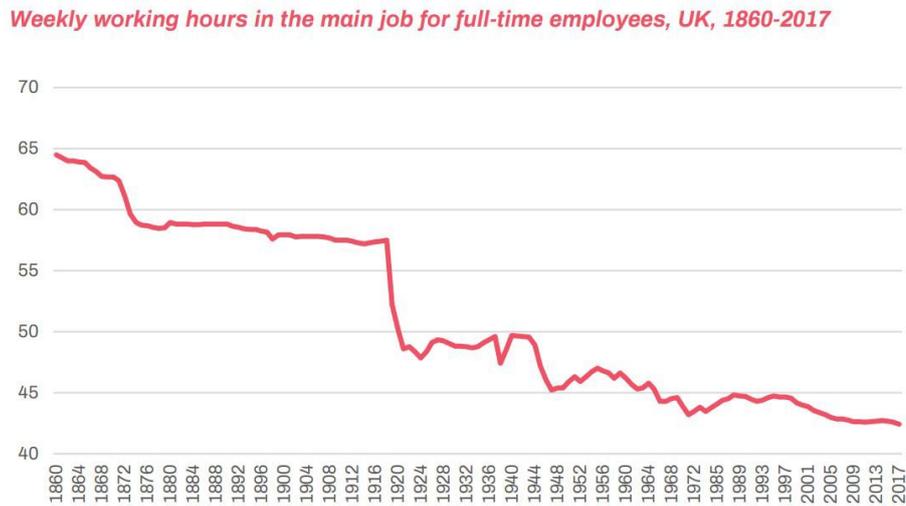
A fear emerges here that automation will in fact “increase the number of labour-powers which are at the disposal of capitalist exploitation” (Marx 1867, p.567). The liberation of the working class remains inevitable through automation, because for Marx capitalism will ultimately fall, whether to communism or simply in on itself. However, the transition from one to the other might not be as simple as he once hoped in the *Grundrisse*, and Marx seems to be acknowledging that much more capitalist exploitation and alienation might emerge from the adoption of automation, before his ultimate emancipatory goal is achieved. Recent scholarship on Marx has reflected this change, noting that readings of Marx’s *Grundrisse* have produced a rose-tinted view of capitalism’s ‘inevitable’ decay, which has transformed Marx’s criticism of capitalism into a school of left-wing ‘wishful thinking’ (Pitts 2017). Interestingly, Marx describes automation as follows:

A mechanical monster whose body fills whole factories, and whose demonic power, at first hidden by the slow and measured motions of its gigantic members, finally bursts forth in the fast and feverish whirl of its countless working organs. (Marx 1858, p.503)

Far from being a panacea, Marx seems to acknowledge the diverse, and sometimes dangerous, uses that automation can be put to.

However, Marx's nature as a political theorist and economist with a specific political project means that he is already committed to a given picture of the future, and therefore his arguments in this area contain some implicit value judgements. Marx's project is one of reading class struggle into the history of economic development in Western industrial nations (Hobsbawm 1962; 1975), thereby including a number of value-judgements that might result in a narrow account: even in a soft form that does not favour one class over the other, evaluating the history and future of work as a struggle between diametrically opposed social groups creates clear divisions which might neglect opposing or outlying examples. Furthermore, as the Marxist project is taken further throughout history, it risks becoming more reified, focusing on a limited set of cases but extrapolating to all forms of work throughout history, with the capitalist class becoming evil and the working-class requiring emancipation (Dean 2012; Bastani 2019). Marx's historical teleology of class struggle was one in which capitalism would eventually be overcome by an organised working-class, which creates a tension in adopting his view: if the analysis of contemporary economic conditions are preordained to result in the destruction of capitalism, then any contemporary data trends in technological development, economic progress, or social movements are already destined for a given outcome. Opposing data is either therefore a necessary step towards this outcome, or must be framed as not actually opposing. This tension can be seen with current stagnation in working

hours, despite the apparent increase in the adoption of automated technologies.



**Figure 7.** Trajectory of UK working hours between 1860 and 2017 (Skidelsky 2019).

At Marx’s time of writing working hours were beginning to lessen in the UK, and yet they were followed by large plateaus during periods when automated technologies were growing in sophistication and prevalence. Moreover, since the 1920s a host of automated technologies have been created, yet working hours have remained relatively stagnant (Jones 2020a; 2020b; 2020c). If the deskilling of workers and the more even distribution of work at the hands of automation is supposed to redound into free time, then it does not appear to be happening yet. Moreover, labour productivity has not seen dramatic increases as a result of technological developments in recent years, leading to a “productivity paradox” (Soete 2018; Benanav 2020; Smith 2020, p.10), in which productivity *should* be skyrocketing with new advanced machines, but

doesn't seem to be doing so significantly. Neither are wages changing dramatically due to an abundance of goods (ONS 2021): many of Marx's hopes for automation have yet become a reality, nor did they become a reality in his lifetime. The first major communist revolution occurred in Russia in 1917, 34 years after Marx's death, and that did not result in the emancipatory social change that he might have hoped for (Boyer 1998). Indeed, the application of automation *today* seems to have widely differing effects, depending on where and how it is applied: in some instances, wage inequality is reduced, productivity is incrementally increased, and working hours are lessened; in others, inequality is deepened, wages are depressed, and jobs are entirely displaced (Acemoglu and Restrepo 2018). We are currently in an age of stagnation, rather than economic revolution (Schwab 2017; Benanav 2020). On the Marxian and Marxist accounts, we must approach these cases in one of two ways: either these examples must be acknowledged as contradictory to the predicted decline of capitalism *now*, but also acknowledged as belonging to capitalism's downfall, perhaps simply in unseen or unexpected ways (such as driving the working-class towards organisation and resistance); or these examples must be reframed as *not actually opposing* the ultimate teleological goals of the Marxist and Marxian projects. In the latter case, it might therefore be argued that stagnant wages, increasing working hours, and continued capitalist dominance in the political, economic, and social sphere are actually necessary steps towards the ultimate achievement of universal Communism, and that Marx will be proved right in the end (and perhaps

that he simply works in mysterious ways); while in the former case, it might be acknowledged that the changeable and dynamic nature of capitalism has resulted in unexpected consequences, but that these new conditions in society might still be utilised by the working-class to organise and overthrow capitalism. In either case the ultimate goal is one containing some level of reification, of automation or capitalism.

While Marx is undoubtedly a pivotal figure in this area, engaging in a Marxist analysis of, or projection towards, the future of work through automation necessitates the commitment to an evaluative position that inevitably reframes or rejects cases that do not fit into it. Marx will be discussed more specifically in the later chapter on *labour*, and his relevance will be highlighted where necessary, but this thesis should not be understood as significantly engaging with Marxist scholarship.

### **1.7. Restating the Definition**

To conclude this chapter, let's revisit the definition of automation that I am forwarding in the thesis. Automation is the process of enclosing a task or set of sub-tasks from further intervention or mediation by the human being instigating them. For a task to be automated, it must not involve the actions of a human being (or by extension, an animal) in order to complete the requisite movements and motions of the task at hand. Automation is a technological endeavour, taking place within and through artefacts and practices. The ideal artificial standard of such a definition will not be reflected in real examples, but is instead an ideal to which real cases

can be compared. Automation is therefore a process that incrementally develops as a task progresses through time, and changes with each form of technological mediation. Such a definition is historically consistent, and can be found in the paradigmatic cases of the Industrial Revolution, as well as those of earlier history and fringe technologies. This definition is not committed to any specific set of particular moral, ethical, or value judgements regarding the general or universal desirability of automation: the definition serves to strip back the extraneous attachments that arise in specific cases of automation in order to reveal the essential qualities at play in a non-reified manner. The intention is to create a much more flexible and inclusive evaluative framework through which instances of automation can be investigated, which can facilitate meaningful comparison between cases, without becoming committed to an inaccurate picture regarding the universal nature of automation that is based on narrow and limited cases. The definition being developed here can facilitate the investigation of automated household artefacts and their development throughout history, allow for reflection on the implications that such devices have, while also facilitating the investigation of the mass automation that emerges across entire industries, without committing to a fallacious position in which the implications of one are extended to the inherent qualities of the other.

It is my argument here that the specific implications of automated devices in a given example are important, and are significantly shaped by the contextual horizon under which each case of automation appears. Such

implications must be considered in their own right, within each context and for each case, without necessarily extrapolating *from one case to all others*. In defining automation in an essential form, as the process of enclosing a task or sub-task from further human intervention, we can better face the dynamic, diverse, and ever-changing landscape of automation, today and into the future.

Having offered a somewhat novel definition of automation, the following chapter will review the contemporary literature regarding automation, and attempt to highlight the position that my own definition might take, as well as the issues within the literature that this definition seeks to redress.

## **2. Reviewing the Literature Concerning Automation**

*It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of light, it was the season of darkness, it was the spring of hope, it was the winter of despair* (Dickens 1859, p.4).

### **2.1 From Essential Definition to Contingent Function**

In the previous chapter, I offered an essential definition of automation, defined as the process of enclosing a task or sub-task from further human intervention, interaction, or mediation. This, I argued, is true of *all* instances of automation, regardless of their intended outcome or desired effects. I therefore separated the essential definition of automation, as a means of enclosure, from its real-world contingent manifestations. No single contingent function of automation can entirely account for the whole essence of automation. Automation does not always or inevitably result in any specific outcome, other than the consistent and essential quality of enclosing acts and sub-acts from further human intervention.

Such a definition is clearly divorced from real-world cases of automation, explicitly by design. Actualised cases of automation are always the automation *of* something, or *for* a particular purpose. For the scope of this thesis, I am specifically focusing on the relationship between automation, *labour*, and *work*. In addition to the somewhat novel definition of automation developed in the previous chapter, I am also offering a renewed definition of *labour* and *work* as distinct modes of activity that will both require significant attention in Chapters 3 and 5

respectively. Before adding further complexity to the model of automation I am developing here, it is pertinent and important to first consider how my definition of automation will fit into the contemporary literature landscape, especially relative to the accounts of automation that focus solely on a given contingent function and neglect the broad notion of automation in its entirety, which my definition is intended to oppose. This chapter will therefore sketch a number of positions found across the literature, which I argue focus solely on a given contingent function of automation in practice and neglect the holistic nature of automation as relating to a wide range of opposing and conflicting functions, and suggest ways in which my own definition is a more effective notion when considering practical cases. The positions that I will discuss often mirror or correspond to each other and many of the thinkers I will discuss intersect with others. Moreover, many of the potential issues cited by some scholars are the basis for optimism according to others, so I will highlight and reflect these connections where they arise. The six specific accounts of automation which will be discussed in this chapter are: (1) historical accounts of automation; (2) empirical studies of specific effects automation has had, or is having; (3) automation as a tool for saving time, and its corollary effects on technological unemployment; (4) automation as a tool for increasing productivity, and its resultant possibilities for post-scarcity economic models; (5) automation's relation to the redressing of social issues, and counter positions that arise around the use of automation to further and continue inequality; and finally, (6) utopian and transhumanist

accounts of automation, and the antithetical dystopian accounts of automation relating to a loss of human significance and meaning. I will conclude by discussing proponents of hybrid models of automation that still involve human participation to some degree, as a potentially related area of the literature in which to enter my own definition.

## **2.2 Historical Accounts of Automation**

To begin, let's consider more historical accounts of automation, having already referred to some in the previous chapter. While almost all discussions of automation include some consideration of its historical development, I distinguish these accounts because either the historical analysis of automation is given primary focus, without regard for the contingent function that automation might have in the future, or because the analysis of a contingent function of automation is framed in its historical setting, rather than in its potential future effects. These first accounts might be said to demonstrate 'neutral' values regarding automation, because the historical facts are of primary importance, while the second might be said to be *more* neutral than other more directly political or ontological accounts, despite demonstrating a somewhat narrow view of automation in one regard or another.

Beginning in Early and Ancient history, a number of scholars have detailed the development of key technological artefacts, including computers (Campbell-Kelly et al 2014; Naydler 2018), manufacturing

technologies (Hutchins and Harrison 1911; Bennett 1979; 1993), and automated machines in general (Bagrit 1964; al-Hassan and Hill 1986; Mayr 1986; Guarnieri 2010; López-Cajún and Ceccarelli 2016; Staccioli and Virgillito 2021). Related technological developments such as Artificial Intelligence (AI) have also generated histories of their own which are intertwined with the development of the types of automated machines discussed here (Russell and Norvig 2021; Wooldridge 2021a; 2021b). Other periods in history have received specific attention, particularly the years following the First and Second World Wars (Dowie 1975; Hunnicutt 1990; Rifkin 1995; Arrowsmith 2002; Golden 2009), and the Industrial Revolution (Ashton 1948; Hobsbawm 1968; Noble 1984; More 2000; Griffin 2010; Rosen 2012; Griffin 2014). Including and reflecting upon the history of automated technologies and drawing on a wide set of examples of technological artefacts throughout that history is important for creating a full and inclusive picture of the reality of automation, and is what I will do throughout the thesis.

While all of these accounts can be political in their narrative, and often offer critical reflections on contemporary or predicted effects of automated technology, I distinguish them from the accounts based more wholly around a contingent function of automation, because there is less of a reified claim being made regarding the nature of automation as a whole. Rather, the historical progression of automation is being outlined as the primary focus of analysis, with contingent predictions and arguments being made after the fact. The definition I am developing in the thesis is

designed to be able to fit into the historical narratives being proposed, because the essential process of enclosure can be read into the various historical moments discussed across the literature. Moreover, where the analyses offered in these historical accounts do slip into reified predictions regarding the state and future of automation, my own approach is able to expand the set of examples being employed in order to avoid an overly narrow historical, and thereby future-facing, account of automation from developing.

### 2.2.1. Empirical Studies of Automation

Before turning to the contingent accounts of automation requiring more specific attention to establish where exactly my own approach will sit in the literature, it is important to first note the role of empirical studies regarding the effects of automation. If the historical accounts of automation plot its history, and make limited suggestions regarding its future, then empirical studies can help to plot its present, and make relatively informed predictions regarding forthcoming years.

Empirical research concerning automation considers a wide range of its effects. Much research has been conducted into the effects that automation has on productivity, with many scholars investigating rates of unemployment as a result of automation (Vermeulen et al 2018; Au-Yong-Oliveira et al 2019), and the apparent stagnation that persists in wages and productivity, despite the expected increases (Stiglitz 2016; Gries and Naudé 2018). The picture of unemployment as a result of automation is

particularly polarised, with some predicted job losses being very high (Kessler 2019), and others being incredibly limited (Smith 2020).

Linked to this is research undertaken into the trends on working time in recent years, many of which consider automation as a contributory factor, even if not as a primary focus (Cole and Ohanian 2002; Russell 2003; Golden 2011; Oh et al 2012; Hermann 2015). A number of reports advocating a reduced working week cite automation as one potential avenue through which this could be achieved (Skidelsky 2019; Stronge and Harper 2019). In these papers and reports, automation is seen to be a potentially beneficial tool in reducing working time, both historically and into the future, but one that has required, and will continue to require, sharp policy governance and political monitoring. Additionally, concerns regarding the human experience of automation have generated empirical research regarding the effects on affected workers, concerning happiness at and because of work (Kosrow and Hinchliffe 2014; Ravina-Rípoll et al 2019), meaningfulness at and after work (Staaby et al 2021), and the perceptions of automation that pervade public understanding (Mulas-Granados et al 2019; Ghimire et al 2020; Cooper et al 2021). The data gathered in these papers reports a tension between the day-to-day benefits of automation experienced by managers and CEOs, and a lack of significance among lower-level workers, alongside a range of anxieties regarding job losses at all levels.

The empirical data found in the studies does not paint a clear picture of automation at this point in time, because its developments are scattered, its effects highly variable, and its sophistication still limited. However, the findings of the papers and reports mentioned here will be referenced where applicable throughout the rest of the thesis. For now, let's turn to the accounts of automation which I am accusing of narrowly focusing on a contingent effect of the process while ignoring the holistic nature of automation as a whole, beginning with the role automation plays in saving time.

### **2.3. Automation as a Tool for Saving Time**

Many of the contingent functions of automation discussed in the contemporary literature overlap and intersect with one another. Consequently, when I discuss automation's capacity to save time in acts of work, there will inevitably be related interactions with its capacity to save money, for example. My separation of automation's contingent effects is therefore to ease analysis, rather than to draw sharp distinctions between the real-world implications of automation.

The function of saving time is one that has seen much attention in the literature in recent years, as well as in mainstream media (Galarza 2016; Skidelsky 2021). The prospect of fully automated machines has an immediate impact on related working hours, because the need for human labourers significantly decreases when machines can operate without

interference or significant supervision. For Karl Marx, this reduction of time for human workers was an important condition of communist revolution, as the newly freed working class could spend their time in unalienated activities, as discussed in the previous chapter (Marx 1846; 1858; 1867). However, the dream of a 'post-work' society, one in which automated machines and automatic robots perform all the necessary labour of a society, did not die with Marx. For some scholars, the ideal of a society in which we no longer work is one that should be aspired for. Kathi Weeks' 2011 book, *The Problem with Work: Feminism, Marxism, Antiwork Politics, and Postwork Imaginaries*, challenges the presupposition that paid employment is the best means by which to distribute wealth. Weeks argues that the unpaid reproductive labour, which disproportionately falls to women, is grounds for politicising work, and aspires to social structures in which creativity and productivity are divorced from capitalist economic models (Weeks 2011). Weeks' arguments are supported by other feminist thinkers, who highlight the gendered inequality built into contemporary work structures, and call for its reorganisation (Ferguson and Folbre 1981; Folbre 1982; Irigaray 1993; Folbre 1994; Strober and Donahoe 2017; Ferguson 2019).

Nick Srnicek and Alex Williams take Marx's dream of unconstrained political expression in a world without work as the focal point of their 2015 book *Inventing the Future: Postcapitalism and a World Without Work*. They argue that if leftist politics can be successfully reformed away from 'folk politics', and instead begin to offer a concerted push for reforms including

full automation, Universal Basic Income (UBI), and widescale social justice, then a new future can be created in which we no longer have to engage in paid employment (Srnicsek and Williams 2015). With our newfound free time, they argue that we would be freer to engage in political discourse and action, and the creative pursuits now only available to the lucky few. Other advocates of post-work societies echo these sentiments, arguing that by reforming current forms of work to be undertaken by automated machines, we will have a revolutionary society no longer governed by economic necessity (Rifkin 1995; White 1997; Aronowitz and Cutler 1998; Autor 2015; Chessell 2018; Hughes and Southern 2019; Skidelsky 2020; Breen and Deranty 2021). Such hopes can even be traced back to last century, with John Maynard Keynes famously proclaiming that:

The economic problem may be solved, or be at least within sight of solution, within a hundred years. This means that the economic problem is not... the permanent problem of the human race. (Keynes 1931, p.8)

While not strictly a declaration of a 'post-work' sentiment, and not specifically an advocacy of automation itself, we are approaching Keynes' deadline of one hundred years. Indeed, while some semblance of a 'post-work' lifestyle has been historically possible for a certain few, including capitalists and the aristocracy, current trends in technological development and social organisation mean that a 'post-work' society *for all* is now more realistic than ever before, despite it still being very far from reality for most workers today.

The utopian hope of such post-work ideals is encapsulated in its purest forms in John Danaher's 2019 book *Automation and Utopia: Human Flourishing in a World Without Work*. Danaher's somewhat revolutionary theory is that society should not only embrace the rejection of work, but that we should also retreat from the physical 'real' world. Such is Danaher's faith in automated technologies that he argues that factories, hospitals, and homes can be entirely staffed and maintained by automated technologies, and that we can retreat into virtual environments. Rather than working, our days can be spent playing, creating, organising, and speaking to one another, with the reduction of working time yielding endless freedom (Danaher 2017a; 2019). While Danaher's ideal is somewhat unique and not specifically shared by other scholars, the dream of a utopia maintained and ensured through automated machinery can be found elsewhere in the literature, in conjunction with post-scarcity economics (Bastani 2019) and Universal Basic Income (Bregman 2016). While tempting, such positions are antithetical to the model of automation I am proposing. Presupposed in such utopias is a wealth of additional automation not explicitly noted or considered: for example, if we fully retreat into a virtual world, will pregnancy, childbirth, and childcare all be automated? If so, then the proposed utopia is far less human and far more mechanised than it might appear; if not, then it would seem that engagement in the virtual world is limitless for some and conditional for others. I will discuss utopian approaches to automation at the end of the chapter, but for now it is pertinent to note that such positions are, by

definition, unsupported by my model of automation, precisely because they narrowly take a contingent function of automation to reflect its entirety, and make generic claims that are unsubstantiated by *all* instances of automation.

Not all post-work futures imagined across the literature are so extreme. Other scholars have argued that a 'post-work' society in which we no longer work *at all* is not desirable, but that changing contemporary conditions of work is eminently possible, desirable, and necessary. Perhaps the most pressing argument for changing the conditions of work is the various campaigns for a reduction in working time, often by utilising automated systems. While most advocates of a 4-day working week do not solely cite automation as the means by which it can be achieved, it is commonly accepted that automating certain systems or tasks in conjunction with other policy changes can result in a shorter working week. Such a reduction is desirable for the businesses employing it because they will see an increase in productivity, a reduction in costs, and a reduction in sick leave (Abildgaard 2020; Barnes and Jones 2020; Soojung-Kim Pang 2020a) but it is also highly beneficial to the affected workers, who will experience increased happiness, reduced stress, and unchanging wages (Stronge and Harper 2019; Käckenhoff and Inverardi 2021; Stronge and Lewis 2021). Calls to make work more meaningful, more flexible, and better paid, while still maintaining the virtue of working itself, can also be found across the literature (Veltman 2016; Deranty 2021; Horgan 2021; Jaffe 2021). While not wholly 'post-work' accounts in the truest sense, such

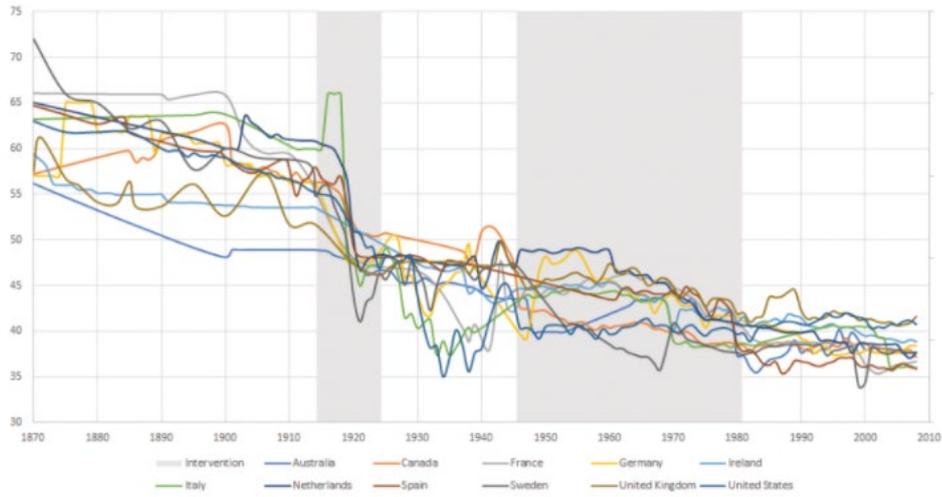
arguments can be said to be post-*current*-work accounts, with the capacity to reduce the time spent in work at the hands of automation being one of the driving forces behind radical social change.

Why do I not align myself with such accounts? It would seem that the reduction of working time, if it does not reduce pay or meaningfulness, is inherently a good thing. On this point I agree: the reduction of working time is historically rooted, with working hours in the United Kingdom falling from an average of 70 hours a week to an average of just over 40 hours a week between the 1850s and 1980s. That we now have a 40-hour work week in the UK is somewhat arbitrary, and is open to further reduction, with new technologies and social practices challenging the validity of a 5-day/40-hour work week.

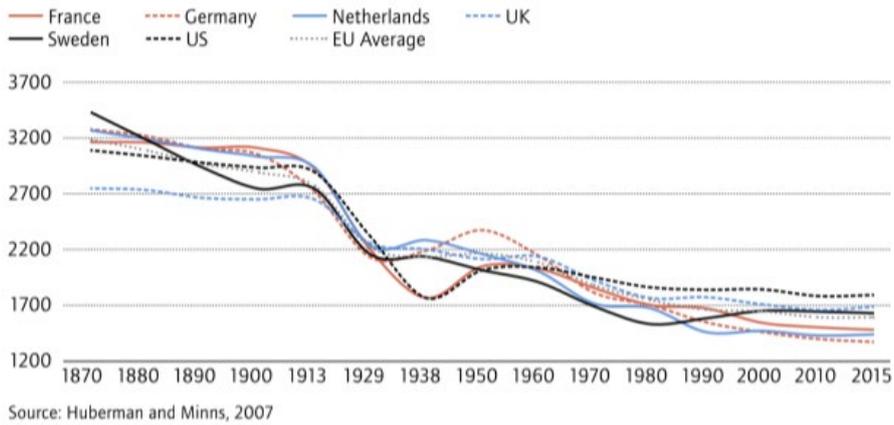
*Weekly working hours in the main job for full-time employees, UK, 1860-2017*



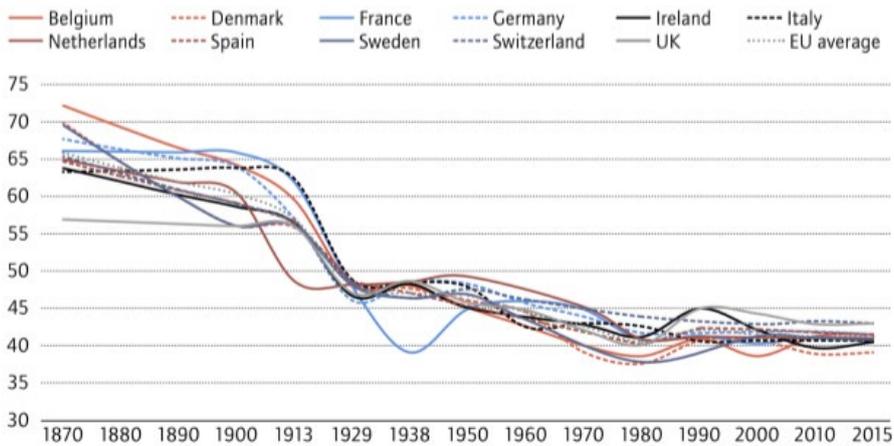
**Figure 1: Weekly working hours in manufacturing 1870-2010**



**Figure 1 Historic trend in annual working hours in selected countries**



**Figure 2 Weekly working hours of full-time employees in the industrial sector: historic trend**



**Figures 8, 9, and 10.** Graphs depicting the trend of working hours in the UK compared to other national averages. (Spiegelaere and Piasna 2017; Gilmore 2019; Skidelsky 2019)

To say that automation has an intrinsic link to such ideals is too limiting. There is no essential quality of automation that guarantees that when a task is enclosed, we will be left with *free* time: it is perfectly reasonable to assume that other jobs will be created elsewhere (Spencer 2018), or that we'll spend our new free time in meaningless consumption, rather than political organisation, for example (Alter 2017). The only guarantee of automation as I describe it is that *the task at hand* will be enclosed from further human intervention. Given that much of the development of automated technologies is occurring within a capitalist framework by capitalist companies, the hope that capitalism is "creating the tools of its own destruction" (Dean 2012) is precisely that: a somewhat vain hope, not necessarily in line with contemporary developments. Presumptions regarding the nature of work, the nature of automation, and the nature of capitalism are all speculative, and are not necessary eventualities. However desirable a post-work society might be (which I would argue against, in line with my definition of *work* in Chapter 5), automation is not inherently, inescapably, or essentially the key to achieving it.

### 2.3.1. Technological Unemployment

In contradistinction to advocates of automation as a tool for reducing working time, other scholars display concern regarding the effects that automation might have on employment (Petropoulos 2018). It is therefore agreed that automation will reduce the time spent in work, but rather than this being emancipatory, there are fears that this will negate meaningful human activity. On this account, rather than leaving us with

limitless free time, if full automation is adopted society will crumble into extreme austerity, unemployment, and poverty. Central to such a view is the valuation of employment as key to generating human meaningfulness, and a concurrent rejection of communist or socialist utopian ideals (or at least an assumption that capitalism will endure and underpin the technological developments causing the feared unemployment). This is a particularly interesting view in light of my stripping back of the contingent functions of automation from its essential quality, because it goes some way to encapsulating precisely *why* such a phenomenological reduction is required. Both the emancipatory free time accounts discussed above and the accounts of technological unemployment that I will detail here agree that automation saves time in acts of work, but they radically disagree on what this time-saving means, and take that diverging disagreement on the contingent outcomes of automation to make broad general claims about the desirability of automation *on the whole*. Arguments against technological unemployment often suggest UBI as a necessary prelude policy, to stave off the unemployment that automation *will* cause (Lowrey 2018; Nieswandt 2021). This is not the same as reclaiming or reforming automation *itself*, and is instead a way of protecting against the harm that automation *necessarily* brings about. Let's consider some such positions regarding automation and technological unemployment.

Martin Ford has published a number of books on the topic. His earliest book, *The Lights in the Tunnel: Automation, Accelerating Technology and the Economy of the Future* (2009) explored the disruptions

that automation might have on employment levels and economic systems in the future, warning that unchecked technological development would leave many workers without paid work and in need of alternative economic and social support. However, the capacity to redress a number of social and economic issues currently found in society, including poverty and climate change, was possible within the development of automation: what is therefore required is constant human oversight, and a rejection of endless 'full' automation across society as a whole (Ford 2009). His second book on the subject, *Rise of the Robots: Technology and the Threat of a Jobless Future* (2015) furthered the analysis, and argued that any job that involved some level of repetition is at risk of being automated and therefore no job is safe from technological unemployment. He broadens the discourse of automation away from the traditional image of the factory worker and argues that all office work, software development, and service work is susceptible to technological unemployment. He calls for immediate policy response, suggesting that a Universal Basic Income needs to be implemented, as well as retraining and the development of 'human-focused' automation where possible across all industries (Ford 2015). In his most recent book, *Rule of the Robots: How Artificial Intelligence Will Transform Everything*, Ford further discusses the possible harm of automated technologies, but is marginally more deterministic about its development: rather than resisting it, he accepts that automation and AI are inevitable and calls for the maximisation of benefit and the reduction of harm to the greatest possible extent, with technological unemployment

being one such harm that needs to be minimised (Ford 2021). Ford is not the only scholar investigating the potential danger of technological unemployment, however: Klaus Schwab, founder of the World Economic Forum, offers a picture of a completely overhauled future of work, albeit in a more positive light than Ford (Schwab 2017); David Blanchflower describes an unhealthy picture of employment, one that will only worsen into the future, with automation being one key factor, amongst others (Blanchflower 2019); Michael A. Peters discusses the need for a strong higher education system, one that is not wholly automated, to furnish future generations with the tools to mould the automated world into a beneficial one (Peters 2017).

However, given that this is a counter-posed point to the accounts of beneficial free time listed in the previous section, some of the scholars listed above have specifically cited technological unemployment, rather than simply free time, as a stepping stone to achieving the types of meaningful post-work lives they envisage. John Danaher himself argues that technological unemployment does not necessarily equate to a loss of meaning, but rather a loss of economic necessity through our work: we'll therefore be left to spend our time in virtuous and beautiful pursuits, instead of being constrained by wage slavery (Danaher 2017b). Ultimately, however, Danaher sees this wholly unemployed society as requiring the integration of such technologies into the human condition, advocating transhumanism in some sense (Danaher 2017b), or of taking place virtually, apart from the physical world (Danaher 2019). Such optimistic views

regarding technological unemployment, which accept its possibility but do not warn of its effects, are found elsewhere in the literature (Autor 2015; Susskind 2017; 2022). Some scholars focus their attention on specific industries, highlighting the possibilities for radical change and restructuring that are available through technological unemployment, be it the transformation of 'expert' fields, from a select few human beings to widely available automated experts (Susskind and Susskind 2017); the democratisation of education away from traditional structural systems (Richardson 2012; Carey 2016); or the expansion and accessibility of medical care, more specifically developed for patients' needs and use (Topol 2015; 2019).

The function of automation to reduce jobs in some industries is undeniable, because it has occurred historically and continues today (Autor 2015). Neither side of this debate is inherently true: automation *could* result in endless free time, spent as we see fit in a communist or socialist utopia; or it *could* result in mass unemployment and austerity, heightening already-present tensions and inequalities. Both accounts use the term 'automation' to denote very different things, which is also true of the various uses of the term 'work' (to denote a meaningful act that shouldn't be automated on one hand, and something that constrains life and should be overcome on the other). By stripping back these contingent functions and generic claims I hope to reveal the effects of automation *as it occurs in specific industries and examples*, without becoming committed to an overly narrow picture of either 'automation' or 'work'.

## **2.4. Automation as a Tool to Increase Productivity**

From the previous discussion, it should be clear that accounts of automation and its potential effects on the future of work vary significantly according to different scholars. While the fact that automation will have *an* effect on working time is undeniable, the contingent and normative judgements made regarding how that free time will *actually* appear differ widely between scholars, often resulting in contested and conflicting accounts. A similarly polarising effect of automation which appears frequently across the literature, connected to the saving of time, is automation's relation to productivity.

The notion of productivity here denotes the productive capacity of automated machinery, particularly in relation to that of human workers. Newly-emerging autonomous technologies have the potential to completely revolutionise the way that jobs are completed either by producing significantly higher quantities of goods, delivering services more accurately and with fewer errors, or by facilitating production on a scale or in areas that human beings simply cannot. This is directly related to technological unemployment, because this function of automation potentially could see the greatest replacement of human workers with autonomous machines. This is of key interest across the literature, both for those scholars I have discussed in relation to technological unemployment, and others more focused on productivity itself. One such scholar is Cynthia Estlund, whose 2021 book *Automation Anxiety: Why and How to Save Work* posits that the productivity capacity of newly developed autonomous

machines will inevitably result in a move away from human labour in favour of inhumanly productive machines. Rather than citing policies like UBI as a “magic bullet”, she argues instead that we need to develop a multifaceted strategy to redistribute work, income, and goods, both to maximise the virtue of automated technologies, and to redress inequalities in the world of work (Estlund 2021). Daniel Arnold et al agree, arguing that we do not need to be anxious regarding the productivity capacities of automation, as long as they are properly governed by policies protecting the affected human workers (Arnold et al 2018).

Andrew McAfee and Erik Brynjolfsson have published two books on this subject. The first, 2011's *Race Against the Machine: How the Digital Revolution is Accelerating Innovation, Driving Productivity, and Irreversibly Transforming Employment and the Economy*, argued that newly developed autonomous technologies are increasing productivity, but in order for them to be beneficial to society, their benefits must be redistributed. Rather than relying on antiquated models of economic distribution, these new technologies demand radical social shifts, otherwise their productivity capacities will detract from human life, rather than enriching it (McAfee and Brynjolfsson 2011). In their 2014 follow-up book, *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*, they make a similar claim, but further argue that these newly productive technologies are best deployed *alongside* human intellect, and that education systems need to be designed around the increasingly automated future, so that new generations are properly equipped for the new social

and economic structures (Brynjolfsson and McAfee 2014). Other scholars agree (Aubrey 2018) but I will discuss models of automation that advocate a human/machine hybrid approach at the end of the chapter.

The productivity capacities of automation are not wholly supported across the literature. A number of scholars claim that our intuitions regarding automation's productive potentials can be overstated. In Jason E. Smith's 2020 book *Smart Machines and Service Work*, he argues that automation has not had the radical and revolutionary effects in the service industry as might once have been hoped, particularly under the conditions of Covid-19. He cites industries including logistics and distribution which have seen a huge influx of human workers during the pandemic, despite some significant technological advancements in these areas (Smith 2020). For Smith, the limits of automation are distinct, and the productive potential of such machines will not overhaul *all* industries on its own. Thomas Tozer agrees, citing significant limits to what automated technologies are, and will be, able to do (Tozer 2020). This phenomenon has become known as the 'productivity paradox' because some industries have seen massive technological advancements but no significant increase in productivity (Soete 2018).

Despite the divided data on the productivity of automated machinery, and the hopes for harnessing whatever productive forces it may or may not release in the future, some scholars remain optimistic. For Leslie Perlow, the use of automated systems and artefacts is one way to

reduce human overwork in businesses, without reducing overall productivity (Perlow 1997). Similarly, Aaron Benanav cites automation as hugely productive but also hugely disruptive for contemporary social and economic systems. For Benanav, we have the potential to enact significant global social and economic change, and automation will play a key part in this change but it can't be pursued in isolation, and must be combined with social and economic policy change, beyond Universal Basic Income (Benanav 2020). Interestingly, despite Benanav's concerns regarding the upheaval caused by automation in the short-term, it is his view that the productive potential of automation could result in an economic system of post-scarcity. This is an important facet of the literature, so let's consider it in more detail.

#### 2.4.1. Post-Scarcity Economics

Post-scarcity economic models often rely on the productivity capacity of automation being reached to its fullest potential so that human workers are no longer needed to produce the required goods of a society, and can instead simply enjoy them. This is a reading that can be applied to Marx's philosophy; his dream of a communist society was one in which goods were distributed fairly according to need, rather than through capitalist economic models built on artificial scarcity. Consequently, when human beings are freed from wage slavery and artificial scarcity, we're free to enjoy the goods of the world, and to spend our time as we see fit (Giddens 1996).

Taking up the Marxist reading of a post-scarcity society, Aaron Bastani's 2019 book *Fully Automated Luxury Communism: A Manifesto* is perhaps the clearest expression of post-scarcity economics in recent years. Bastani argues that contemporary technologies not only have the capacity to free us from work, but also have an economic function to drive down the value of goods by allowing for vastly expanded production, but also inhuman modes of resource generation, in particular the automated mining of asteroids for precious minerals, which human beings cannot do. With additional technological developments towards renewable energy and sustainable food production, Bastani posits that automated technologies hold the key to a new age of human history, one in which we can *all* enjoy lives of luxury, free from scarcity and work (Bastani 2019). The notions of sustainability and sustainable growth are echoed in other works, including Philip Sadler's 2010 book *Sustainable Growth in a Post-Scarcity World: Consumption, Demand, and the Poverty Penalty*, in which he argues that a dream like Bastani's must begin with companies delivering their goods to markets at the bottom of the current economic system, so that the scarcity of goods is eliminated from bottom to top (Sadler 2010). The imminence of such ideals is argued to be close, with some scholars positing that a post-scarcity society could be achieved in the next 30-50 years (Aguilar-Millan et al 2010), and others arguing that environmental and ecological conditions on the planet might necessitate both an automated post-scarcity society as well as the end of capitalism (Frase 2016). Interestingly, not all post-scarcity economic models follow on from Marx,

with Murray Bookchin being a famous proponent of post-scarcity anarchism, in which the newfound plenty achieved through automated technologies can be translated into a complete dissolution of governance and social hierarchy (Bookchin 1971).

While such proposals are certainly attractive and the potential productivity of automated tools is certainly intriguing, to commit to such an economic model by holding automation as a key driving force is inherently limiting. The fears regarding technological unemployment and the promises of post-scarcity societies employ the same process or set of artefacts: the feasibility and efficacy of each proposal must lie elsewhere than in automation itself. By holding automation as a necessary facet of each contradicting future, it is clear that 'automation' is a contested term, and that a more ecumenical framework is required. If automation is going to eliminate human productivity in favour of automated production, there is no guarantee that the benefits of such a society will run downwards to the newly-replaced human workers: it is equally possible that the owners of the automated machines will simply keep the additional profits for themselves, and the rest of us are left to fend for ourselves. However, it is equally possible that we will achieve a post-scarcity utopia, and that capitalism will be erased in favour of a completely free and fair society. Neither are *inherent* or *necessary* realities that are found *within* automation itself. On my account, automation is simply the process of enclosing a task or sub-task from further human intervention: this can be utilised to achieve certain desired functions, but to commit to a picture of a

wholly automated future, for better or worse, is inherently limiting. The development of automated technologies has taken new life in recent years, and a different form to that of the Industrial Revolution, and it is undeniable that there is a potentiality for change within it, but to envisage anything further than specific limited changes is to misunderstand all the various contingent functions that automation fulfils, and the essential nature of what automation *is*.

### **2.5. Automation as a Tool for Redressing Social Issues**

The investigation of automation in relation to time saving and productivity is somewhat mechanical in nature, because it relates to the movements and motions of automated machines, and extrapolates from a given function to an imagined future based wholly upon it. Across the literature, automation is also posited as relating to a number of social issues.

One of the most pressing social issues to which automation is often linked is climate change and the future of environmentalism. While other contemporary technologies, such as cryptocurrency, have a fairly uniform negative impact on the environment (Egiyi and Ofoegbu 2020; Goodkind et al 2020), the role of automated technologies in climate change is less clear. On one hand, the development of large-scale machines and the sophisticated hardware and software needed to properly run them will have an environmental impact. If the machines can be powered by

renewable energy sources, maintained to function in perpetuity, and created from sustainable materials, then the environmental impact might be lessened. Moreover, the introduction of automated public transport systems might go some way to combating the problem of high emissions in urban areas (Riggs et al 2019). By utilising automated reasoning in certain situations, more environmentally sustainable decisions can be made, which might not be as easily achieved with purely human control (Inagaki 2003). However, others argue that automation's positive effects on climate change are much more limited, and that ultimately automated technologies function in ways that are much less akin to the hyperbolic rhetoric often presented by developers and the media. As such, positive impacts of automation must be found and designed, rather than expected (Wajcman 2017). In fact, Murtagh et al (2015) argue that automated systems can reduce the pro-environmental behaviour of people close to them, and warn that environmental action must always be stressed as a pursuit undertaken by machines *and* humans (Murtagh et al 2015). The need for environmental action now and in the future is evident, and automated technologies *can* be employed for such ends, but cannot be heralded as a panacea.

Another social issue that automation is often targeted against is that of capitalist exploitation and inequality. This has been touched on within the areas of the literature discussed previously, but is worth briefly reiterating here. One of the key thinkers in this area is Paul Mason, whose 2016 book *PostCapitalism: A Guide to Our Future* posits that the years

following the 2008 financial crisis offer an opportunity to move into a post-capitalist society, one that employs automation to eliminate capitalist exploitation and neoliberal distribution systems (Mason 2016). Other scholars also advocate for the transition into a post-capitalist society, often assisted by automated machinery, whether through design (Alexander 2020) or socio-political revolution (Miller 2015; Srnicek and Williams 2015; Dinerstein and Pitts 2018). An important facet of this critique of capitalism is the hope that automation will redress the types of boring, meaningless, and repetitive work that are currently mandatory for many in capitalist countries. David Graeber's 2018 book *Bullshit Jobs: A Theory* argues that many contemporary jobs do not actually produce anything or provide an important service, and that work has become an end in itself. The types of menial, repetitive, and meaningless tasks that make up much of contemporary paid employment, he argues, should be eliminated (perhaps by automated machinery), so that we can be left to spend our time in more meaningful and expressive activities (Graeber 2018). This is particularly pertinent to developments in recent years, because these meaningless forms of work often take up a huge amount of our lives (Suzman 2021), while also becoming distinctly less secure. Bernard Stiegler draws a similar distinction to Graeber, citing 'labour' as a meaningful intellectual pursuit, in opposition to the dehumanising banality of 'employment'. Stiegler calls for the full automation and removal of 'employment' from society (Stiegler 2016), but has been critiqued for holding an overly conservative view of work which does not adequately reflect the changing relationship between

work and family under neoliberal economic conditions (Turner 2021). Many contemporary jobs are menial and repetitive, but also highly precarious, particularly those found in the gig economy (Morgan and Pariece 2017; Mulcahy 2018; Larsson and Teigland 2020). While such jobs have become focal points for political organisation (Cant 2019), the gig economy is one in which automation is argued to solve a number of problems (Crouch 2019; Kessler 2019). However, the difficulty in separating the dynamic and complex relationship between paid employment, unpaid 'reproductive' labour, leisure activities, meaningful expression, and familial commitments renders any argument for the wholesale automation of entire industries far too limited in my view, as will be discussed further in Chapters 3 and 5.

Such positive readings of automation's relation to social issues are not unchallenged: a number of scholars take a much more negative view towards the effect that automation has and will have on society. The adoption of automation in a number of fields has generated much anxiety and resistance with regard to its effects on important social issues. Perhaps foremost amongst these social issues are racism and economic inequality, and there are a number of scholars who do not see automation as emancipatory in these areas, but rather propagating the same inequalities that we find today. Virginia Eubanks' 2019 book *Automating Inequality: How High-Tech Tools Profile, Police, and Punish the Poor* is perhaps the clearest example of this, with Eubanks arguing that the implementation of automated systems by governments and companies allows for the same

biases held by human owners to become automated. Eubanks argues that economic inequalities, and the unfair treatment of vulnerable people by those in power, will not be solved through automating the systems that deal with them, but will instead make the inequality greater (Eubanks 2019). Cathy O’Neil and Safiya Umoja Noble agree with Eubank’s analysis, both specifically citing algorithms as key culprits of this automation of inequality (O’Neil 2017; Noble 2018). Shoshana Zuboff extrapolates from these cases to argue that automated technologies, particularly those with supervisory and surveillance capacities, have ushered in a new form of capitalism, which she terms ‘surveillance capitalism’. In this newfound system, Zuboff argues that automated tracking technologies severely limit freedom and autonomy, reducing human beings to a resource fed into an increasingly automated capitalist machine (Zuboff 2019). Given the power of such a system over the development and implementation of automated technologies, it would seem unlikely that economic and social inequality would be redressed through automation at all (Popescu et al 2018; Collier 2019). Such arguments can be traced back to the 19<sup>th</sup> Century, when Henry George argued that the technologies espoused at the time for bringing about revolutionary productivity were themselves products of capitalism, rather than the antithesis thereof (George 1879), and repeated more recently with fears regarding capitalism’s hold on our potential automated futures (Piketty 2014; Standing 2017).

The social issues detailed on both sides of the debate, which will either be cured or continued by automation, are of the utmost importance,

and require direct and concentrated attention to be overcome. I would argue that automation has no intrinsic or essential relation to their removal or propagation in society: the way that automated technologies are deployed and developed will have a significant impact on their social effects, but automation itself is not entirely aimed towards one side or the other. Automation offers the opportunity to address and resolve a number of social issues currently plaguing society, but such automated artefacts need to be developed for specific cases: generic claims regarding the 'goodness' or 'badness' of automation inherently neglect the diversity of artefacts and processes that fall under its purview. Of course, all automated technologies inevitably have a social effect because they occur in a social setting, relating directly as they do to human intentionality. All instances of automation in practice will therefore have *some sort* of social implication, because they form a condition of human life as we know it (Feenberg 1993; Rosenberger and Verbeek 2015; Stiegler 2016). Accurate and inclusive predications regarding automation and the future of work cannot therefore be based on generic claims and narrow examples, and instead the precise implications of each instance must initially be considered in isolation. In order to resolve economic inequality, we can neither entirely trust in automation alone, nor entirely blame automation: we must develop and deploy automated technologies for each case as it arises.

## **2.6. Utopian and Transhumanist Accounts of Automation**

The various accounts of automation discussed previously all focus on different functions of automation. They share some general tendencies, including the type of process that is implied when the term 'automation' is used. To finish the chapter, let's consider the two binary and counterposed visions of automation that can be extrapolated from the literature: the utopian vision and the dystopian vision. Utopian visions of automation take many forms, with differing levels of intensity. Some scholars describe an improved or overhauled society, but cannot truly be said to be describing a 'utopia' *per se*. Equally, scholars who warn of the specific issues relating to given instances of automation are not necessarily being dystopian in their descriptions, because negativity or anxiety do not necessarily equate to dystopia. Utopian and dystopian visions of automation are therefore something more extreme than the positive or negative arguments given in much of the literature thus far discussed. Let's consider utopian automation, and transhumanism, in more detail.

Some of the literature already discussed thus far might be called utopian in a soft manner. Post-work theorists, who envisage futures in which work no longer holds economic significance in our lives (Weeks 2011; Srnicek and Williams 2015), or in which all boring work is done by machines (Stiegler 2016; Danaher 2017b; Graeber 2018), are in some way committing to a utopian vision of the future. This is utopian thinking because it is a perfect idealised situation, but one which seems particularly unreal: we can almost immediately ask, what is being defined as work? If it

*only* relates to paid employment, and economic and social structures (including UBI) are developed to ensure economic sustainability, then what of the unpaid work that disproportionately falls to women, which cannot be automated in the same way? (Langhamer 2000) When machines do all the factory work, there is still cooking, cleaning, and childcare to do: utopian futures of post-work take a narrow view of both automation *and* work, and neglect much that falls outside of those parameters (Turner 2021). Although some scholars have suggested that even the most biologically necessary work can and should be automated, or at least redistributed (Lewis 2019), the predominant notion of work that is being escaped in post-work theories is that of paid employment, which does not fully encapsulate the breadth of work that must be done. It could equally be argued that post-scarcity thinkers are somewhat utopian in their hopeful view of the future, with Aaron Bastani's *Fully Automated Luxury Communism* (2019) being a key example. The vision of a fully automated society in which everyone has more than enough of everything and can live lives of luxury is perhaps skewed towards one type of life: while mass production might be able to supply all of our needs, the role of caring in such a society is still left open, and perhaps it is even assumed that it will still be done by those who do it now (Bastani 2019). Marx's utopian vision of infinite free time to spend as we see fit, echoed by scholars like Darrell West, sometimes cite education as the means to achieve an automated utopia, one in which we no longer work and can instead fill our lives with learning and leisure (West 2018). I argue that by virtue of such ideals being

so utopian, they are disconnected from reality to some degree: the idea that we can fully escape work is an impossible one. The types of leisure activities described as utopian by these scholars often involve a whole host of repetitive, boring tasks: the learning of an instrument, the editing of a piece of writing, or the practising of a new skill are all arduous and, sometimes, boring. If the principle of automation is to simply remove arduous or repetitive tasks, then we might not be left with the very activities with which utopian scholars hope to fill our lives (Carr 2016).

Perhaps the most obviously utopian future imagined through automation is that of transhumanism. Transhumanism is the philosophical definition of humanity as something that can be extended, improved, and affected by technology (More 2013). The vision of the discipline is inherently utopian, because it is founded on the belief that humanity is incomplete or not wholly realised, and that the inclusion of technological artefacts and systems within our biological beings can further and improve the human condition and our relationship to our environment (Bostrom 2005; Tegmark 2018). While the movement can be traced back hundreds of years, it grew in the early 1900s, with the term 'transhumanism' becoming popularised in an essay of the same name by Julian Huxley in 1957 (Huxley 1957). With modern technological advances, human conditions including aging, disease, cognitive limitations, and so on are targeted as things that can be overcome, to fully realise human potential through increasingly technological means (Pearce 1995; Grey and Rae 2007). This potentiality includes governing human progress by rational and scientific standards

rather than political ones (More and Vita-More 2013); the end of gender binaries (Dvorsky and Hughes 2008); and the abolition of antiquated political systems (Gayozzo 2018). The transhumanist project can be extended to posthumanism, in which the human condition itself is overcome (Bostrom 2003) and human beings reach a singularity with machines (Kurzweil 2005; Danaher 2019). This is not solely a scholarly discipline: the World Transhumanist Association was established in 1998 to help develop policies that reflect the transhumanist agenda; it was later rebranded as 'Humanity+' in 2008, with a move towards social issues and general longevity (Humanity+ 2021). The types of utopian futures imagined by transhumanists are often heavily automated, including not only the usual automation of work and production, but also the technological automation of biological and social processes.

Transhumanism is not without its detractors, who disagree with the technologically mediated utopia envisioned by its advocates (Fukuyama 2003; Livingstone 2015). However, there is a more pressing and fundamental issue with transhumanism: the undeniable connection between the transhumanist project and eugenics (Bashford 2010). On the surface, the desires to eliminate disease and ageing and to advance human evolution to its next technologically-mediated step seem noble. On reflection the grounding of such a future relies upon the elimination of undesirable genetic traits and biological processes. This is of immediate moral concern: precisely who decides what is undesirable and in need of automating out of the human condition? (Koch 2010) It can be generally

agreed that curing cancer and malaria are noble pursuits, but we are immediately confronted with highly dubious extensions: what about autism? What about blindness or deafness? What about genetic markers that will only affect a person's children rather than themselves? How will these treatments be distributed? If a family or community can't afford the technologies in question, are they left without treatment or do they rely on the generosity of other transhuman patrons? There has been much writing by advocates of transhumanism to distinguish the transhumanist project from eugenics (Sorgner 2009), and particularly that of the eugenics 'research' undertaken in Nazi Germany (Paul 2014). Steve Fuller and Veronika Lipinska offer a telling argument in this regard, which is worth quoting at length:

...there is nothing special about Homo Sapiens understood in strict biological terms that might permit it to control its own destiny any more successfully than the other organisms with which we cohabit the planet. Love it or loathe it, eugenics stepped into the breach to address this problem, precisely in a manner that was designed to be favourable to humans... Unfortunately, our ability to consider these matters dispassionately has fallen foul of Nazi Germany... In the case of eugenics, we are faced with what may turn out to have been the right means but used to the wrong end. The practice of eugenics is not itself a moral problem (Fuller and Lipinska 2014, p.63–64).

Of course, the practice of eugenics, and by extension transhumanism, *is* a moral problem. The questions regarding which genetic traits to eliminate and which biological processes to automate are *inherently* and *unavoidably* moral ones. If a set of technological artefacts and systems can be used by a totalitarian and xenophobic state like Nazi Germany in such a way that the technology *is still functioning in its intended way* (to eliminate certain

genetic traits), then we cannot wholly argue that using those technologies in such a way is itself purely mechanical, and that the bad faith agents of the Nazis were simply doing it in a bad way. The belief that human beings are in need of genetic alteration is an inherently moral one, with the extreme example of Nazism not being an outlier case, but rather the same approach being taken to its natural limits. There is therefore no guarantee that a rogue transhumanist company would not act in a similarly abhorrent manner. The technologies in question can be seen to simply fulfil a function, but when, in practice, that function intends towards a specific normative end (the genetic alteration of human beings), then investigating the process in a purely mechanical manner is redundant, as it misses the very importance of the case. The precise value judgements regarding *which* genes to eliminate or alter might change, but the process of employing these technologies *will necessarily involve a value and moral judgement*.

Of course, I am not saying that all transhumanists are Nazis: I am arguing that the transhumanist project, as with any other utopian account of automation regardless of its strength or specific aim, is inherently based on a specific limited set of cases, and a reified common sense understanding of technology, work, and humanhood. Such an account is therefore inherently too limited to offer a picture of automation *as a whole*: as soon as it encounters an example of automation that does not fit in with its utopian agenda, it will have to ignore it or alter its aims. The post-work ideal of a fully automated leisure society neglects the necessary biological reproductive labour needed to keep it afloat, or it must follow

that the endless leisure is only available for some, or part of the time. The post-scarcity ideal of a utopia of enough for all neglects the cases of capitalist automation in which increased production results in enhanced economic disparity, or it must include some notion of political revolution separate from automation itself. The transhumanist ideal of a future of post-humans with no disease or ageing, presumes that all of the developers of the required technologies act in good faith, or accept that their envisioned future is as susceptible to dystopian repeats of historical forms of transhumanism. Such approaches to technology simply have too much additional baggage, and are too generic in nature, to adequately define what automation and work actually *are*. Such approaches are precisely the types of understanding that render a phenomenological reduction of automation so necessary.

#### 2.6.1. Dystopian Accounts of Automation

Utopian visions of automation are not the only set of contingent predications regarding the future. Where there is utopian optimism, so too is there dystopian pessimism. Dystopian views of automation are as historically grounded as utopian accounts, and held particular prominence in early 20<sup>th</sup> Century Europe (Swier 2014). At the time, automation as we understand it today was developing in sophistication and prominence in factories across Europe, and the Second World War revealed the simultaneously shocking developments of nuclear weaponry and the technologically-mediated totalitarian genocide under Nazism (Dietz 2000). This period of time saw the emergence of the philosophy of technology in

the Western tradition, and the same group of thinkers who were instrumental in its establishment were also particularly distrustful of technology. These “classical” philosophers of technology included “Jacques Ellul, Hannah Arendt, Lewis Mumford, Herbert Marcuse... and, above all, Heidegger” (Smith 2018, p.28). Many of these thinkers warned of the dystopian future threatened by automation: for Ellul, efficiency-driven technologies were threatening a collapse of human meaning (Ellul 1954); Marcuse warned of the lack of freedom in an automated industrial society (Marcuse 1964); while Mumford noted the shift occurring from technology existing as means for virtuous ends towards the technological desire to “maximize energy, speed, or automation... [becoming] ends in themselves” (Mumford 1964, p.5). Heidegger’s essential view of technology as demanding energy and utility from nature (Heidegger 1954) displays an anxiety that the large-scale industrial technologies of his time would overshadow and transform the natural world for the worse (Gertz 2018; Ihde 2021; Rosenberger 2021). Arendt specifically targeted automation and its relation to labour, as she defined it, in the modern world, arguing that “the actual implications of technology have come to light only in its last stage, with the advent of automation” (Arendt 1958, p.147). She feared that a fully automated society would create a “society of labourers without labour, that is without the only activity left to them. Surely, nothing could be worse” (ibid. p.5). She further warned that a drive to accept full automation across society would lead to a fundamental ontological loss,

arguing that “all our pride in what we can do will disappear into some kind of mutation of the human race” (Arendt 1963, p.273).

These significant dystopian fears regarding a significant loss of human meaning at the hands of automation are echoed more recently, particularly by Paul Mason in his 2020 book *Clear Bright Future: A Radical Defence of the Human Being*. In it, he describes a dystopian vision of an automated future in which human beings are reduced to puppets or cogs in an inhuman machine, and urges his readers to reclaim and defend their humanhood through language, interaction, and innovation (Mason 2020). The necessity and importance of work is also espoused by Georges Friedmann, who defends work as an organic part of human life, one that should not be wholly automated, for fear of losing something distinctly and naturally human (Friedmann 1992). Specific resistance to the automation of work is also found in Carl Benedikt Frey’s 2019 book *The Technology Trap: Capital, Labour, and Power in the Age of Automation*, in which he recounts the history of technological innovation and highlights the importance of managing the years that immediately follow technological revolutions, to ensure that benefits are distributed across society and that unfair dystopian futures do not become a reality (Frey 2019). Similarly, Gavin Mueller advocates a return to the Luddite mentality of resisting technological innovation, by calling for a continued ‘neo-Luddite’ resistance to contemporary automated systems of control (Mueller 2021). Nicholas Carr and James Bridle paint equally dystopian pictures of the present, in which automated machines ease our lives but detract from our natural

capacities, leaving us disengaged and unhappy (Carr 2014), lost in a sea of information that we can no longer understand or control (Bridle 2019).

Such dystopian accounts of automation can also be compared to the literature already discussed on technological unemployment (Ford 2015; Blanchflower 2019) and automation's role in perpetuating current inequalities (Eubanks 2019; Zuboff 2019). As with the utopian accounts described in the previous section, these dystopian pictures of technology are convincing and alluring in some ways, and reflect some of the particularly negative realities of contemporary technological life. For the same reasons I am avoiding the utopian accounts of automation, so too do I reject these dystopian pictures of automation as being overly reified. In practice, it is of course inevitable that there will be some particularly negative cases of automation, but such cases are precisely that: *individual cases* of automation, rather than examples representative of automation *as a whole*. Despite being in opposition, the utopian and dystopian accounts might both be correct in relation to specific limited cases, but neither can be completely right about automation in its entirety beyond the realm of science fiction. Some technological advancements may redress social issues in certain areas of the world, but other advancements may propagate inequality in other areas. Work might be eliminated in some industries or nations, and met with retraining or endless leisure, while other industries or countries might see unwanted and unsupported unemployment. Automation has no inherent or essential links to either outcome, but could result in either or both. However, to jump to such

conclusions without first properly exploring and defining precisely *what automation is* will inevitably lead to narrow and limited understandings that neglect large portions of the issue. By fully exploring what automation is in its own right, it will become clear how it can be deployed in a multifaceted, specific, and contextually-sensitive manner, *without* becoming committed to a picture of automation as wholly good or wholly bad. Chapters 4 and 6 will seek to demonstrate such understandings of automation in practice by analysing three case studies, once the definitions of *labour* and *work* have also been detailed. Before moving on to discuss *labour*, it is important to first consider one final aspect of the literature: hybrid models of automation.

## **2.7. Hybrid Models of Automation**

There is also a school of thought in the literature today that posits the importance of automation which still includes human agents (Diebold 1959). This might seem at odds with my definition of enclosing tasks from further human intervention and therefore I should reject it out of hand: such instances of automation can be classified under the *augment/extend* form of automation discussed in the previous chapter. In such cases, the automated machines enclose specific tasks or sub-tasks from further human intervention, rather than the entire process. Parts of the whole can be said to be automated, but room is left for human agents still to participate in some regard. One such example is Ajay Agrawal et al's 2018

book *Prediction Machines: The Simple Economics of Artificial Intelligence*, which argues that a lot of business is made up of predictions that can be greatly augmented by use of Artificial Intelligence (AI). By using AI to help guide predictions, business decisions can be much more accurate and businesses more productive, but human agents can still play other vital roles (Agrawal et al 2018). Frank et al echo these sentiments, arguing that automated systems can greatly enhance some aspects of work when applied properly, but can do so to augment human jobs, rather than fully replacing them (Frank et al 2017). This can be achieved by ensuring that policy decisions surrounding the implementation of automated technologies and systems reflect the continued desire for human workers, as well as the limits of the technologies themselves (Arnold et al 2018; Tozer 2020). Such hybrid models conceive automated technologies as things that can be developed inclusively with changes to human work practices, neither replacing or displacing human workers, nor changing their humanhood, but extending and augmenting the capabilities of human workers (Daugherty and Wilson 2018; Kremer and Went 2018). These models of automation seek to retain the welfare of human workers, while also maximising the benefits of automated technologies (Parasuraman 1997; Parasuraman 2000; Visser et al 2018).

It is true that these models of automation are still narrowly intended to some degree: there is perhaps an expectation or presumption regarding the future productivity and importance of automated systems, and a valuation of their inevitability and the need to protect the human

worker. Equally, these approaches are significantly less committed to a specific framework than the other approaches discussed in the chapter, and certainly less committed than the utopian and dystopian accounts of automation. Rather, they allow for significantly more eventualities within a contextual horizon which facilitates both human and machine actions. By automating sub-tasks, or reconfiguring acts of work to automate certain aspects but allow for human input in others, the 'full' automation of other models is not aspired to, and the types of futures imagined elsewhere in the literature do not necessarily come to pass. In relation to my definition, the enclosure of specific tasks and sub-tasks would not result in the complete replacement or displacement of human agents, but would instead serve to augment and extend pre-existing activities.

However, nor am I wholly aligning myself with this school of thinking. While hybrid models of automation are significantly more open, there are still a number of commitments that must be made: humans and machines *can and should work together* in a significant manner, and tasks should not be wholly automated away from human intervention. I have criticised models of automation that commit to all acts of work being automated or not and the same criticism applies here: by using my definition of automation, it might become clear in practical case studies that some tasks should be wholly automated, either to replace human workers or to displace the space of activity so that human intervention is no longer possible. Simultaneously, it might also become clear that other tasks should not be wholly automated, that hybrid models might be

preferred, or that no automation *at all* is desirable. These conclusions will emerge on a case-by-case basis, informed by the definition of automation I offered in the previous chapter and with sensitivity to the specific contextual horizon in which the task appears. When investigating cases of automation in practice, committing to any type of conceptual limitation without first properly applying an essential definition of automation will ultimately lead to a narrow and incomplete conception.

By investigating the literature as I have in this chapter, I have made the strength of my definition clear: rather than focusing on a limited set of examples and becoming committed to a reified notion of automation (and resultant technocratic prediction of the future), applying my novel evaluative framework to each individual case will allow it to be fully explored in isolation, without pre-judging what the implications of the case are based on a narrow common sense view. Having understood each case individually, comparisons and connections between cases can be drawn in a meaningful way, while still allowing for contradictory or unrelated cases to be considered. The future of work might well be automated, but presupposing what that future will look like will inevitably colour our current examples of automation in ways that might not be true to their reality. We must remain open to *all* cases of automation however they appear, and ready ourselves for the future without presupposing what it will be like. Instead, we can develop automation *now*, in line with the specific desired outcomes of each contextualised case, and create an automated future from a patchwork of varying cases. I believe there is

space in the literature for my novel evaluative framework to be used as a precursor to any analysis that has already taken place: we can reflect on the conclusions and findings of each part of the literature, and ask how the case and its outcome reflect my definition of automation.

Such a definition of automation does not exist in isolation.

Automation is always related *to* something, or exists as the automation *of* something. As already stated, and suggested in my choice of literature, my focus will be on the automation of work, as distinguished into two separate modes of activity: *labour* and *work*. Let's now turn to defining *labour*, before applying my definition of automation to some case studies of *labour* in practice.

## **Section 2 - What is Labour?**

### **3. Labour**

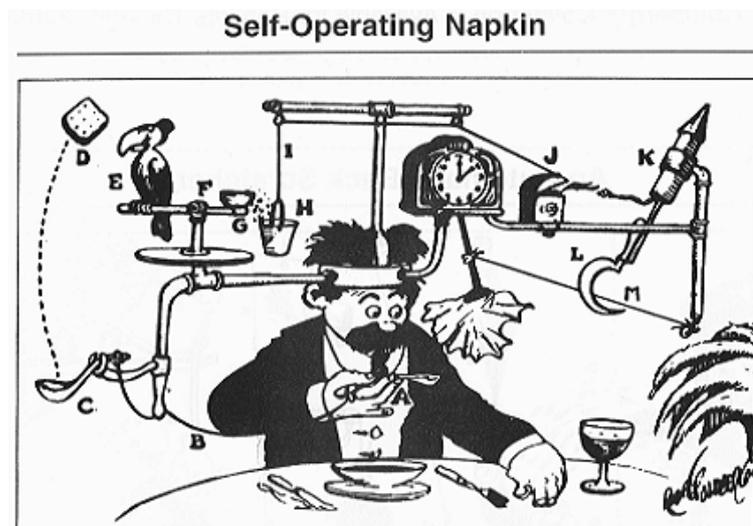
*John Henry said to his captain/You know a man ain't nothin' but a man/I'm bettin'  
right now you won't beat me down/I'm gonna die with my hammer in my hand  
(Laurie 2010).*

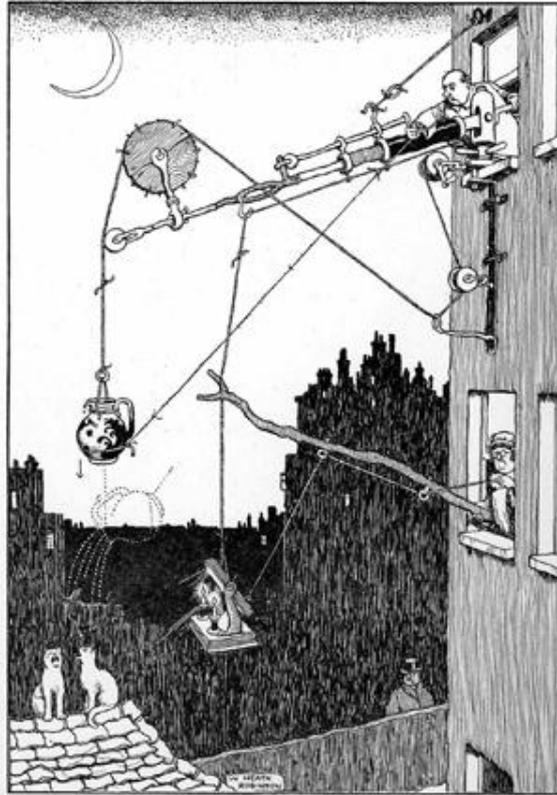
#### **3.1. From Automation to Labour**

In the previous two chapters I offered an account of automation as the process of enclosing a task from further human mediation, interaction, or intervention. The functions for which automation can be employed have been stripped back in the first instance, and a central essential quality has been offered which will be found in *all* instances of automation, regardless of its contingent usage. No single example of automation can ever therefore fully encapsulate the process as a whole. Such a definition is, by design, detached from real-world cases, and therefore might seem at odds with the realities of contemporary technological artefacts, particularly in relation to examples of automation and the future of work, given that this is the focus of the thesis. In practice, automation is rarely deployed for its own sake, or simply to demonstrate the capacity of contemporary technology and thereby complicate a simple task by including unnecessary machinery. The automation of today cannot be likened to the overt and novel complexity of a Rube Goldberg or Heath Robinson machine, which performs a task in an outlandish, impressive, and amusing manner, but without concern for efficiency, feasibility, or utility. In practice, the automation of something is to enclose it from further mediation *for a specific human end*. While automation has almost infinite uses, the

overarching aim of this thesis is to offer a response to the question of automation and the future of work, and I have a particular interest in the ways in which work is enclosed from further human intervention via automated machines. I don't believe that simply applying my definition of automation to real-world cases of automated work is adequate to contend with such a huge question regarding our future. Instead, we first must define what we mean by work, in a similar manner to the way that automation has been precisely defined.

To that end, I will offer distinct binary definitions of what we commonly call 'work', separating the singular intuitive phrase into distinct modes of activity: *labour* and *work*. This chapter will present a definition of *labour*, and the following chapter will then combine it with the definition of automation previously developed, in relation to specific case studies.





**Figures 11 and 12 (Top-Bottom).** Cartoonist Rube Goldberg's *Professor Butts and the Self-Operating Napkin* (1931) and illustrator Heath Robinson's *Multi-Movement Tabby Silencer* (1935). (Goldberg 1931; Robinson 1935)

### **3.2. Why Not Just Work?**

When discussing the term 'work', there are a number of intuitive qualities often attached to the word that might immediately strike the reader: work is a necessity in contemporary society; something that marks the shift from childhood to adulthood; something that we get paid for; something undertaken in order to provide sufficient economic value to an agent and their family; something that *can* be fun and can result in the creation of community; something that can also be strenuous, boring, and repetitive; something that takes up roughly a third of our lives, and is

diametrically opposed to other pursuits, such as leisure. Across the literature on automation, as discussed in the previous chapter, this intuitive understanding of work is prevalent: work is boring, and opposed to meaningful human pursuits (Stiegler 2016; Graeber 2018); unnecessary in the face of advancing technologies; something to be wholly automated (Autor 2015; Bastani 2019); and a form of activity that is quickly becoming archaic in the face of increasingly capable and sophisticated technologies (Susskind and Susskind 2017; Danaher 2019). Conversely, there is a similarly intuitive understanding of work deployed across the literature as a form of activity central to the human condition (Friedmann 1992); something necessary to structure economic distribution and social organisation (Ford 2015); something that should not be automated at any cost (Mueller 2021). For some scholars, 'work' can be eliminated altogether, and advocates of 'post-work' present aspirations of social structures that reject paid employment as the means of social organisation and economic distribution (Danaher 2019; Benanav 2020). Beyond these intuitive notions of work as primarily relating to paid employment, precisely what is meant by 'work' on these accounts? There is a general tendency to ignore forms of 'work' that fall beyond paid employment, and one of the key critiques of 'post-work' philosophies is that the limits of automation are often very poorly defined. It is clear how factory jobs and the role of GPs might be automated, but much less clear as to whether childcare, familial responsibilities, or complicated housework could, will, and should also be fully automated. The end of paid employment might be

a noble enough goal, but the resultant imagined futures still leave an awful lot of work, often defined as 'reproductive labour' still to be performed by human hands. Even the necessary labours that go into producing the very automated machines that are bringing about this supposed technological revolution themselves require huge amounts of human effort (Smith et al 2006; Altenried 2022), notwithstanding the types of biologically fundamental labours that are not currently targeted by technology companies, such as gathering water or chopping wood (Beneria 1999). Such activities should undoubtedly be considered in the same category of activity as paid employment: they require skill and effort, are necessary for economic and social production, and require time and attention of the engaged agents. But despite this similarity, they are often ignored in discussions of automation and the future of work across the literature (Luxton 1997). Many scholars have argued that viewing work purely in terms of paid employment neglects a significant portion of the necessary activities undertaken to maintain a productive society (Folbre 1982; 1994; Weeks 2011; Ferguson 2019). The definition of work that is being compared to any notion of automation *must* therefore account for these forms of work that exist beyond paid employment, otherwise the imagined 'post-work' society will inevitably exacerbate contemporary gender, social, and economic inequalities, rather than redress them, and would create a utopia for a lucky few that rely on the continued work of many more.

These forms of 'reproductive labour' (Bieler and Morton 2021) are not the only forms of work missed by the intuitive definition of work as

paid employment. Work undertaken for free, including charity work or because the worker garners some non-economic value from it, seeing it as meaningful rather than necessary, are missed in the narrow definition of work often applied to futuristic notions of automation (Veltman 2016). Moreover, contemporary working conditions are far removed from the traditional spatial, temporal, and economic standards of previous years, with many people's experience of work no longer fitting into the 20<sup>th</sup> Century standard of a Monday-Friday/9am-5pm format that includes a standardised wage (Prassl 2018; Cant 2019). The boundary between work and leisure is particularly blurred in 'reproductive labour', because it often occurs in a person's 'free time' and in their home, with the labour disproportionately falling to women who may also combine it with fun pursuits, such as listening to the radio or talking with friends (Oakley 1976; Langhamer 2000; Dyer 2021). Contemporary technologies also stretch intuitive notions of work to their breaking point, with devices such as smart phones and laptops being used for both work and leisure pursuits simultaneously, resulting in a radically extended working day that may not have a defined end (Crary 2014), particularly for those working from home (Kost 2020; Martin 2021). Covid-19 and its resultant national and international lockdowns have problematised work acutely in recent years: working from home became a norm for many, and the route back to the traditional conditions of working seemed either impossible or unwanted (Soojung-Kim Pang 2020a; 2020b; Jones and Winder 2021; Korinek and Stiglitz 2021). It is clear that the notion of work used in discussions of

automation and the future of work must be significantly enlarged to encompass the forms of 'work' that fall beyond the framework of paid employment, and to respond to the challenges posed to traditional understandings by contemporary technological and social developments.

### **3.3. Modes of Activity, rather than Categories of Action**

How then do I propose to investigate work in such a way? To begin with, what is required is to perform a similar phenomenological reduction of what we intuitively call 'work', as was performed with automation in the first chapter. However, unlike with automation, I argue that stripping back the contingent functions, specific examples, and common sense assumptions of work reveals not one single notion, but a network of modes of activity that require distinction and definition. Engaging with work in this way will overcome the conflicting accounts of work today, where some scholars argue for its protection and others its destruction, and will better account for the myriad forms of work that currently exist. I will offer binary definitions of *labour* and *work*<sup>16</sup> which escape the narrow view of paid employment and move away from intuitive conceptions of work which extrapolate from specific examples or industries to the entire world of work. These distinct notions are of *labour* and *work*, but refer to technical

---

<sup>16</sup> The use of these two terms might remind the reader of Hannah Arendt's writing. I will clarify and discuss my debt to Arendt later in the chapter.

definitions as modes of activity, rather than specific sets or catalogues of activities in their own right.

A mode of activity refers to the way in which an activity or action is undertaken. It does not only refer to the movements and motions of a task, but also the conditions in which it is undertaken, the motivations driving it, the desired outcome of it, and the conditions that shape its progression. As noted in the introductory chapter, I refer to such a network of motivations, conditions, and desires as a 'contextual horizon'. All acts occur within a contextual horizon, even in their most natural and unmediated formulation, and therefore a mode of activity is the way in which a task is undertaken in practice, denoting a specific purpose guided by specific conditions. At this stage of the chapter, the mode of *labour* can be understood as relating to biological survival and welfare, so that undertaking an act in this mode, motivated by this desire, and conditioned by any resultant requirements will significantly shape the task as it proceeds. This might seem a novel way of approaching *labour* and *work*, but the intention is to allow a more flexible and inclusive account of the two terms to flourish. By approaching them in this way, we do not become beholden to a catalogue of distinct activities or qualities of paid employment, and can instead acknowledge when the same actions are taken in different modes, or when actions operate between or across modes. Some examples, including eating, building, or speaking, might at first seem to belong wholly to one mode or contextual horizon but alternate cases will almost always emerge, or can at the very least be

imagined. Focusing wholly on an activity and categorising *any and all* formulations of that activity as identical in some way neglects the diversity of human action that is needed when considering automation and the future of work.

Let's consider the example of digging. Undeniably, anyone who digs a hole with a spade, regardless of their intention, is undergoing the same movements and motions in their task. However, a person digging a hole because they're being paid to do so by an employer who wants to lay a pipeline is undertaking the task under very different conditions from someone who is digging a hole as part of a piece of art, despite the movements being the same. Someone who digs a hole in their garden to plant a flower might be only concerned with the pleasure gained from both the act and the outcome, or they might be expressing a political view regarding environmental sustainability through the act. If the garden is in a prison, then the act takes on additional important contextual implications. A person digging a hole in which they will be buried, subject to threat, coercion, or force, is acting for radically different reasons to the artist or the gardener, despite the act of digging the hole remaining largely unchanged across all examples. The meaning, significance, and importance of an act therefore cannot simply be reduced to the movements and motions of the act itself: the larger contextual horizon in which it appears must be considered. An agent who engages in paid employment cannot be said to belong wholly to one given mode simply by virtue of their being paid, and we cannot make generalisations regarding the need to fully

automate such actions without neglecting important counterexamples. One key aim of defining *labour* as a mode of activity is precisely to avoid framing the issue wholly around the question of economic remuneration, because it is a somewhat arbitrary and highly inaccurate mode of classifying 'work' that inevitably neglects important outliers. Rather than committing to a picture of 'work' in which activities that are paid are 'work' and those that aren't fall under a different category of action, such as 'reproductive labour', we can begin to understand activities that fall into the intuitive and important notion of 'work' and those that don't *directly in relation to one another*, creating a more holistic picture of human experience.

This is particularly important with regard to automation. Often automation is posited as bringing about the 'end of work' (Srnicek and Williams 2015; Danaher 2019) but if this only relates to paid employment, we neglect a host of other activities that will either be left out, or would also benefit from the application of automation. Even if the intuitive understanding of 'work' is still held to be adequate, and analysis expands it to include repetitive, menial, or boring tasks that are both paid and unpaid, the standard by which automation is applied would be completely arbitrary. As a result, the initial goals of removing both meaningless and detrimental paid employment *and* 'reproductive labour' might be achieved, but there will be inadvertent and unintended consequences with other activities. The very artistic, creative, and political activities that 'post-work' scholars hold as desirable once 'work' has been overcome might well

be automated away by the application of their own standards for automation in the first instance. If all digging is automated as boring, menial, and repetitive, applied across society as one activity that is holding us back from living fulfilling lives, then we might also foreclose the possibility of gardening, artistic expression, environmental protest, and any other number of activities that might be desired by ‘post-work’ scholars. We need to be equipped to better target automation in areas where it is most needed and most effective, but to do so by focusing on tasks in their own right is too limiting. Many ‘post-work’ and pro-automation scholars agree that automation should target dangerous, demeaning, and unnecessary acts *wherever* they appear (Susskind and Susskind 2017; Daugherty and Wilson 2018; Danaher 2019), just as pro-work and anti-automation scholars would agree that meaningful and fulfilling tasks should be left in human hands (Carr 2014; Ford 2015; Mueller 2021). In order to achieve these binary desires a better and more nuanced framework is required to approach work in all its dynamic and varied actualities and potentialities. This is precisely what I offer here: by redefining *labour* and *work* as distinct modes of activity, I will demonstrate in the subsequent chapters how effective analysis of real-world cases can be developed when combined with the definition of automation offered previously.

### 3.3.1. A Note on Leisure

Dividing the singular intuitive term ‘work’ into two distinct modes of activities might seem novel, but also narrow in its own right. It is

important to note that my focus on these two modes of activities does not preclude the existence of other such modes: in particular, one key omission from this thesis is leisure, which undoubtedly factors into the world of work. The enjoyment of a task does not necessarily dictate engagement in either mode. An agent can fulfil their biological needs in a way that is enjoyable, relaxing, or fun, or in a way that is stressful, onerous, or boring, just as meaningful articulation can be both pleasant and uncomfortable. A primary motivation towards enjoyment, if this is a sufficient definition of leisure, does not entirely fit into either mode that I am describing, but by the same token, it might be argued that leisure is the 'other' part of the day that I'm omitting. If Robert Owen's famous ideal of eight hours' work, eight hours' recreation, eight hours' rest (Owen 1813) is to be aspired to, then the two modes discussed here are clearly missing a vital third part, and I leave room for leisure to be considered as an additional mode of activity.

However, there are also ways of breaking down leisure into the two modes offered here. Leisure is often undertaken in order to rest and recuperate, so that the agent is ready to face the next work day (Korpela and Kinnunen 2010; Duerden et al 2018) but according to my definition of *labour*, this might be understood as a biologically necessary act, one undertaken in order to maintain the agent's welfare. As such, rather than operating in a distinct mode, leisure acts *can* fall into the mode of *labour*. This is particularly important because many acts of leisure themselves involve a huge amount of additional effort, and are not necessarily

'relaxing' in a traditional sense (Rojek 2009): in my openness to 'reproductive labour', it is also important to be open to the labour that goes into acts of leisure, and as such we might further collapse the distinction between labour and leisure. Moreover, where leisure fulfils a more meaningful role in the agent's life, beyond simply recharging them for their job, the qualities of the act might align with the mode of *work*, rather than requiring a distinct mode of its own. Where Johan Huizinga claims that play is a key factor in the production of culture and society (Huizinga 1938), it might be argued that we are discussing a novel form of *work* if the involved agents are primarily intended towards some sort of meaningful interaction and expression. In either case, leisure *can* be explained by the two definitions of *labour* and *work*, but space is left open for additional modes of activity to be defined. To introduce three novel definitions of automation, *labour*, and *work* requires a sufficient level of attention and detail that including a fourth notion would render the investigation unwieldy. Further research is required to establish such an extension of my model, but there is simply not enough space to satisfactorily do so here.<sup>17</sup>

---

<sup>17</sup> Discussions of the philosophical importance of leisure are found elsewhere in the literature, surrounding leisure and play as a human need and a condition for a good life (Ramsay 2005; Pieper 2009; Ryall et al 2013; Sicart 2014; Bouwer and van Leeuwen 2017; Zuzanek 2020).

### **3.4. Defining Labour**

How then might *labour*<sup>18</sup> be defined as a heuristic ideal type? I argue that *labour* has three key elements: (1) biological necessity, (2) cyclical temporality, and (3) a universal presence in the human condition. Let's consider each in turn.

#### **3.4.1. Biological Necessity**

*Labour* relates to our biological metabolism, and the necessary biological conditions of living on Earth. As biologically conditioned creatures, we have a number of fundamental biological necessities that are universal to all human beings: the need to eat, to drink, to sleep, etc. *Labour* is the mode of activity that relates to the fulfilling of such necessities, and is chiefly characterised by the intention to survive, maintain, or enhance an agent's biological welfare. By virtue of having a biological metabolism, so too do we have the capacity to fulfil, maintain, and protect our metabolism through acts of *labour*. Having a biological necessity is not itself *labour*: the sub-personal processes that govern digesting food, extracting nutrients, and maintaining the internal functions of the body are not acts of *labour* in their own right, because they are not acts *per se*. Such a biological condition *creates a demand for labour* in the agent who is conditioned in such a way. These biological motivations (hunger, shelter, tiredness etc) force engagement with the relevant necessary tasks, so that when a human agent engages in an activity *directly*

---

<sup>18</sup> As previously stated, I distinguish my use of the term 'labour' from intuitive or commonplace uses by italicising it.

*and primarily* for one of these biological motivations, they are doing so in the mode of *labour*. Our biological conditions provide us with the means of engaging in *labour* for biologically necessary purposes, both the sub-personal processes that keep the body operating, and the various capacities demanded by our biological metabolisms through acts of *labour*. Having a body, the capacity to communicate, or the categorisation of humanhood all facilitate an engagement with *labour*, either directly or through others, and allow us to maintain our biological metabolism and that of others.<sup>19</sup> Importantly, because human beings are not inherently solitary creatures, and the biological metabolism is universal to all humans, *labour* does not only relate to individual actions targeted at the self. Biological necessity extends to those surrounding every agent, so acting in the mode of *labour* will also extend to caring for, and acting in relation to, the biological metabolism of those around us. Perhaps the clearest example of the extension of biological necessity is between a parent/guardian and child: the child requires the direct engagement of other, more capable, agents in order to maintain its biological metabolism, and the parent or guardian can care for the child's survival without

---

<sup>19</sup> A transhumanist response might be that such biological necessity can be escaped while still maintaining the presence of a human body in some form: by eliminating hunger or tiredness from human biology through implanted technologies, but keeping the human 'shape' of a body, we might be no longer beholden to biological metabolism and *labour*. I question whether such an example is truly human, given that the transhuman (and by extension, posthuman) project is precisely designed to escape human limitations. If we exist wholly digitally, or if technological artefacts fulfil most of our processes, then questions of *labour* become moot, because we are no longer discussing human agents in the way that I am now. Questions of whether the transhuman or the posthuman would still need to engage in, or would even have the capacity to engage in, *labour* are interesting, but won't be addressed here.

necessarily thinking of their own welfare. This capacity for care, compassion, and altruism is not only extended to those biologically related to us: it can be extended to *any* creature beholden to biological necessity. By extension, biological concern can be extended to *biological metabolism as a whole*, with environmental and ecological concerns not only relating to the continued welfare of the actor themselves, but to all other biologically conditioned beings on Earth.

Biological necessities can be maintained in a straightforward manner: I can pick fruit from a bush and eat it to stave off hunger. Particularly under contemporary conditions, fulfilment can be more complicated: a biological need to eat might motivate one agent to grow their own food in a garden, but another to obtain paid employment to earn a sufficient wage to feed, house, and warm themselves and their family. This is especially important in refuting a potential reading of this definition as romanticising a pre-modern lifestyle, or of drawing a normative distinction between the 'natural' human being and the 'modern' or 'social' human being. Biological metabolism, as I'm describing it, encompasses the necessary conditions for surviving and maintaining an agent's biological *welfare as it appears in their given contextual horizon*. As a result, biological necessity will assume different forms in different societies and cultures, at different periods in time, for different people, and through different technological mediators. If it is necessary for one agent to exchange money for biologically necessary goods, but necessary for another agent to cultivate their own goods, both occur in the mode of

*labour* if each agent is primarily concerned with their biological welfare.

The food that each agent is eating, the cultural practice surrounding eating, and the technologies they use might be significantly different, but the mode of activity is the same. Biological metabolism is homogenous in its presence across all human beings, but not in the practical means in which it is fulfilled and maintained.

Under contemporary conditions, the need to survive might seem very distant: especially in the Western world, we have ready access to food, clean water, and advanced medicine. We still need to maintain our biological welfare, even if it is in an easier manner than elsewhere in the world or in history. The means by which our subsistence is achieved can differ widely: in the 21<sup>st</sup> Century, many jobs are undertaken on a zero-hour basis, changing with demand and availability (Morgan and Pariece 2017); in the 20<sup>th</sup> Century, the norm for many was working 9am-5pm Monday-Friday, with set amounts of holiday allowance per year (Skidelsky 2020); prior to the Industrial Revolution, work was governed by the seasons, with demand and harvests creating periods of intense busyness, followed by longer periods of leisure (Schor 1993). In theory, an agent could secure their year's subsistence by earning a large amount of money, or generating a large amount of resources, in a small amount of time, and then simply maintain themselves until they needed to repeat the necessary process. In such a case, despite not having to earn a wage or procure goods, they would still have to engage in other acts of *labour* to maintain themselves, including eating and cleaning. In the 'post-work' models of the future, paid

employment is no longer a facet of life, and the production and distribution of biologically necessary goods is made more equal and fair, but the biologically necessary acts of eating, cleaning, and caring remain prevalent, even if scholars do not account for these activities as belonging to ‘work’ (or *labour*, as I am defining it) (Bastani 2019; Danaher 2019).

These biological necessities do not solely apply to the physiological welfare of human agents. The mental and emotional welfare of an agent is just as biologically important as the physiological necessities of eating and sleeping: clear links exist between physical illness and mental or emotional health (Stewart-Brown 1998; Vreeland 2007). Our lives are not only governed by our physical experiences: our mental and emotional states are fundamental to a happy and meaningful life (Ratcliffe 2010). There has been a concerted effort in recent years to appreciate mental and emotional health to a similar standard as physical health (Naylor et al 2016), and my definition of biological welfare will necessarily include such considerations. An agent’s physical, mental, and emotional health are each vital for their continued welfare, and we must appreciate the effort expended in emotionally draining acts in a similar manner to those that are physically taxing (Hochschild 1983). An agent who engages in social interaction, either in person or online, in order to stave off loneliness can do so in the mode of *labour*, if it is out of concern for their current or future welfare (Rose Hill 2020), regardless of how effective such an attempt is (Turkle 2011). Social interactions can therefore be seen as biologically necessary in this regard, because a certain amount of welfare

comes from a suitable level of social interaction (Ishii-Kuntz 1990). For a human being to survive and to maintain their welfare, they must care for all aspects of themselves. Having a healthy body, but suffering from crippling depression or rampant loneliness is not conducive to one's continued welfare and survival.

This inclusion of social interaction as biologically necessary adds an additional component to the biological concern of *labour*. *Labour* does not only encompass acts undertaken out of a concern for one's *own* welfare, but also for the welfare of others. Indeed, the 'reproductive labour' of care work is primarily a concern for others, whether they are related or otherwise.<sup>20</sup> The concern for a child's continued welfare, survival, and maintenance might prompt engagement in a number of related acts, just as caring for an elderly relative or neighbour firmly belongs to the mode of *labour*, but does not relate to the agent's own welfare. These types of acts are often undertaken without pay (Ehrenreich and Hochschild 2004; Mullin 2005), but occur in the mode of *labour*, precisely because they relate to a concern for biological welfare. Action motivated by a concern for the survival and welfare of others, or even of the whole human race, occurs in

---

<sup>20</sup> I avoid using the term 'reproductive labour' to differentiate distinct modes of activity, because it draws a similarly arbitrary distinction to that of intuitive distinctions between paid and unpaid work. That one act is productive (in an economic sense) and another is not does not inherently affect the act itself. In a post-capitalist society, all acts could be argued to be 'reproductive', because value might no longer be drawn from the finished product of an act. Moreover, the types of activities that often fall into the category of 'reproductive labour' are themselves productive to some degree: cooking a meal for a family, cleaning a house, and caring for relatives and children all involve the production of certain goods and services, and distinguishes them as a separate mode of activities is not conducive to an accurate and inclusive notion of *labour*. I will avoid using the term 'reproductive labour' in my own conceptual analysis, and will only use it to denote the distinction made in the literature.

the mode of *labour*, because it is a direct interaction with biological metabolism. Ecological and environmental activism also belong, at least in some part, to the mode of *labour*, because they concern the ecological conditions under which *all* human beings are biologically conditioned (Thunberg 2019; Wallace-Wells 2019). While clearly distinct from an agent bathing themselves, a community working in a shared garden, or a parent caring for a child, environmental activism shares a comparable intention, primarily aimed towards the fundamental conditions of living, and so it can, at the very least, be understood in this same way. Even if such an example is too extreme, then the care for others' biological welfare, whether it is a family or a local community, can still firmly be understood in the mode of *labour*. Human beings do not inhabit the Earth alone, and a concern for biological necessity can therefore extend to others beyond us.

It is clear that I am offering a definition of *labour* relating to biological metabolism, welfare, and survival in a very broad sense, to include mental, emotional, and social welfare, as well as the biological concerns for others. Two key clarifications are needed here. The first is that this interest in biological metabolism as the primary intention of *labour* is in no way pre-laden with additional judgements regarding the determinism of our biological conditions. Possession of certain biological sub-processes does not force engagement with them in a specific manner. I am not making the claim that we are biologically predetermined or expected to have children, be parents, or maintain a culturally or socially specific standard of health, for example. These are drives that exist *in the biological*

*metabolism of humanity*, but not necessarily *in each human being per se*. A person who fasts for religious reasons and ignores their biological need for food is not corrupting the mode of *labour*, but is instead subverting their biological metabolism for reasons beyond *labour*: such an act might be better understood in terms of *work*, as I will discuss in Chapter 5. That we have certain biological necessities means that some actions and processes will be inevitable, but we, as human agents, maintain free will and self-determination in all regards.

This leads to the second clarification: this definition of *labour* in no way justifies violence against others. It might be inferred that my focus on biological welfare might be co-opted by an extremist group to justify the targeting of those who they view as infringing on their biological metabolisms. Such acts are always articulatory of a political, religious, ontological, or personal viewpoint on the world, rather than a biological fact. Such an act is a corruption of the mode of *work*, as I will discuss in Chapter 5, but violent or hateful acts cannot be justified within the mode of *labour*. Of course, the definition of *labour* being developed here can help to shed light on why people behave in certain ways when under threat, but is in no way a blanket justification: as stated in the first clarification, human agents maintain their free will and self-determination, and are not slaves to our biological metabolism, but rather are conditioned and enclosed by it. There are things we have to do, including eating and sleeping, in order to stay alive, but the way in which we do them is entirely deliberate on our part. The ways in which such actions are conditioned and enclosed by our

specific social, cultural, and historical contextual horizons can affect the shape that such actions take, but cannot inherently force us to act. Where instances of force or coercion do appear, or when an agent is the victim of violence or oppression, then we might use this definition of labour to explore the case, but not to justify it. A person who is forced to perform manual *labour* under threat of death is behaving at the most extreme level of *labour*, because they are desperately trying to survive: such acts cannot be normalised across the entire mode of *labour*, for all biologically conditioned humans, because doing so would be at odds with biological welfare itself. Violence, extreme greed, and coercion might therefore be understood as additional modes of activity not covered in this thesis, but are not captured under my definition of *labour*.

Having made these clarifications, let's now consider the temporality of *labour*.

#### 3.4.2. The Temporality of *Labour*

The primacy of biological necessity to the mode of *labour* goes some way to designating its temporality. An agent's biological metabolism is something that needs constant maintenance and attention, and so the mode of *labour* is a cyclical and constant one. The ultimate aim of *labour* is to ensure the continued survival of the agent or agents it is intended towards, and such a task cannot be achieved with a single solitary act: each biologically necessary task only fulfils the temporary and ephemeral need at hand, and never brings about an end to biological necessity *as a whole*.

The eating of a single meal does not end my hunger indefinitely, nor hunger for all; the earning of a single wage does not end my economic need, or economic need in general; and the birth of one child does not negate the need for its further care, or the general need to have more children. The entire process of *labour* cannot therefore be encapsulated, explained, or comprehensively defined by one single task, but only by the necessities and metabolisms driving the process *as a whole*. Even with regard to the lifespan of the agent, when they die and can no longer maintain their biological metabolism, the life process of the human race continues. The cycles of necessity and fulfilment, of survival and sustenance, will continue for as long as there are humans alive who remain biologically conditioned, and not, for example, transhuman or posthuman (Bostrom 2005; More 2013; Fuller and Lipinska 2014).

This cyclicity therefore also applies to the products and processes of *labour* which are themselves often impermanent and ephemeral. *Labour* frequently does not end with a permanent enduring object, but instead produces goods that are consumed by an agent, or which involve further maintenance and interaction. Cooking produces a meal that is then destroyed in its consumption, just as the task of cleaning a house is eventually undone by the agent living in it. *Labour* is constant, and, by virtue of its connection with our biological metabolism, will remain constant for as long as we are alive.<sup>21</sup> This is true of all instances of *labour*:

---

<sup>21</sup> James Acaster's joke about the cycle of jobs and "no more jobs" summarises this quite aptly: "Isn't that your whole life? There's 'no more jobs' and 'jobs' on a constant loop,

not only cooking and cleaning, but the constant labour of childcare, the endless economic labour of wage-earning, and the urgency of environmental labour. Because *labour* is specifically targeted at an agent's survival, and survival is not something that can be secured indefinitely into the future without further action, *labour* is constant and cyclical.

Moreover, the 'end-product' of one biologically necessary task might feed into a different biologically necessary task: the *labour* of earning a wage feeds into the *labour* of buying food and cooking it, and vice versa. This closeness between *labouring* and consuming might be uncomfortable for some readers, both for its ephemeral nature, and for its connotations in capitalist economies. Hannah Arendt, for example, highlights this cyclicity in *labour* in *The Human Condition* (1958), claiming that:

Labouring and consuming follow each other so closely that they almost constitute one and the same movement, which is hardly ended when it must be started all over again (Arendt 1958, p.100).

This is something of a critique of Marx, wherein Arendt is suggesting that a society wholly populated by *labour* would be an incredibly consumptive one that lacks meaningful engagement in other sorts of activity. For Andrea Veltman, these cyclical and biologically necessary tasks are inherently political, because they disproportionately fall to women, as what is commonly referred to as "reproductive labour":

Turning the raw into the cooked, dirt into cleanliness, or children into developed human beings secures our individual survival and the life of the species, but the products of labour are inherently

---

until eventually, one day, permanently no more jobs forever... you really miss jobs when its 'no more jobs' forever. Too much of a good thing, the old death" (Acaster 2018).

ephemeral; reproductive labour eventually evaporates into the never-ending cycle of biological life (Veltman 2010, p.55).

I deliberately avoid the distinction between ‘productive’ and ‘reproductive labour’, because I am not offering a value-theory of labour. I argue that *all* acts of *labour* are productive in some sense, and the fact that the objects or services produced in some forms of *labour* have an economic value, while in others they do not, is not a sufficient basis to distinguish them as ontologically different. Such value frameworks can also be inverted if the economic system is different: a post-work utopia would value ‘necessary’ or creative labour more than economically productive labour, for example. The value ascribed to labour processes, be it economic or social/metaphysical, is contingent upon the social structure in which it arises, and differs widely depending on where in the world is being considered. Pregnancy and childcare are prime examples of this, because in the United Kingdom they are unpaid (although somewhat economically supported), cyclical<sup>22</sup>, but widely accepted as meaningful in some way (Mullin 2005). This is inherently political for Veltman because of its disproportionate gender bias:

The daily labour of maintaining life does not appear lowly because women, political outsiders, and alien insiders perform it; rather, the marginalized labour at the mundane preservation of life is because this labour is frequently less fulfilling (or more tedious, taxing, stupefying, draining, or disgusting) than other human activities. Subordinate or second-class social status is often borne out in

---

<sup>22</sup> Pregnancy and childcare are such examples. Diprose and Ziarek, for example, highlight the tensions between the economic valuation of pregnancy, and the Arendtian valuation of birth as a unique moment of beginning anew, which might resist the homogenous cyclicity that I am describing. “Arendt defines ‘natality’ *not* as the birth of new ‘life’, but variously as a ‘new beginning’ and the human ‘capacity of beginning something anew’” (Diprose and Ziarek 2018, p.2).

practice in a relegation to chores that one would rather have someone else perform, or in toiling to maintain the lives of others... Even if the life-giving activities of pregnancy, birth, and parenting can be sources of power or self-affirmation, we should not extol the value of such labour as scrubbing toilets, laundering linens, cleaning floors, or hoeing fields in order to reclaim the moral worth of the oppressed, for the basic dignity of the oppressed transcends their labour, which fails to express or actualize their human worth (Veltman 2010, p.57).

These biologically necessary acts are necessary for *all* human beings but do not fall to all of us to complete. While we must all eat, not all of us must cook, and so on. While these political implications are undoubtedly important and pressing, they are not central to the mode of *labour* as I am describing it, but have rather important implications for practical cases. We must all survive and engage with our biological necessity, so *labour* is a universal condition of human life, in its most fundamental form.

This cyclicity and constancy is not something that can be wholly removed from the human condition simply by pushing it onto others. Even in a post-capitalist, post-work utopia, in which all of our biological needs are met by automated robots (Bastani 2019), this cyclicity would endure, because we'd still have to obtain and eat the automated food, and undertake the laborious tasks of pregnancy and childcare. Whether the necessary acts of *labour* are forced onto slaves (O'Brien 1885), robots (West 2018), or women (Weeks 2011), *labour* remains a constant and pivotal feature of our lives, and will do so for as long as we remain human, and not posthuman or transhuman.

### 3.4.3. The Universality of *Labour*

It is implicit in the cyclicity of *labour* that it is also a universal condition of human existence, regardless of how biological necessity is fulfilled and maintained. All human beings, regardless of historical epoch, specific culture, social standing of the agent, technological mediation at play, and so on, will be conditioned by a biological metabolism, and as a result have to engage with *labour*. While the practical cases of *labour* will look very different from one another depending on their specific contextual horizon, *labour* is a universal presence to all human beings: we may all eat different things, but we all must eat. For as long as human beings must exert themselves to maintain their biological metabolism and to survive, then *labour* will be a mode of activity available to, and necessary for, all human beings. This is not to homogenise specific acts of *labour*, or to denigrate the specific cultural and social importance of practices surrounding *labour*. Giovanni Federico warns against reifying agricultural practices, and argues that “agriculture is a highly local activity [and] broad generalisations... cannot capture the peculiarities of the area that they are dealing with” (Federico 2005, p.4). I am arguing that the specific practices that emerge around agriculture form the contextual horizon of the act, but that the biological necessity of procuring food (through practices including agriculture) is universal to all human beings. Biologically necessary acts of *labour* will take on special significance to different cultures, but the underlying need to survive is universal.

It might therefore be inferred that the condition of *labour* is the chief defining feature of human existence. As Friedrich Engels posited “... [labour] is the prime basic condition for all human existence... we have to say that labour created man himself” (Engels 1876, p.68, my bracketing), and it might be presumed that I am holding a similarly central position with regard to *labour*. I argue that while all human beings need to engage with *labour*, in various ways and to various degrees, it is not the sum of all human endeavours. That we must all *labour* does not mean that this is the only mode of activity available to us, or that human agents can be entirely defined by their *labour* or their biological needs. *Labour* is necessary to ensure the continued survival of the human race, but offers little opportunity to express anything further than this. Andrea Veltman notes this distinction, arguing that:

Without labour, life cannot continue. But labouring to preserve life cannot provide a reason as to *why* one lives, and labour is therein inessential within a philosophical arena of non-utilitarian value (Veltman 2010, p.57).

*Labour* is the bedrock through which human action emerges, because to be able to do anything else we must first ensure that we are healthy and safe. Even those who can displace their *labour* onto others (whether via automated machinery, paid workers, or indentured labourers) must still engage with their biological metabolisms through acts of *labour* in the smallest way: monitoring their machines, paying their workers, or overseeing their slaves. Any act that has a direct relation to the agent’s means of survival, regardless of the content of that act, belongs to the

mode of *labour* if it is being undertaken to ensure their biological welfare. From these foundational acts of *labour* arise many other forms of action not directly concerning the agent's survival, which can express things beyond biological necessity. I will define one such mode of activity as *work*, which concerns the articulation of the agent's identity beyond their biological condition: while such acts undoubtedly require acts of *labour* in order to function, they cannot be reduced to the same motivations and intentions. *Labour* is necessary, but insufficient for a wholly meaningful life.

What the universality of *labour* does allow us to question in this regard is when, where, and by whom *labour* takes place. Approaching *labour* in this way does not include a value-theory of labour, so we can better account for the agents who are undertaking the biologically necessary *labour* of a society, which can highlight inequalities in given practices (Folbre 1994; Weeks 2011; Cant 2019; Eubanks 2019). Moreover, the universal presence of *labour* in all human lives allows us to understand additional dimensions of necessity with regards to *groups* of human agents. Given that all human beings are conditioned by their biological conditions, and are subject to necessities, the mode of *labour* will appear in relation to individual action *and* group action, group necessity, and group desire. We can take the individual view of a single agent's biological necessities and explore the ways in which those related actions appear in the mode of *labour*, but we can also explore the ways in which shared necessities are responded to. This might be immediate relations in a family or community, or on the larger scale of nations and the human race as a

whole (Graeber and Wengrow 2021). While individual necessities, needs, desires, and practices will differ between agents, some homogeneous needs will emerge across large groups: specific food needs or practices will differ from person to person, but access to food *as a whole* is necessary across **all** groups of human agents. Agricultural industries that feed areas, groups, or societies might be guided by the economic desire of their governing body, for example, *but still serve a strictly biological purpose for the agents they feed*. While such an industry would be highly complex and multipurpose, serving a wide range of intentionalities, desires, and purposes, it can at the very least be seen as achieving a primarily laborious and biological purpose. The act becomes multifaceted: the farm worker might be acting in the mode of *labour* to earn a wage; the farm owner might be serving the purposes of *labour* by providing food to their local community; and the farm's investor might be earning financial benefit from the farm, potentially in the mode of *labour* if the money is used to support themselves.

This can also be historically contingent: the need for most of contemporary society to have access to electrical power means that we can understand and approach power plants as artefacts serving the purpose of biological necessity and *labour*, despite this not being 'naturally' essential. It is possible to heat a house or cook a meal with fire, but contemporary conditions are such that technological advances allow us to do so with electrically powered artefacts, and an engineer of a power grid can be understood as a *labourer*, despite engaging in very complex and

distinctly contemporary tasks. Biologically necessary *labour* can be undertaken by agents who produce more than they need for themselves, or out of a concern for the biological metabolism of others: climate activism *can* (although does not need to be) understood as a biological concern for the metabolism of human beings *as a whole*, for example. Human beings are all universally beholden to a biological necessity, and will therefore have to engage with *labour* in various ways throughout their lives.

#### 3.4.4. Restating the Definition

To conclude, let's reiterate my definition: *labour* is a mode of activity that is biologically necessary and primarily concerns the maintenance, welfare, and survival of the agent's biological metabolism, or of the biological metabolisms of those that it is intended towards. Biological necessity is defined broadly, to include the mental, emotional, social, cultural, and economic welfare of the agent, as well as their physiological welfare. *Labour* is cyclical and continuous, requiring constant and intermittent attention, and its presence is universal to all human beings, regardless of the specific and significant ways in which it is undertaken between cultures.

This definition operates as an 'ideal type', similar to the definition of automation offered in the previous two chapters. As such, I am offering three key qualities that form a distinct mode of activity that will condition and formulate a given activity or task. But this is not an overly high standard which all acts must meet or pass. While many acts of *labour* will

clearly display all the qualities of the definition I am offering here, there may be further cases in which an act displays one of the qualities, but fails to meet another. In such cases, my definition remains a useful and effective tool for analysis. It allows us to question precisely where and why the act in question fails to display the conditions of *labour* as I describe them, without forcing us to create further distinct definitions. An example here might be an agent that takes on paid employment over a fixed term that doesn't pay enough, or is dangerous. The agent might be motivated to engage with the act in order to earn a wage for biologically necessary purposes, but the temporality is fixed rather than cyclical, and the motions of the act are at odds with their welfare. Such an example might be seen as not adequately fitting into my definition; I argue that viewing such an act through the lens of *labour* is useful because it allows us to highlight precisely where the act is imperfect in relation to my definition. It explains why the agent engages in the act, and the ways in which the motivational context is at odds with the enclosed conditions of the act, thereby suggesting ways to either change the act itself or move the agent to a more satisfactory act.

This problem case might be technically refuted in its own right: the temporality of the act may be fixed, but the agent's need to earn a wage remains cyclical. The movements of the act itself might be at odds with the agent's biological welfare, but the agent is engaging in it due to a clear biological motivation (as I'm describing it). It being an imperfect example which doesn't perfectly align with the ideal type of *labour* does not remove

it from that mode of activity. As such, a further problem case might be that of paid employment that an agent garners non-biological meaning from. Rather than an overtly negative case, such an example might be seen to stretch my definition to its limits, because there is a clear biological intent behind the agent's engagement, but also a further desire to extract non-biological value from it. Such cases perhaps highlight the limits between the two modes of *labour* and *work*, and therefore might be used to push the definition of *labour* beyond its logical parameters. I argue that my definition remains useful here. The fact that an act provides a monetary wage or biologically necessary goods/services *does not* render it inherently as an instance of *labour*. An artist can earn a wage by selling their art, but can engage in the act with the desire to meaningfully engage with the world: the key quality in need of investigation is the motivational intention behind the act, the conditions of the act itself, and the eventual outcome. If those qualities of the act are conducive to **both *labour* and *work***, then we are simply able to investigate the case in terms of both modes. Such an open act would allow the agent to simply care for their survival one day, and to meaningfully engage with the world on another. Moreover, we might also investigate which conditions of the act are conducive to the tenets of *labour* and which the tenets of *work*, better understanding the qualities of the act that are biologically intended and which are meaningfully intended.

Because I am defining *labour* primarily as an ideal type with three key qualities, fringe cases do not break the definition, but instead allow for

a creative extension of the definition resulting in a useful and productive analysis.

### **3.5. A Debt to Hannah Arendt**

My definition of *labour* here might remind the reader of the writing of Hannah Arendt, particularly from her 1958 book *The Human Condition*, in which she too defines *labour* as a fundamental, universal activity, but one that does not fully encapsulate humanity. It is pertinent to acknowledge that an earlier research question for this thesis was directly aimed at an Arendtian account of *labour*, *work*, and automation, so Arendt is an important inspirational figure for this research.<sup>23</sup>

The similarities are clear: Arendt argues that labour is “the activity which corresponds to the biological process of the human body... the human condition of labour is life itself” (Arendt 1958, p.7), denoting the same biological necessity I have argued for. She argues that labour is cyclical and constant, claiming that “labouring always moves in the same circle, which is prescribed by the biological process of the living organism

---

<sup>23</sup> One of the key issues with pursuing the aims of this thesis in a strictly Arendtian manner is that her *writing* is frequently and strongly opposed to the question of automation, as I will discuss in this section. However, I believe that my *approach* to this question remains indebted to the *spirit* of Arendt’s writing on the subject, and embodies her politics of agonism (Arendt 1970, 1993; Passerin d’Entreves 1993; Robaszkiewicz and Weinman, 2022), by entering a novel evaluative framework in an ecumenical manner into the heavily conflicted literature of automation and work. Future research could take the Arendtian strands of this thesis further, developing the interesting ways in which Arendt herself might be used in contemporary discussions, not only as an influence as I am doing, but in more of a direct manner.

and the end of its “toil and trouble” comes only with the death of this organism” (ibid. p.99). She also acknowledges that a person’s necessary labour can be displaced onto others, writing that “because men were dominated by the necessities of life, they could win their freedom only through the domination of those who they subjected to necessity by force” (ibid. p.84). Most importantly, Arendt employs a distinction between labour and work, but includes a third category, action, that I do not. Perhaps this is the most important divergence between Arendt’s philosophy and my own. For Arendt, work concerns utility and labour concerns biology, but speech and action only arise in a third mode, distinct from necessity and utility. For Arendt, the mode of *action* is one in which:

With word and deed we insert ourselves into the human world... this insertion is not forced upon us by necessity, like labour, and it is not promoted by utility, like work... to act, in its most general sense, means to take an initiative, to begin... to set something in motion (ibid. p.176-177).

Such a model is largely based on Ancient Greek social structures, which Arendt sees as no longer representative of contemporary structures of employment, arguing that:

We saw before that in our world the seeming elimination of labour, as the painful effort to which all human life is bound, had first of all the consequence that work is now performed in the mode of labouring (ibid. p.230).

The collapse of labour into work, for Arendt, is largely due to technological developments made in the mode of work and expanded to the rest of human life:

In the world of *Homo Faber*, where everything must be of some use... meaning itself can appear only as an end... the issue at stake is, of course, not instrumentality, the use of means to achieve an end, as such, but rather the generalisation of the fabrication experience in which usefulness and utility are established as the ultimate standards for life and the world of men (ibid. p.154-157).

I therefore diverge from Arendt in two key ways: my valuation of meaningful work, and my valuation of technology. For Arendt, meaningful activity that is not concerned with utility or necessity is achieved in the mode of action, performed through speech acts and lasting deeds. I make no such distinction, and will argue in Chapter 5 that meaningful expression and engagement with the world can be achieved through acts that are also necessary and useful, and do not occur in a mode of their own. The key issue with distinguishing meaningful expression in a mode of its own is that it creates a distinction between a meaningful act and *any* useful or necessary act. This might be perfectly acceptable when taken in relation to a narrow set of political and historical examples in which political articulation and lasting change was the only goal. However, even these acts intend toward *some type of utility*, which is further complicated when we consider more day-to-day examples. If an object is expressive, politically intended, and meaningfully created, but also is a durable, lasting artefact that the creator sells in order to earn a wage, it would seem that Arendt's tripartite distinction completely fails to offer any significant reflections. This critique has been made by a number of scholars (White 1997; Canovan 2008; Lindman 2015), who agree that the model offered in *The Human Condition* is conceptually interesting, but is one that requires a significant amount of additional groundwork to apply to real cases. The critique can

be formulated as follows: if meaningful expression can *only* be achieved in a distinct mode of activity, divorced from utility and necessity, when can we ever actually achieve it? Practical cases that meet this high standard are incredibly limited and impractical. If a more sympathetic reading of Arendt is given, and we instead consider the mode of action as an ideal type for real cases to be compared to, then how does the exclusion of necessity or utility allow for any kind of meaningful reflection or comparison? If an instance of action, for Arendt, only appears in the Ancient Greek polis or in times of extreme political unrest (Arendt 1951; 1958), then it is, by definition, opposed to the types of discussions required relating to automation and the future of work. In being so narrow, it also brackets out any sort of meaningful application to other forms of expressive action that are politically cogent and necessary, but that occur through useful, durable artefact creation, the most obvious of which would be practical responses to climate change. For this first reason, I will avoid adopting an Arendtian valuation of meaningful work.

The second reason for avoiding an Arendtian framework of labour and work, despite being inspired by her thinking, is Arendt's valuation of technology. As noted in the first chapter, Arendt belongs to the first generation of Western philosophers of technology, who established the philosophy of technology as a discipline in its own right, but held a 'classical' approach to technology which was often particularly negative, distrustful, and pessimistic (Smith 2018). Arendt herself was particularly negative towards modern technological developments, questioning the

desires underpinning them and worrying about the futures created through them (Arendt 1963). Holders of the 'classical' approach to technology hold a number of misgivings and prejudices toward technological developments, including automation, and generally hold that contemporary technologies are inherently detrimental to society. Such an account offers precisely the types of reified and narrow imaginaries that I am trying to move away from by adopting a method of phenomenological reduction. While Arendt might have some interesting comments regarding automation and the future of work, undertaking such an analysis wholly within an Arendtian framework requires a huge amount of groundwork, and is not guaranteed to be consistent and convincing. As such, Arendt will operate as a key influence for the thesis, but not one that I will engage with further.

### **3.6. The Enclosure of Labour**

Thus far I have discussed the relationship between acts of *labour* and their contextual horizon, which might strike the reader as transcendental to some degree, and detached from real-world examples. Given the interest in the automation of work guiding the research of this thesis, the next chapter will consider practical case studies of automated *labour*. In order to do so, we must first establish the ways in which automation and *labour*, as I'm defining it, interact in practical cases, so the ways in which acts of *labour* are *practically enclosed* will now be

considered, having already established how they are governed contextually.

It is first pertinent to note that *all* acts are enclosed in some way. No act is without limits, without requirements, and without a motivation and an outcome: even the simplest act has some cause, and will have some effect, regardless of how insignificant or mundane it may be. No task is completely expansive with endless possibilities, nor is any task completely and comprehensively imprisoned in one way of proceeding. Even within one task, different instances can be altered, limited, expanded, or affected in certain ways compared to each other, meaning that one task can be undertaken in a range of ways. Acts of work, as they are commonly understood, are no different, with agents engaged in such acts doing so *within* a given contextual horizon and mode of activity, such as *labour*, but *through and within* an enclosed set of movements and motions. Such movements and motions will inevitably be conditioned in a number of ways, depending on how, where, and why they are taking place. An act can therefore be said to be enclosed, depending on the way in which it proceeds. Such enclosure might be comprehensive and complete if there is only one way to do it, and the movements are tightly regulated, controlled, or fully automated but the enclosure might be more open and less rigid if multiple outcomes are desired, there are many ways to pursue those outcomes, or if the process is itself highly complicated or convoluted. Automation is one such way to enclose a task, but it is not the only way: a task can be enclosed with human effort if you pay others to do it, for

example. A task that involves no technology whatsoever can still be described as enclosed by social practices, practical limitations, and the relevant motivations/outcomes. An act of *labour* is therefore practically enclosed by its contextual horizon, regardless of the actual movements of the task: the driving motivation and the desired outcome enclose the task, and regulate its movements.

The practicalities of an enclosed task can account for the difficulties in understanding the precise mode of activity in question. Because the practical conditions of a task can contain multiple drives, motivations, and desired outcomes, the mode of activity in question might not always be clear: if an agent is motivated to engage in a task because of a financial incentive, a biological necessity, *and* a desire for meaningful expression, it is more difficult to differentiate between the modes at play. Moreover, the agent might operate in different modes depending on the specific example in question: a menial job can be made fulfilling with the right co-workers, and a fulfilling job can be made menial through negative technological conditions, for example. Exploring tasks in terms of both their contextual horizons *and* their practical conditions of enclosure allows for a much better understanding of each case of work. By overlaying the modes of activity and reflecting on them, we will be able to see what facets of the task's enclosure allow for *labour* and *work* to take root, or which aspects of the task's enclosure do *not* allow for either mode. If a task is wholly enclosed to negate one of the modes, we might ask how it can be made more open to both modes: or in the case of automation, how it might be

completely closed off to the other mode. This interplay between the contextual horizon and the conditional enclosure of a task distinguishes my definition from others in the literature, and (while complex) allows for a more nuanced and dynamic understanding of automation in practice. Let's explore this further with regard to some specific and common forms of enclosure.

### 3.6.1. The Spatial Enclosure of *Labour*

All instances of labour occur in physical space, and will engage some kind of physical mechanical movement (of the body, of a machine, of the Earth, etc). All acts therefore occur within a spatial or physical enclosure, which governs the physical movements of the act, the physical or spatial ramifications of the act, and the space in which it is occurring. Acts that occur in the natural world, using objects that pre-exist in nature, are still enclosed: they are governed by the limits of the physical world, and have set possible or desired outcomes. A lone agent who desires food, and finds a bush in a forest can manipulate it with their hands to find berries, for example. The agent is therefore enclosed within the spatial condition of the forest, which will bring about some unique and specific conditions: the agent will be at the mercy of the weather; they may be visible from all sides; they are not in a private environment, and so on. There is also the physical, 'spatial' (as I'm describing it) condition of the berry bush. It is non-standardised and therefore not regulated, so the bush might not yield the desired outcome, perhaps if another creature has already stripped it, or it is out of season. Finally, in such an instance, the movements of the agent's

body must also be considered as another part of the spatial enclosure of the task. The agent will use their hands, eyes, nose, and so on, to complete the task as best they can. This might involve pricking their fingers on spiky branches, smelling berries for quality, and testing the ripeness, taste, or toxicity with their mouth.

These enclosing conditions will also be affected by the mode of activity within which the task (in this case foraging for berries) occurs: the motivation is hunger, and the desired outcome is to eat. If the motivation is different, and the forager needs berries for an art project, then the outcome will be different, but the spatial enclosure might be similar (although the agent might not taste the berries, for example). This case might seem trivial, and it could be argued that this is not enclosed at all, but is completely open-ended. The act *is* conditioned by the spatial conditions under which it arises: the bush will only yield specific berries; the forest will only have a specific range of bushes; and so on. Moreover, it is easy to see how these spatial conditions can be manipulated. The same act could be undertaken with the same outcome, but the condition of 'forest' could be exchanged for 'garden'. If the bush being picked is owned by somebody, or is in an orchard, then the movements of picking the berries are unchanged, but the spatial conditions change significantly: the bushes might not be native to the area; they might be genetically modified; or economic remuneration may be required if it is privately owned. If the forager themselves planted the bush in their own garden, the distance between act and outcome might be elongated, with months being spent

cultivating the bush before the berries are able to be picked. If the forager owns lots of bushes, they might be able to harvest enough for the local community, or to sell the berries for a profit. They might employ somebody to pick the berries, and simply sit back and eat the unsold fruit. All such instances revolve around the spatial enclosure of the task and can be compared to one another. As the task becomes increasingly complicated, and additional motivations are enacted through it, sub-tasks might become necessary that are themselves spatially enclosed: employing berry pickers requires paperwork and accounting that might necessitate additional sub-tasks undertaken in an office, rather than in the field, for example. As long as the biologically necessary motivations of the task remain achievable, then the spatial enclosure of the task is conducive to its mode of activity.

It is clear to see how automation affects this aspect of a task's enclosure. Through increasingly sophisticated changes to the task's spatial conditions, we eventually arrive back at a simple instance, wherein the agent expresses their biological desire, engages the correct automated machine, and then gathers the desired biologically necessary object. There is a genealogy of acts between the 'natural' example of the forager and the fully automated case of automated food production, in which the role of the human agent changes significantly: adding additional technologies, altering the movements, including other agents, and so on, are all explicit alterations to the enclosure of the task. The addition of secondary concerns by these alterations is not in itself inherently problematic, but can become so if these concerns overtake or overrule the initial biological concern of

the agent. Any task that has had its spatial enclosing actively altered only becomes problematic when it directly impacts on the capacity of the agent to achieve their desired biological outcome. The automation of *labour* does not have to be problematic, and *could* supply a whole society with the required biologically necessary goods; or it *could* become highly problematic, displacing human workers from the spaces in which biologically necessary acts of *labour* can take place. Neither are necessary cases, and by investigating the spatial conditions of automation we can explore the benefits and costs of a task in light of the desired outcome. The interest here is to explore the ways in which tasks become spatially changed, for both 'better and worse', and for the ways in which automation *can* (note: not does, must, should, or shouldn't) impact tasks.

### 3.6.2. The Temporal Enclosure of *Labour*

Intimately linked to the spatial condition of a task's enclosure is its temporal condition. Alterations to the physical conditions of an act will inevitably affect temporal qualities of that act, even if they are not intended: moving the location of an act to a different space might incur a longer commute, or if work is performed at home then the mix of 'productive' and 'reproductive' labour might result in interruptions from children or homelife (Boris 1994; Balakrishnan 2002). Conversely, changing the spatial enclosure of a task can also reduce its temporal conditions: having to work from home eliminates commuting time, and can reduce the hours needed to achieve the desired outcome if additional sub-tasks (including meetings or communal breaks) are also eliminated (Jones and

Winder 2021). Because *labour* is cyclical, there is a constant need to engage in *labour* so the time saved in individual acts can allow a fuller interaction with the agent's biological metabolism: spending more time recovering, cooking, and so on. The technologies included in a task can also greatly affect its temporal conditions: email and other portable digital tools can significantly reduce the time needed to communicate between colleagues, compared to using the phone or writing a letter. However, there might be an additional period of time required to train an agent with a new technology, or to maintain the technologies that reduce time. In the case of email which is accessible on a smart phone, it can also greatly lengthen the working day: where previously, work could be left at work, the ability to respond to emails at home can prevent an agent from ever disengaging from the task at hand, extending their working day almost indefinitely (Crary 2014). By considering the temporal conditions of both tasks *and* sub-tasks, it might become clear that time is saved in some areas, but extended overall. This is particularly pertinent with acts of *labour* extended over a large economy of scale, in which individual agents perform lots of simple sub-tasks, on an assembly line for example, to achieve a large overarching goal: their sub-task might be temporally reduced to simply pressing a button, or moving an object from the line to a box, but they are required to do it a thousand times a day.

Temporal enclosure through technological means might also only apply to the majority of cases in a given task. The move towards online banking, and the reliance on smart phone technologies during the

pandemic for checking into establishments, saves time for those who have access to the technology, but extends the process for those who don't. If a person doesn't have access to a smart phone or the internet, then moving banking structures almost wholly online significantly extends the process for them, even if it saves time for others. Changes to the temporal enclosure of a task are not always to the benefit of the agent. This is also true of examples of intuitively-defined work: the reduced time needed to complete one task might transform into additional pressure to complete more individual tasks *per working day* than previously. The news stories that emerged from Amazon's 'fulfilment centres' regarding the dangerous conditions workers faced to fill unachievable quotas, and the ways in which 'time-wasting' (if using the toilet can be called a waste of time) was monitored by automated systems, show that reducing time in a task is not always desirable (Del Ray 2019; Richardson et al 2020). This was met with political response and calls for unionisation (Sainato 2021), which has occurred in a variety of other similarly time-pressurised industries, such as food-delivery services (Cant 2019), but not all cases are so explicit, so public, or so forcefully met with an organised and communal response (Moody 2017). Whilst campaigns for the reduction of working time acknowledge this potential issue within reducing the working day, it *must* be noted as a drawback and real possibility which affects the temporal conditions of work through automated technologies (Crary 2014; Stronge and Harper 2019; Stronge and Lewis 2021). Not all instances of automated technologies will negatively affect the temporal conditions of a task, in

much the same way as with the spatial conditions of a task, and investigating them through the lens of enclosure can allow proper scrutiny of both positive and negative cases.

### 3.6.3. The Social and Interpersonal Condition of Labour

The spatial and temporal conditions of enclosure are perhaps the clearest and most obvious conditions that a task will have. An emergent condition, particularly in practice, is how the task is conditioned by its relation to, and intervention by, other agents, or how it appears more widely in a social structure. Instances of *labour* rarely take place in isolation, and human actions generally intersect with the desires, intentions, and actions of others, either directly or indirectly. In practice, *labour* is rarely as simple as a singular individual agent fulfilling their own needs; particularly under contemporary conditions *labour* is often undertaken for economic remuneration and includes the intentions of an employer, or overlaps with the *labour* of others. This is not the only social/interpersonal condition of *labour*, however, because even private, unpaid *labour* undertaken in the home might interact with other local agents, or intersect with the local community if the agent has to buy resources, for example. In many ways this is the reality of *labouring*, particularly under contemporary conditions: rarely can an act be completed in absolute isolation in a wholly self-sufficient manner. Contemporary society is networked and interlinked in ways that mean all actions have a social and interpersonal condition, even if only a very slight one.

This allows us to explore the ways in which one act can benefit multiple agents. Perhaps the clearest example is that of an employer and an employee. If an employer desires to produce X amount of object Y, they can employ another agent to complete the desired goal by expending their own efforts. The employee is remunerated with the capacity to fulfil their own biological metabolism through the earning of a wage. This is a clear example of *labour*, providing that the employer uses the profit generated from selling the produced object to service their own biological metabolism. Once both parties have generated their wage, they can also engage in other socially enclosed tasks: if the employee spends their wages in a shop, buying food or clothing, then they are fulfilling their own biological necessity while also allowing the shopkeeper to achieve theirs, by providing them with money. The same is true if the employer pays tax on the products they have produced, and that tax is put towards the social care of others in the community. Such examples can be extended widely, to include other employees, delivery drivers, cleaners, accountants, dependent children and families, and so on.

Moreover, such interpersonal and social conditions of enclosure do not need to be economic in nature. Biologically necessary goods can be exchanged for other such goods, or simply donated if a surplus is achieved. If a farmer grows crops for themselves and their family, but has extra at the end of the harvest, they might trade with other farmers locally, or barter for other non-biologically necessary goods. This can of course be expressive of other values, including moral or environmental values, which might

better fall into the mode of *work*, but if it is simply performed so that all parties have sufficient goods to survive, then it is firmly in the mode of *labour*. Even if it does occur in the mode of *work*, it is clear that a social and interpersonal condition of the act is influencing the progression of the task.

### **3.7. Problematic Instances of Enclosure**

Given the phenomenological reduction at the heart of this thesis, it might be apparent that I have largely neglected highly problematic cases of *labour* that appear in the news and across the literature. This is a necessary step to ensure that the central notions of automation and *labour* are as widely application as possible, and avoid succumbing to an overreliance on particular cases or examples. However, as we move towards case studies of *labour* in practice, it is important to comment on the problematic cases of *labour* that arise across the news and literature.

In many cases, the problematic cases of *labour* have a specific issue with one of the conditions of enclosure I have noted above. The dangerous factories of the 18<sup>th</sup> and 19<sup>th</sup> Century were spatially enclosed by crowded, unventilated, and unregulated spaces, that were actively dangerous for those working in them (Hutchins and Harrison 1911). Overly long working hours are a common temporal condition of these spaces, both historically (Arrowsmith 2002) and currently (Skidelsky 2019). Economic exploitation and damaging interpersonal conditions of *labour* are present in automated systems (Eubanks 2019) and cases of in-work poverty (Lohnmann and Marx

2018; Bloodworth 2019; Joseph Rowntree Foundation 2021), while modern slavery persists as the most extremely negative form of interpersonal enclosure (Kara 2017; Kenway 2021). I have defined *labour* as primarily an intention towards biological welfare, understood broadly to include physical, mental, emotional, social, and economic welfare: so cases of *labour* that **do not** facilitate this type of care for an agent's biological welfare are inherently problematic. Poor pay, long hours, dangerous working conditions, coercion, and the threat of violence or familial repercussions are all driving factors for engagement in tasks that do not properly serve an agent's biological metabolism. In some instances, these types of acts are the only means of earning any kind of wage, despite actively working against or failing to meet the agent's biological needs (Shipler 2005). In others, agents are tricked or coerced into their engagement, and then are held in dangerous and precarious working conditions through fear or control (Hatton 2020). Despite laws and campaigns being developed to combat these instances of *labour* (Hutchins and Harrison 1911; Driver 1946; Chateauvert 2013), they persist, and to ignore them would be irresponsible.

As per my definition of *labour*, any instance of *labour* that purports to fulfil the agent's biological metabolism but actually does not, or any instance that actively harms an agent's biological metabolism, is a perversion of *labour* in its true form, and fails to adequately reflect the ideal form of *labour* I am advocating. Importantly, this does not rest on the success or failure of the task: an act of *labour* can produce a biologically

necessary object, but if it does so in a dangerous manner then it is still problematic. Paying a worker a very high wage, but working them into the ground over a long period of time is still detrimental to their welfare. Equally, a biologically-sustainable farm that respects the workers but results in a poor harvest due to weather conditions might not be problematic, but simply unfortunate or unlucky. Only when the act is *actively conditioned to the detriment of the agent's biological welfare* does it become problematic. There is therefore no acceptable task in the mode of *labour* that involves slavery, threat, or violence.<sup>24</sup>

The precise 'location' of the issue can be investigated through the framework of *labour* I have developed. By exploring a task in light of its spatial, temporal, and interpersonal/social conditions, it can be revealed which is detrimental for the agent, whether it is endemic to the task, or whether it can be removed by altering the affecting condition. Beyond any specific value judgements here, such problematic instances of *labour* can also be criticised from a strictly 'mechanical' standpoint: they are no longer fit for purpose as acts of *labour* because they do not allow the involved

---

<sup>24</sup> In speaking of problematic instances of *labour*, a further mode of activity might become apparent: that of *toil*. While *labour* primarily intends towards biological necessity in a cyclical and meaningless manner, some activities might share a cyclicity and meaninglessness, but be motivated by reasons beyond biological necessity. In many legal systems throughout history, punishments have taken the form of 'hard labour', such as breaking rocks or digging holes without a desired outcome other than the 'hard labour' itself. Such cases are certainly cyclical, difficult, and meaningless, but do not serve the agent's biological necessity, often occurring in direct opposition to it (Foucault 1977; Mei 2009; Scott and Flynn 2014; Hatton 2021; Spencer 2022). This is an interesting and important additional mode of activity to consider, one that I leave ample room for in my approach for further investigations.

agents to fulfil their biological metabolism. Such instances are perhaps more obvious candidates for ‘full’ automation, if the danger or detriment of a task cannot be removed by altering its enclosing conditions. While the application of automation is never without some issues or considerations (Paredes and Fleming-Muñoz 2021), a heavy industry that increasingly relies on technology, but remains unavoidably dangerous, such as mining, might benefit from automation in order to remove some of the inherent risk (Ralston et al 2014).

### **3.8. A Marxist Response**

Defining *labour* in this way, as a biologically necessary, cyclical, and universal mode of activity which is enclosed by a number of spatial, temporal, and interpersonal/social conditions is novel, and distinct from perhaps the most commonly found account of labour in the literature: that of Karl Marx. The final discussion of problematic instances of *labour* might lead the reader to immediately raise a Marxist critique of capital, and to argue that the problematic instances of *labour* that I have discussed here can be reframed as capitalist alienation and exploitation. Such critiques are raised across the literature regarding automation and the removal of (what I would term) problematic *labour*, from Marxists (Dean 2012; Srnicek and Williams 2015; Bastani 2019) and non-Marxists (Frank et al 2017; Susskind and Susskind 2017; Graeber 2018; Susskind 2020). In either case, critiquing *labour* through capital involves a commitment to a Marxist (or Marxist-esque) framework, which is the type of account that I am trying to strip

back. Let's first consider the Marxist account of labour, and a potential Marxist response to this chapter, and finish with my own response.

In the broadest possible terms, a Marxist analysis of labour holds a value-theory of labour, one that is a central ontological condition of humanhood, and any resultant issues are analysed in terms of the class tension that arises between capital and labour. The Marxist account argues that capital is the reason that the labourer is *always* alienated or estranged from their labour so that *any and all* instances of labour under capitalism are inherently detrimental to some degree, and that the labourers involved would be better served if capitalist involvement in the labour process was removed. This alienation at the hands of capital occurs in two ways. Firstly, the labourer is physically distanced and alienated from the fruits of their labour, and instead of owning the object they are labouring on, they are given a monetary wage which, by definition, is *never entirely equal to* the value of what they have produced (Fuchs 2014). The capitalist keeps as profit this surplus value created by the labourer and the worker is estranged from seeing the full extent of their value-creation (Screpanti 2019). Secondly, the labourer is economically and legally alienated from the *means* of production because they do not own the space in which the labour occurs, the tools they use, or the administrative structures that support the production (Fuchs 2014). The capitalist owns the factory, the machines, and deals entirely with the policies, administration, and management of the productive process. The labourer cannot therefore dictate their own hours or working conditions and is left at the mercy of

the capitalist who steals surplus value from the labourer by paying them less than their labour is worth (Beller 2018). According to the Marxist account, the labourer is always sustaining a loss because the capitalist is 'skimming off the top' without actually contributing to the productive process. This is specific to labour: Marx *does* distinguish between work, as a general phrase covering the expenditure of energy in a productive process that *all* humans engage in at all times in history, and labour, which *only* arises as a class relation between capital and proletariat (Fuchs and Seignani 2013; Fuchs 2020). The ideal post-capitalist society wouldn't necessitate labour but would instead allow "self-determined work of well-rounded individuals" (Fuchs 2020, p.75).

So why is alienation such an issue for Marx? It could be argued that if a labourer is paid a sufficient wage and treated fairly, they would have no cause to complain because their needs are being met. The Marxist sees alienation as *always* problematic because of the centrality of labour to the human condition. Marx wrote that labour is "the active expression of the labourer's own life" (Marx 1847, p.33); for Engels labour is "the source of all wealth" and "the prime basic condition for all human existence, and this to such an extent that, in a sense, we have to say that labour created man himself" (Engels 1876, p.7). This is specifically 'productive labour', because the human labourer actualises themselves by working on a physical object, transforming the natural world around them according to their will and capacities, rather than simply surviving through 'reproductive labour'. This has the twofold effect of both providing the means of survival *and* allowing

the labourer to actualise themselves through their labouring. As Sean

Sayers writes:

Productive labour is thus, for Marx, the most fundamental and essential human activity, in the sense, first of all, that people must produce in order to consume and in order to live... It is through the process of labour that we make ourselves into human and social creatures and transcend the conditions of mere nature (Sayers 1998, p.32).

Labour is therefore a meaningful activity, through which we assert and reveal ourselves as human beings. It is clear to see why Marx finds an economic and political system in which we are alienated from these capacities undesirable. A Marxist might therefore disagree with my definition of *labour* as a universal essential activity, but one in which human meaning *beyond* survival is *not* created. If labour is understood to be both central to and sufficient for a meaningful life, then presenting an argument in which the presence of capitalism isn't inherently or essentially detrimental would be one that needs refuting.

### 3.8.1. My response to the Marxist response

A number of responses are needed both to disagree with the Marxist reading of labour and to support my own. The first is simply conceptual differences: I am putting forward definitions of *labour* and *work* that are conceptually distinct from those offered by Marx. I see *labour* and *work* as distinct modes of activity embedded in contextual horizons, whereas Marx poses an ontological and value-theory of labour intrinsically opposed to capitalism. The definitions of *labour* and *work* that I offer **can** account for these Marxist fears regarding capitalist exploitation of

labourers, but aren't entirely reduced to seeing *all* problematic instances of *labour* in this way. Capitalist structures can affect the spatial, temporal, and interpersonal conditions of a task in such a way as to exploit, coerce, or generally damage the labourers involved, or to prevent them from sustaining their welfare. I account for these instances as they arise in post-capitalist, post-work, and communist societies. Where Marx is committed to the ideal that a society free from capitalism would simply allow for the self-actualisation of well-rounded agents, the model I am proposing *would still be useful in a fully automated communist state*. This is simply a difference in conceptual commitments: if the reader fully embraces the Marxist concept of labour, the model I am presenting will appear incorrect.

The second response is to highlight the assumption underpinning post-capitalist societies that all the issues with *labour*, current and historical, will be solved by simply removing capitalism. There are two key critiques here. Firstly, it is inaccurate with regard to the history of communist countries that capitalism is *the only* issue, because communist states such as the former USSR (Holmstrom 1977; Silverstone 1983), post-communist countries (Bieler and Salyga 2020), and even socialist countries (Roemer 1982) still exhibit the exploitation of labourers by a non-labouring class. Exploitation and alienation persist in non-capitalist political and economic systems, and negative instances of *labour* cannot be entirely explained as products of capitalism. Secondly, it presumes that even if the removal of capitalism entirely solves the issue of exploitation, the same skills and motivations needed for labouring can be spent in other forms of

activity. The Marxist post-capitalist ideal society is one in which no one labours, given that labour is a form of work that *only emerges under conditions of class relation*. In a post-class society the factory worker would be able to 'self-actualise' as they see fit, using the same capacities that were previously exercised in labouring.

This is problematic for a number of reasons. Firstly, there is a presumption that the skills needed in labour can be used to perform other actions, something which Hannah Arendt argued "rests on the fallacious reasoning that labour power, if not consumed in the maintenance of life, will nourish higher activities" (Veltman 2010, p.71). Beyond unalienated forms of production, such as arts and crafts, there is no reason to believe that the skills of a service or factory worker will allow them to actualise themselves in technological or political pursuits, for example. Moreover, the type of ideal imagined by Marx himself is one that is highly predicated on a very specific lifestyle. His famous quote of an ideal, post-capitalist life is one in which he could "hunt in the morning, fish in the afternoon, rear cattle in the evening, criticise after dinner, just as I have a mind, without ever becoming hunter, fisherman, herdsman or critic" (Marx 1846, p.54). This presumes living in the countryside, or somewhere with access to these activities, as well as the skills to engage in them. If everybody spends their days fishing, rearing cattle, and hunting, there would have to be sufficient space, animal stock, and equipment for everyone to do so. Environmental concerns notwithstanding, this neglects people who live in urban areas, and presupposes a class of people who will write, proofread, print, and

publish the books that we criticise after dinner. Perhaps most importantly, someone is still gutting the fish, preparing the meat, cleaning the muddy boots, and cooking the dinner. The 'utopia' envisioned by Marx seems to be one that is an almost romantic reimagining of Victorian landed gentry, in which these necessities are either all that are left to us, or are completed by another class of either machines or humans.

This enduring presence of necessary labour highlights a further critical issue with the Marxist approach: namely, precisely that there is an enduring category of non-productive and reproductive labour, which would appear to persist into a communist utopia, one which wouldn't appear to be automated because it isn't the actualising productive labour that appears as class struggle for Marx. Such activities disproportionately fall to women, but don't fully fit into capitalist exploitation because they existed before capitalism's growth in society, and will endure after it. Is it the case that women should find these tasks meaningless and devoid of self-actualisation? Veltman argues that activities of reproductive labour "fail to express or actualise [the] human worth" (Veltman 2010, p.57) of the agent, so to present them as meaningful in a post-capitalist society seems as equally exploitative as the capitalist advocating wage labour as meaningful. A Marxist ideal society is *not* one that directly redresses unfairly and unjustly distributed reproductive labour, because the notions at play are too narrow and specific (Ferguson and Folbre 1981; Folbre 1982; Ferguson 1991; Irigaray 1993; Folbre 1994; Weeks 2011; Strober and Donahoe 2017; Ferguson 2019).

Finally, I disagree with the Marxist account of automation. It might be argued in response to my critique of enduring unfairly distributed reproductive labour that automation *would* abolish such tasks. For Marx, the replacement of human labour power for machine power will “redound to the benefit of emancipated labour, and [be] the condition of its emancipation” (Marx 1858, p.701). As discussed in Chapter 1, Marx sees automation as first “throwing [human labour power] back onto the labour market”, which “increases the number of labour-powers which are at the disposal of capitalist exploitation” (Marx 1867, p.567, my bracketing). This will “short[en] the hours of labour, but when employed by capital it lengthens them” (Marx 1867, p.568-569, my bracketing), denoting short-term upheaval that will eventually give way to ‘full automation’ as a decrease in human labour power spreads between industries (ibid. p.503). Such a “mechanical monster whose body fills whole factories, and whose demonic power... finally bursts forth in the fast and feverish whirl of its countless working organs” (ibid. p.503) is the condition for post-capitalist revolution, but one that is created by capitalism itself (Dean 2012; Smith 2020).

Such an account simply has too many additional assumptions, values, and judgements to survive the kind of phenomenological reduction that I am advocating. The Marxist account holds that labour is the chief activity through which human-ness is expressed and actualised; that capitalism is the sole reason for alienating us from our labour; and that the removal of capitalism will solve all issues surrounding the creation of

human meaning and value. Even in minimised forms, these types of assumptions are implicit in the framework. While capitalism is undoubtedly the source of much exploitation and problematic *labour*, it is not *the only* such source. This thesis should not be read as a justification for capitalist exploitation, but rather as a case for understanding capitalist exploitation *within* a model explaining the structural issues within *labour at large*. We must be able to account for Marxist arguments against capitalism, but also be open to cases of *labour* that escape this somewhat narrow framework. Just as I do not make an argument for automation inevitably leading to sci-fi dystopias, I do not agree that automation will inevitably result in a communist or socialist utopia: the question of automation, *labour*, and *work* is necessarily much more complicated than that.

Having developed a conception of *labour* as a biologically necessary, cyclical, and universal mode of activity embedded in a contextual horizon and enclosed by spatial, temporal, and interpersonal/social conditions, formulated as an ideal type and distinguished from Marxist responses, let's now turn to some case studies of the automation of *labour* in practice.

## **4. Automating Labour**

*In a properly automated and educated world, then, machines may prove to be the true humanizing influence. It may be that machines will do the work that makes life possible and that human beings will do all the other things that make life pleasant and worthwhile (Asimov 1990, p.19).*

### **4.1. From Theory to Practice**

In the previous chapter, I sketched a technical and ideal definition of *labour*, as a mode of activity primarily directed towards a concern for an agent's biological metabolism, which is universal to all human beings, occurs cyclically, and is enclosed by spatial, temporal, and interpersonal/social conditions. In Chapters 1 and 2, I offered a definition of automation as the process of enclosing a task from further mediation, intervention, or interaction, through technological means. Both definitions involve a 'stripping back' of the contingent value judgements and presuppositions that are often found in considerations of automation and the future of work, and I offered essential simple definitions for each notion. However, the future of work is not one that can be wholly discussed in conceptual terms. There is a wide range of technological artefacts that have, or are being, developed that threaten to disrupt the world of work for better or worse, and the lived experience of work for many people around the world is highly precarious. So how do my definitions apply to such cases, and what does approaching automation in the way I am proposing allow us to see with real-world examples?

Let's consider three case studies of the automation of *labour*, and explore the practical applications of the definitions I am developing. The

three cases I will explore are self-driving cars; the automation of manufacturing; and interpersonal care technologies. For each I will give a general overview of the case, discuss some of the existing literature on the subject, critique the literature and general notions at play in these discussions, and conclude by applying my definitions of automation and *labour*, suggesting how they might be practically applied to these cases. These cases have been chosen because they are prominent across the literature and popular culture, eliciting a number of reified and future-oriented responses. Self-driving cars are in many ways an emerging case of an actual automated technology, developing from more limited technological artefacts to a seemingly imminent, attainable, and realistic automated consumer electronic artefact. Whether this potentiality is genuine and will be realised in coming years (McBride 2021), or whether these predications are simply a hyperbolic tool of car companies and pipedream of technological developers (Metz 2021a) is hotly debated, but self-driving cars are an important paradigmatic example of an automated technology. As discussed in previous chapters, the automation of manufacturing is an enduring feature of the literature surrounding automation and the future of work (Marx 1867; Rifkin 1995; Bastani 2019), and is therefore an important case to consider in more depth. Finally, the introduction of automated technologies into interpersonal care industries, such as healthcare and sex work, is raising ethical, moral, and ontological questions regarding AI and human workers (Parks 2010; Berg 2021), and might be seen as a case in which my novel evaluative framework misses a

fundamental facet of the issue. Using these three cases, I will highlight the additional contingent values often included in their discussion, and suggest ways in which case-specific conclusions and predictions can still be achieved using my broadly applicable evaluative framework. In stripping back the common sense and narrow discussions surrounding these cases, the application of my definitions will follow a general line of inquiry: “*what is being automated in these cases, in what ways, and for what purposes? How does such a case of automation meaningfully and usefully intersect with the definition of labour?*” These are still concerned with the specific implications of the cases in question, but do not begin with a narrow focus on that case as representative of automation in its entirety: I will leave room for questions surrounding the ‘goodness and badness’ of *each case* after the central definitions and notions have been properly established, *but will not begin with such questions*. Let’s begin with the first case study of the self-driving car.

#### **4.2. Case Study 1: Self-Driving Cars**

In societies around the world, driving plays a significant part in many facets of life, and some form of travelling is a condition of most jobs that are not performed digitally. Commuting to work, the transportation of necessary goods, and travelling for leisure render travel a fundamental part of contemporary life. However, given contemporary ecological conditions, the environmental sustainability of commuting is under close scrutiny in

urban planning, as the design of automobiles and transport systems takes on an urgent political dimension. Many cities are designed around the use of cars, and discussions surrounding the design of future cities often involves a consideration for both transportation needs and the inclusion of environmental sustainability as a guiding force in design (Khan and Zaman 2018; Sturiale and Scuderi 2019). With the opposing effects of Covid-19 reducing the need for commuting but increasing the desirability of individual transportation solutions, self-driving cars have taken on a new significance in public discourse. It is clear to see why the idea of self-driving cars has generated such interest in the public imagination and across academia in recent years, given the ubiquity and necessity of driving and the accompanying simultaneous moral and environmental issues. Prototype self-driving cars have been unveiled by many companies, including Tesla, BMW, Google, and Uber, and some critics heralded 2021 as the year in which they would take hold of the market (McBride 2021). Self-driving cars appear to solve a number of key social issues because they allow for safer, more reliable travel, while most are electric and designed with some regard for their sustainability. While the related technologies of self-driving cars emerge from pre-existing systems, including autopilot technologies, driver assistance systems, and guidance/GPS (Global Positioning System) infrastructures, the possibility of a truly 'self' driving car remains questionable (Metz 2021a; 2021b). Moreover, most of the devices proposed are intended to slot into Western driving habits and markets, and might not properly reflect the different driving practices in

non-Western countries and cities, particularly the sprawling and busy metropolises of New Delhi and Hồ Chí Minh City (Pandey et al 2020).



**Figure 13.** While self-driving cars are often designed for Western roads, non-Western cities and countries have very different driving practices, which might pose issues for the implementation of autonomous vehicles (Galloway 2017).

#### 4.2.1. Self-Driving Cars as Automation

Regardless of the plausibility of such devices, their role as automated tools seems clear: a self-driving car is one that requires no additional input from the owner, other than instructing the vehicle of the desired location and any additional parameters of the journey. The automation of such a device is perhaps most clear if we consider the progression of the task through different instances of technological mediation. Because automation, as I define it, develops over a continuum, beginning with a case containing the least possible level of technological mediation and resulting in a completely enclosed case in which no further human intervention is required (or maybe even possible), it is useful to examine precisely which conditions of enclosure change with each

iteration, in order to both highlight the threshold at which we might say 'automation' has taken place and to identify the exact conditions that are responsible for this change.

The task of driving is one that is always technologically mediated because it requires a car or equivalent vehicle. If we strip back this technological component, it could be argued that the desire or need to get from one place to another is at the heart of the task of driving. Before we consider driving as a distinct act, it is useful to consider the technological progression of the reduced act of simply getting from A to B. The case with the least technological mediation, and most open spatial, temporal, and interpersonal conditions of enclosure, is that of walking or running. In such a case, there is minimal technological mediation, beyond perhaps shoes, prosthetic limbs or a defined path, and the conditions of enclosure are such that it can take place anywhere: in any space, at (and over) any time, and with or without any further social or interpersonal interactions. However, it is also true that walking or running requires the active involvement of the agent in (literally) every step of the task. Even an agent not actively paying attention to their action, who might be said to be walking 'on autopilot', is still actively engaging their body with each step. Other tasks, such as speaking on the phone or thinking about something else (Edensor 2000) are wholly possible while walking or running but the agent needs to be actively involved in the process of the task. My walking cannot be delegated to another agent or animal if *my* getting from A to B is the core aim, although if the intention of the act is to get *something* and

bring it back then delegation might be possible. Precisely because walking and running have active connotations and require the agent to be involved with the act, there is the opportunity to include additional interpersonal conditions of enclosure, such as religious practice or political demonstration (Slavin 2003).

However, there are also limitations to the pursuit of the goal of getting from A to B in this way. There are spatial and temporal limits: despite being very open and accessible, it is a slower way to travel and has limits on its scope and speed; additional training or preparation acts may be required if an agent is to undertake a long walk or run, for example. Under contemporary interpersonal and social conditions there is also a requirement that the space being walked or run in is suitable for pedestrians, and is not wholly given over to automobile transport, for example. Moreover, further conditions might grow in significance depending on the specific context that the act is being taken in: walking at night through a dangerous area might be markedly less conducive to the agent's safety and wellbeing than driving; just as trying to walk underwater might be a redundant form of travelling. While environmentally sustainable, walking is a highly limited act if the intention is to travel between two points that are far away from one another, or contain difficult terrain. Other formulations of the act of getting from A to B which include alternate conditions and further technological mediation may then be considered. Cycling involves a distinctly technological component, but also seems to be closer to walking and running than it does to driving a car.

The act might also be achieved with the use of a horse and cart, or similar animal. Changing the conditions of the task inevitably affects the spatial and temporal conditions of the task, as travelling between the two points becomes faster or the range of travel is extended. Equally such tasks might generate additional further necessary tasks: the agent might have to stable and care for their horse, or engage in the maintenance of their bike. The contextual horizon of such acts also changes: using a bike might be less conducive to religious and political expression; the use of animals might take on additional religious and cultural contexts in different cultures.

In these extended cases the agent is still required to be active throughout the process of travelling, either by guiding and driving the horse or by pedalling the bike: while the effort might be lessened or infrequent, the agent must still involve themselves. Only with the introduction of the horse and cart do we begin to see the agent as a passenger, rather than as a driver. It is in this way that we begin to observe the emergence of the automation of the task. Such comparisons are far from perfect examples of automation: I have already excluded the inclusion of animal power from my definition of automation, and to my knowledge there are no proposals for creating automated robot horse and cart systems. Even if the bicycle in question has a sidecar, or is a tandem, the agent cannot be said to be engaging in an automated task, because there is still a human being actively operating the process. While the goal of travelling might be achieved, and the tenets of automation can be seen

emerging, we cannot yet call walking, cycling, horse-riding, or even any passive formulation of such acts, automation.

It is at this juncture that we can begin to consider the driving of a car. There is a clear progression (albeit not necessarily in a linear fashion) from walking, via the use of a bicycle and horse and cart, to the use of a car. A car is a device that clearly encloses a large number of the requisite tasks in travelling from A to B: rather than having to take every step of a long walk, continuously pedal a bike, or watch a horse's direction and temperament, the agent must now press one of three pedals, monitor their position and speed on the road, and be aware of other drivers. They are spared interaction with the motions of the engine and internal mechanics of the car if it functions properly and in the event of a breakdown can delegate the additional created tasks of repair to a paid mechanic or engineer. The spatial conditions of the task are somewhat more limiting, given that a car must be driven on a specific, legally-mandated road, just as the temporal conditions are greatly expanded but also limited by speed limits and safe driving speeds. There are also additional training and legal requirements in learning to drive, securing the necessary documents and insurance, fuelling and maintaining the vehicle.

If we compare a modern car to the first cars created, modern cars are much easier to operate and can travel further in a quicker and safer manner. However, we still struggle to call either the first cars or contemporary cars automated. Confusion may arise due to the availability

of automatic cars, and an argument might be made that having an automatic gearbox renders such a car automatic on my definition. While the use of an automatic gearbox undoubtedly automates *that specific set of sub-tasks*, and certainly reflects a step closer to the ideal definition of automation presented in Chapter 1, the driver must still actively complete all other tasks, including steering and monitoring speed. Even if a car has lane-assist and cruise-control technologies and the operating of the car itself is 'fully' automated, if the agent still has to concern themselves with the fuelling, maintenance, and directing of the vehicle, then applying my definition still reveals the important ways in which it falls short. Employing a chauffeur does not satisfy the conditions of 'perfect' automation, for the same reason that being a passenger in a horse and cart fails to adequately reflect the definition. If the act remains firmly in the hands of a human agent, even if that agent is different from the initialising agent, then it is not entirely automated. Even if we discount my qualification of automation as always occurring technologically, the human chauffeur is still as susceptible to the issues of the initial agent, and the initial agent cannot reliably detach themselves from the process in the same way that operating a self-driving car allows: the human chauffeur could go on strike, find a new job, or the money used to pay their salary could run out. In more extreme examples, with the use of slaves and overseers, the use of human agents is always unreliable in a mechanical sense. Employing human agents is by definition unregulated precisely because human beings have the capacity to act in unexpected and undesired ways. Until the

process can be bracketed and enclosed to negate all further human intervention, we are not dealing with a fully automated artefact.

It is important to properly explore the ways in which self-driving cars emerge and develop through preceding technological artefacts, and to highlight the key ways in which the task in question is reflected in proposed automated technologies. Let us now turn to self-driving cars in their own right. The term ‘self-driving car’ refers to a wide range of devices, displaying the gradations I have discussed above:

	Level	Name	Degree of Automation	Automation Functions	Requirement of a Human Driver	Market Status
Human Drivers Control the Environment	Level 0	No Automation	No-automation	Driver is in complete control and none of the functions are automated	Driver is in charge of the vehicle	Already Exists in the market
	Level 1	Driver Assistance	Function-specific automation	Involves one or more specific control functions such as steering or braking, throttle controls, etc	Driver still controls most of the functions	Already Exists in the market
	Level 2	Partial Automation	Combined function automation	Involves automation of at least two primary functions including cruise control and lane centering	The drivers are partially relieved to control specific functions	Came in the market in 2013
Automated driving system monitors the environment	Level 3	Conditional Automation	Limited Self-Driving Automation	Safety critical functions such as steering, throttle, brake can be automated.	Level 3 cars need drivers to intervene when the self-driving systems fail	Expected to hit the market by 2020
	Level 4	High Automation	Full-self driving automation	The cars are designed to perform all safety-critical driving functions and monitor roadway conditions for an entire trip.	Driver is not expected to take control	Expected to hit the roads from 2025 onwards
	Level 5	Full Automation	Full-autonomy	Fully autonomous vehicle that can run without any human driver	Drivers not required	No timeline is still given by any automaker

**Figure 14.** A table of autonomous ‘levels’ commonly ascribed to self-driving cars (GreyB, 2021).

It is clear that Level 0 is far more technologically mediated than walking, and that it reflects much more of the ideal definition than cycling does. At the time of writing, cruise- and lane-control at Level 2 are widely available, but the technological developments for the further 3 levels seem much

further away, or much more limited in scope than first imagined (Metz 2021b). Current 'self-driving' cars are more akin to incredibly sophisticated auto-pilot technologies that still require human input at various stages (Geisslinger et al 2021). The realities of the technologies are sharply distinct from the proposed devices offered by car manufacturers and in science fiction. One of the most fundamental proposals for a fully automated car is for the operating agent to fully transform from a driver to a passenger, and to be able to wholly forego *any* further intervention in the process, beyond stating their desired destination, but even this ideal still requires active human intervention to fuel/charge the vehicle, repair and maintain it (even if this will be outsourced to other agents). It is undeniable that a vehicle that operates entirely without any further human intervention, by the passenger or any other related agent, clearly displays the qualities of automation as I define it, but even in the wildest science fiction formulations of such devices, *some* intervention might *always* be required in a practical sense.

While the reality of such self-driving cars, and perhaps even their realistic feasibility, can be called into question, these devices serve as an interesting exploratory point to consider my definition of automation and *labour* in practice. It is clear how a self-driving car operates in relation to my ideal definition of automation, so let's now consider how it might relate to the mode of *labour*.

#### 4.2.2 Self-Driving Cars and Labour

It is clear that travelling by car (or other motorised vehicle) plays an important role for many people worldwide. It is easy to see how the act can be undertaken in the mode of *labour*: many paid employment opportunities require a driven commute; shops and supermarkets might require a driving journey to access them; hospitals are often only accessible by car (or human-driven ambulance); and contemporary social structures often mean that families are more geographically spread out than previously. The maintenance of our biological metabolisms, including the physiological, mental, emotional, economic, and social facets of such a metabolism, *can* require a driven component to complete, and engaging in driving can be directly motivated by such biological concerns. As we saw in the previous section, the intuitive case of driving can be reduced to a need to travel from A to B so it might not be that in all cases the agent must *drive per se*: many countries have public transport systems of buses and trains; the act can be undertaken in one of the lesser technologically mediated ways such as walking or cycling; or there may be the opportunity to outsource the active portion of the task to a taxi driver or chauffeur.

This does not detract from the *possibility* of driving or needing to travel from appearing in the mode of *labour*. Not all parts of the world have access to consumer vehicles, and rural areas or developing countries may lack reliable and effective public transport systems, or an infrastructure of taxi services. Even where public transport and taxi services are available, they might be too expensive or impractical to

effectively meet the biological end of the task in question. The ownership and maintenance of a car might therefore be a biological necessity, despite existing far beyond the usual confines of biological metabolism. If this is the case, the necessary tasks of running, maintaining, and repairing the vehicle can themselves be seen as acts of *labour*: if a job provides necessary economic income, is inaccessible other than by a driven commute and the agent has no access to either public transport or alternative employment, they might have to engage in engine maintenance out of a direct concern for their biological (and economic) welfare in the mode of *labour*. The car becomes a biologically necessary object in this case, just as an ambulance is a biologically necessary object to the victim of a car crash. While this might be complicated by the agent using the same biologically necessary vehicle to engage with meaningful or leisure activities, it does not change the fact that the car *can* be operated in the mode of *labour*, when its usage is primarily intended towards the agent's biological necessity. This is further compounded by contemporary urban planning, which often revolves around car travel for both biologically necessary and all other acts. Indeed, many Western cities were designed or redesigned around the spatial needs of the car: many cities in the USA were centrally planned around the car with highways cutting through inner-city neighbourhoods and amenities located in areas that required a car to access, rendering the use of, or access to, a car mandatory (Jacobs 1961). Such transformations can alienate human beings from traditional forms of cultural, historical, and intersubjective experiences (Redick 2009),

showing that there is always a trade-off when pushing a contextual horizon in one direction at the cost of other directions. This type of urban planning has been repeated in developing countries but without the same success, with car use declining in favour of public transport or smaller vehicles, such as motorbikes and scooters (Kenworthy 2007; 2017). Regardless, it is clear that owning and operating a car *can* occur in the mode of *labour*.

By extension, self-driving cars will also serve these biologically necessary purposes. If a manual car can facilitate travel in the mode of *labour*, a self-driving car will surely perform the same functions but in an easier and less engaged way. Without reducing the need to commute, shop, or go to a hospital, a self-driving car will instead make the process faster, less taxing, and less involved for the initialising agent. Moreover, such devices would also reduce the required training and testing before operating them: the owning agent would no longer have to pass a test or obtain a driving licence because they will be a complete passenger, rather than a driver. On a broader scale, self-driving cars are also predicted to better serve the biological needs of humanity *as a whole* by reducing the human-led risks of driving and making the process of driving safer, for drivers, passengers, and pedestrians (Daily et al 2017). Whether self-driving cars *are* actually safer than human drivers is debatable (Nees 2019), but self-driving cars are *intended* to keep pedestrians and drivers safe and therefore purport to fulfil a clearly biological function. Self-driving cars are often advertised or proposed in these terms: a 2016 advert for new Tesla autopilot technologies featured the tagline “revolutionize your commute”,

and their website proclaims that one of the key features of its autopilot is to “make your Tesla safer and more capable over time” (Tesla 2022). Self-driving cars are therefore intended to fulfil a clear biological function, both for individual agents and for society on the whole.



**Figure 15.** A still from a 2016 Tesla advert for the company’s autopilot technologies.

#### 4.2.3. The Discourse on Self-Driving Cars

Self-driving cars are rarely discussed in the literature in relation to *labour*: much of the contemporary discussion surrounding their development focuses on issues of safety and moral responsibility. Consequently, the discourse surrounding self-driving cars is far from clear-cut, and the proposed effect of these devices has been hotly debated in the literature and in mainstream media. For many scholars it is the implications that such devices will have for the safety of drivers, passengers, and pedestrians that are of the greatest concern (Nielsen and Haustein 2018). The idea of putting the welfare of the ‘driver’ and any passengers and pedestrians into the hands of a fully automated machine has generated much anxiety in the literature, and so many scholars’ first question is

whether the artefacts are sufficiently safe to operate at high speeds, in complex situations, and for long amounts of time (Coelingh and Nilsson 2018; Nees 2019).<sup>25</sup> The particular use of AI to respond to dangerous situations, and questions regarding how to train the devices to properly respond to such situations, have been a focal point of discussion, with many scholars questioning the precise manner in which to teach self-driving cars to make such difficult decisions (Bonneton et al 2015; Borenstein et al 2019; Geisslinger et al 2021). There are also ethical concerns surrounding the implementation of automated cars in urban environments (Mladenovic and McPherson 2016; Epting 2019a), and the types of decision making that the machines will be able to perform (Nyholm and Smids 2016). The Trolley Dilemma has been a popular example and focal point of these ethical and moral discussions in the literature, with many questions being raised as to how self-driving cars might and should respond in situations of unavoidable risk and harm (Wolkenstein 2018; Lawlor 2021). This has produced much interest in the legal framework surrounding self-driving cars, particularly the role of responsibility and agency for automated devices, because they carry such a heavy burden for both passengers and pedestrians (Coeckelbergh 2016; Li et al 2016; Bhargava and Kim 2017; Gurney 2017; Miller 2017; Nyholm 2018).

---

<sup>25</sup> The implementation of such devices and their safety implications are often discussed in relation to Western countries, but would be more difficult issues to compute in busier, more populous, lively, and dynamic areas such as India and Thailand.

Aside from the ethical and moral considerations of self-driving cars, attention is also being paid to the ways in which such devices will reflect social justice issues, including gender and racial biases (Epting 2019b). Of particular urgency is how self-driving cars might address, affect, or be affected by gender inequality (Redshaw 2018; Weber and Kröger 2018); and what elements of racial discrimination might be carried over into them (Hildebrand and Sheller 2018). Concerns regarding the social implications of self-driving cars can intersect with research on the social impact that urban planning has on minority and marginalised communities, which extends to urban planning more generally (Jacobs 1961). While overall the literature is critically engaged with self-driving cars, some scholars also warn against taking the hyperbolic language of developers and retailers as wholly true. These new developments of self-driving technologies are often marketed as “utopian, empowering, and exalting partnership between the human and machine” (Hildebrand 2019, p.169), but this picture does not adequately reflect the nuanced ways in which these machines bring both “pleasure and displeasure” (ibid.), and ways in which our optimism or scepticism regarding their implementation can shape their development (Nielsen and Haustein 2018).

These investigations of the moral, ethical, legal, and social implications of self-driving cars are undoubtedly important: I am not suggesting that we cease to engage in such discussions. I am arguing that such discussions are speculative in nature, and focus wholly on contingent functions of these potential technologies. By definition, they are based on

the way self-driving cars *might* operate or *might* be developed, and conceive of the technologies in terms of what they might *do*, rather than accounting for what they *are*. These moral, ethical, legal, and social questions are pressing and important and I believe that approaching them from the framework I offer in this thesis will result in significantly more open and applicable understanding of the issues. Because many of these technologies are still only proposals and prototypes, we have the opportunity to respond to these issues before they materialise, in a way that is conducive to a full and accurate understanding. Rather than becoming overly concerned in the first instance with autonomous cars being *inherently* morally impermissible or *inherently* dangerous, we should first strip the cases back to their core, and build back up to more general considerations. Without doing so, we might become blind to potential alternative avenues of technological and social development. By firstly questioning how these devices reflect a conception of automation as the enclosing of a task from further mediation, in a general manner not tied to any one example, and by applying the notion of *labour* as a mode of activity primarily intended towards the biological welfare of the affected agents, I believe that we can better account for what is causing anxiety in the case of self-driving cars, and what we want to actualise in eventual future technologies.

#### 4.2.4. Reconsidering Self-Driving Cars

The ways in which the example of self-driving cars aligns with my definitions of automation and *labour* have been established. What exactly

does such an approach offer to the current literature? It will become apparent, if it was not already, that the discourse about self-driving cars does not concern itself with technological advances being pursued simply for their own sake: the issues raised in the literature are not with the technologies in isolation, but rather with what they are being used *for*, and what potential implications they *might have* (Metz and Boudette 2021). According to my definitions, what are the guiding motivations governing the development of such technologies? There are two answers: in relation to my definition of automation, the guiding motivation is to fully enclose the task of travelling by car from further active human intervention; in relation to my definition of *labour*, the primary concern is for fulfilling biologically necessary tasks, and protecting/reflecting/maintaining the biological welfare of the affected agents, be they ‘driver’<sup>26</sup>, passenger, or pedestrian. Let’s consider some implications of these new approaches.

If we define the task in question as enclosing *the travelling from A to B* from further human intervention, the development of a self-driving car might not be the most appropriate response from a purely functional standpoint. In order to facilitate an agent’s, or *all agents’*, capacity to travel to their desired location, individual vehicles might *seem* to be the best response, but come with a large amount of functional difficulties. The overarching logistical network connecting all the vehicles together would have to be all-encompassing and infallible, able to deal with a large number

---

<sup>26</sup> Perhaps a more appropriate term for the ‘driver’ of a self-driving car would be ‘owner’ or ‘operator’.

of individually moving parts, thereby requiring an *incredibly* sophisticated, capable, and reliable technological form of AI. This might be a singular 'brain' controlling all the moving pieces, or a multitude of individual 'brains' (either in each individual car, or operated by each company that produces and sells self-driving cars): in either case, it would take a staggering amount of data processing, given that all individual self-driving cars would have to refer to a shared set of data regarding global positioning, local positioning, traffic levels, weather warnings, and so on. The AI technologies that go into each self-driving car must, by definition, be able to acknowledge and respond to one another, so to have as many self-driving cars on the road as there are people travelling would be an incredibly complicated network of data to manage. Moreover, as the number of vehicles in motion increases, so too does the number of additional activities that are made necessary: more cars on the road mean more potential accidents, and thereby more accident response units (either human or automated themselves); more cars mean more possibilities of breakdowns, and thereby more repair centres (again, either human or automated); and the production of a high volume of vehicles requires a large enough manufacturing system for initial production, plus all their replacements (the automation of which will be the focus of the next case study). While self-driving cars do enclose the task of travelling for individual agents, the additional forms of *labour* that emerge (such as repair, particularly if self-driving cars continue to fulfil biologically central positions in contemporary life) might pull us back from understanding the

process as perfectly automated, according to my definition, because a huge amount of human effort would still need to be expended in maintenance and repair.

An alternative might therefore be to expand public transport systems, rather than expanding individual vehicles. Expanding a network of trains and buses to serve the needs of all citizens in an area, and automating their operation (as with London's automated Docklands Light Railway), would result in fewer 'moving pieces' than self-driving cars, which could ensure increased reliability and safety. It also reduces the necessary repair, maintenance, and emergency response contingencies, and might be easier to maintain higher levels of safety. Automated taxi services could operate in areas that aren't reached by public transport, and automated train and bus lines could even be implemented *alongside* self-driving cars to further reduce the overall number of 'moving parts' on the road. These are evaluative considerations, rather than normative ones: the primary concern of the task in question (getting people from A to B in a safe, effective, and easy manner) can be achieved through an expanded automated public transport system just as easily, and perhaps even more effectively, than a population's worth of self-driving cars. Normative implications can also be considered: where much of the discussion surrounds the moral responsibility of self-driving cars which crash or injure pedestrians, the moral responsibility of a public transport system would lie with the governing body that implements it, and with the company that produces it, because there is less of a role for the users of the service to

actively engage in it. If the desire of self-driving cars is to reduce all users to the role of passengers, then a public transport system would seem to achieve it more readily than private autonomous vehicles.

There are also implications for the biological condition of humanity *as a whole*, because scholars have long identified public transport as a more environmentally sustainable form of transportation than private vehicles (Garling and Schuitema 2007), despite advances in 'clean' automobile technologies (Giles-Corti et al 2016). Using fewer resources to run a transportation system, to build and repair the relevant vehicles, and a lower space requirement for the system itself renders it more biologically friendly in an overarching sense. This does not mean that it fails to meet the requirements of the task: agents can still use public transport (and perhaps additional walking or cycling) to get to their destination in a safe and effective manner. Given that in urban settings it is often necessary to park away from the desired destination and walk the rest of the way, the inclusion of walking at either end of the journey is not something unique to public transportation. Furthermore, such technological developments could be combined with similarly intended social, political, and economic changes: if the task of travelling is made biologically necessary because of a paid job that requires a commute, perhaps more flexible working conditions could also be implemented to reduce the need of travelling as a biological necessity. If the task is appearing in the mode of *labour*, removing the commute altogether might better allow the agent to fulfil their needs, if working from home is also accompanied by sufficient social

and interpersonal interaction to stave off loneliness or to identify mental health issues. The Covid-19 pandemic has increased attention on the practice of commuting for work, because during the national and international lockdowns many began to work from home, and some critics have suggested that we should not return to all pre-pandemic working practices, including commuting (Conger 2020; Kari 2020; Roy 2020; Soojung-Kim Pang 2020b). Rather than everyone having a self-driving car, we could travel less and use automated public transport systems when travel is necessary, better reflecting the biological needs of both individual travellers and humanity as a whole.



**Figure 16.** An example of London’s automated Docklands Light Railway (DLR) and its proposed expansion as of 2020 (Talora 2020).

I have previously discussed that pursuing an act in one mode can expand the contextual horizon of the act in one direction at the cost of foreclosing it in another, creating new opportunities at the cost of old

opportunities or other potentialities. What is lost in pursuing the automation of travelling in this way, rather than via self-driving cars? Perhaps the most obvious foreclosing by automated public transport would be the engagement of driving in the mode of *work*. The driving of cars not only fulfils a biological purpose, but is also pursued as sport racing. Formula 1, rally driving, or NASCAR are examples of driving in which the human agent retains full control of the vehicle, demonstrating their skill and bravery by actively racing a car against other humans. In both developing self-driving cars or by automating travel through automated public transport systems, there might be a reduction in the possibility of sport racing. Equally, such movements might also give further significance to sport racing because the distinction of human drivers from automated vehicles might lead to additional value being placed on their skills: sport drivers might be some of the last human beings to actively drive as we understand it now. The opportunities to experience sport driving might be reduced as experiencing car travel is altered (in self-driving cars) or removed entirely (with automated public transport). Self-driving cars might develop their own type of drone racing, allowing for meaningful engagement in a different sort of 'piloting', but previous versions of racing are undoubtedly being foreclosed.

Specific to solving the issue of travel through the implementation of automated public transport systems would be foreclosing of some of the ways in which individuals can meaningfully engage with driving a car. For some people, owning and maintaining a car of their own, maximising the

efficiency of the engine, or restoring a rare classic model, is meaningful in its own right. For others, the act of driving can be meaningful beyond biological necessity, perhaps as a way of expressing affection or dedication. Learning to drive and owning a first car may be a significant moment in young people's lives in the UK, and this might not be reproducible with automated public transport. Rushing to see a loved one or in an emergency, showing off by driving quickly in front of friends, or sharing the driving on a long journey are all forms of expressive driving that would be lost, either partly by self-driving cars or wholly by automated public transport. The place of driving in popular culture reflects these kinds of meaningful engagement with driving: Roy Orbison's 1987 song "*I Drove All Night*" might not be replicated in a self-driving car or train, because sitting in an autonomous vehicle doesn't match actively driving. On film and TV, the trope of the 'high-speed car chase' would be very different if it were two self-driving cars, even if it were possible to program: it would seem morally irresponsible to fit an autonomous car with a 'high-speed chase' setting. Of course, with every push of a contextual horizon in one direction, new possibilities will be created as others are foreclosed, and so other forms of media and expressive engagement with travel will emerge but it is important to also note those that will be removed.

The intention to make travelling more wholly enclosed by technological means, safer, and easier is undoubtedly a pressing one for contemporary society. Identifying self-driving cars as the only response to this issue, or at least as an inevitable response, is inherently limiting. When

stripping back the issue to its central intention of travelling and then comparing this intention to the two definitions of automation and *labour*, I argue that other alternatives become clear. Even if it is not agreed that my suggestions here are plausible or effective, I have demonstrated that self-driving cars are not the only response. Moreover, critiquing individual cases of self-driving cars does not have to result in generic claims regarding a reified notion of 'self-driving cars': I have critiqued the technologies in terms of their functional usage, and then in turn critiqued their wider implications. We need not concern ourselves with the speculative moral implications of a device if, in the first instance, it does not adequately solve the problem it is intended to address in a mechanical sense. Neither technological development is wholly apparent yet, and so we have the opportunity to develop one and neglect the other, and I believe that my dual definitions of automation and *labour* can help in framing more clearly what is at stake.

### **4.3. Case Study 2: The Automation of Manufacturing**

Intertwined with the production of self-driving cars is the automation of manufacturing. Manufacturing and production have been important cases in philosophical considerations of automation since the Industrial Revolution, and is perhaps the first example that might come to mind when the automation of work is raised. Practically speaking, the automation of manufacturing is fundamental for other forms of

automation to be possible, and is a cornerstone of many ‘post-scarcity’ economic models (Srniczek and Williams 2015; Bastani 2019). Given the necessity of manufactured goods today, the ‘full’ automation of manufacturing production is one that would have a far-reaching impact across society (Carlsson 1995). Manufacturing is an industry in which the application of automation also seems both possible and imminent, with designs for ‘lights-out’ factories, populated entirely by automated robotic arms running in complete darkness (Erdoğan 2019) threatening to become the standard for manufacturing in the Western world. Of course, such images are often proposed in the literature in a particular reified manner: the sterile and tireless human-free factory floor is one that allows the newly displaced human labourers to spend their endless free time as they see fit; or they are depicted as brooding and insidious sites of mechanistic and distinctly inhuman production, not replacing labourers with freedom but displacing them into forced unemployment without purpose, support, or meaning. While it is true that automation has been realised in many factories, and that the automation of manufacturing is an important case to consider in practical terms, to begin from a specific, narrow account is inherently limiting, and so I will apply a phenomenological reduction before considering how the case relates to my notions of automation and *labour*.

#### 4.3.1. Manufacturing and Automation

The type of manufacturing I am referring to, and which is generally referred to in the literature with regard to the automation of manufacturing, is the large-scale, technologically mediated production,

fabrication, or manufacture of goods or services, usually taking place in a factory. Therefore the most un-automated and non-technologically-mediated example doesn't quite fit the case, unlike the progression from walking to self-driving cars. An individual agent could, without use of sophisticated technological tools or industrial scale machinery, employ learned techniques to manufacture a given object using natural materials at their disposal. In opposition to the types of manufacturing I am discussing here, such acts would be inherently small-scale, focused on the production of single objects, with a lot of deliberate time and care taken in their design and production. In response to the perceived damage and denigration of the productive practices popularised in the Industrial Revolution, the Arts and Crafts Movement began in 1880s Britain, arguing that industrial production methods were the opposite of meaningful art, and were socially dangerous and demeaning. The Movement advocated for products that were created with integrity, deliberate care and attention, and a care for the human beings involved (Cumming and Kaplan 1991). If such methods of production were presented as an alternative to *all* large-scale manufacturing, contemporary society would be impossible to maintain in its current form. More importantly for this thesis, such forms of production would be antithetical to the inclusion of automation: precisely by their nature as deliberate, socially aware, and distinctly human modes of production, the use of automated tools would negate their very purpose (Triggs 2012). Highlighting issues with the automation of contemporary manufacturing does not necessarily result in a rejection of large-scale

technologically mediated manufacturing as a whole: in fact, I argue that doing so misses the fundamental quality of the act in its own right.

In defining manufacturing as large-scale, industrial, technological mediated forms of production in their most simple form, the definition extends from factories to include power plants, large-scale companies that deal with data, mechanised agriculture, and other such sites of production. The least automated examples of such manufacturing industries might be those of late 18<sup>th</sup> and early 19<sup>th</sup> Century textile mills in England (Hobsbawm 1962; 1975), which can perhaps be cited as the first instance of manufacturing as it is being discussed here. These cases used newly developed and specifically intended machinery to complete certain sub-tasks, but also still relied on human workers to complete many other additional emergent tasks. Children were employed to get into the small spaces surrounding these machines, to clean and reload them, while human workers operated and interacted with machines throughout the process (Hutchins and Harrison 1911). 19<sup>th</sup> Century factories certainly display some of the qualities of automation, and are undeniably 'closer' to the ideal type defined in Chapter 1 than an individual agent producing goods at home, but they are not paradigmatic cases of automation precisely because they still relied on large numbers of human workers to operate, clean, fuel, maintain, and repair the machines, as well as to collect the emergent product. Moreover, even with the advent of Taylorism in the late 19<sup>th</sup> Century and the scientific management of production, the additional necessary tasks associated with such factories, including

supervision, management, accounting, delivery, and logistics remained firmly completed by human beings, further suggesting a gap between these cases and automation as I am defining it. From this imperfect point, we can see that the necessary technologies involved in manufacturing have become increasingly sophisticated, advanced, and productive, and the role played by human agents in these processes has changed significantly. At the beginning of the Industrial Revolution, the tasks left to human beings might have been onerous, repetitive, and boring, but were also somewhat expansive, requiring multiple stages and technical knowledge. As technologies have advanced and been augmented with social practices like assembly line and lean manufacturing, the role of human beings has changed: tasks left to human hands in manufacturing now are overtly simple tasks undertaken at incredibly high volumes. This demands large numbers of human agents to behave in a machine-like manner to complete tasks that are easy for human beings, but (currently) difficult to program into machines (Jones 2021). However, some manufacturing plants still rely on human agents for supervision, maintenance, and specific technical job roles (Gunther 2005; Acemoglu and Restrepo 2018), although technologies are beginning to fulfil these roles in other industries (Del Ray 2019). The image of a factory floor fully populated by robotic arms and advanced production machinery, with a few human agents fulfilling highly technical, deeply human, or simple supervisory roles, is popular across the literature. 'Lights-out' automation, in which no human agents intervene in the production of a given object (Lee 2018), is fundamental for the futures

imagined by 'post-work' and post-capitalist scholars (Marx 1867; Bastani 2019; Danaher 2019).

This is perhaps clearest in automotive factories. When first developed in the early 20<sup>th</sup> Century, factories designed for the production of automobiles employed large numbers of human workers in conjunction with sophisticated machines designed to complete specific sub-tasks, and automotive factories were huge employers globally (Ryan and Campo 2013). These factories displayed limited, but undeniable, qualities of automation. Over time, the technologies became more sophisticated and required different, but less, human intervention, which was coupled with 'lean' or 'just-in-time' production methods introduced in the 1950s and 1960s, ensuring that no time or money was wasted and production ran at a maximum (Turnbull 1988; Moody 2017). The role of human workers significantly changed, employment levels dropped, and qualities of automation became clearer. Today, automotive factories utilise automated robotic arms across their assembly lines, and the role of human workers has further changed, now limited to supervision, maintenance, and additional administrative duties. The progressive implementation of automation has been gradual, but is now closer than ever to the ideal definition I offer.



**Figure 17.** An image of a Ford Motor Co. factory floor (Guo 2017).

#### 4.3.2. Manufacturing and *Labour*

The connection between manufacturing and automation is clear and explicit. I argue that the connection between manufacturing and *labour* is equally as clear, but will distinguish my account from other (political) discussions of automation and labour (Marx 1858; 1867). As mentioned above, manufacturing can be formulated as a form of employment which has a clear biological intent in contemporary society: a human being engaging in manufacturing who does so in order to earn a wage and fulfil their biological and economic necessities is clearly acting in the mode of *labour* as I define it. If we understand manufacturing plants as offering paid employment as a biological necessity in the mode of *labour*, their automation seems counterintuitive without replacement systems of either employment or UBI (Lowrey 2018). This is a general distinction with *all* forms of employment under capitalism, with any increase in unemployment being antithetical to the affected workers' biological welfare (Miller 2015; Mason 2016). Manufacturing can fulfil clear biologically necessary ends beyond paid employment, and often does so in

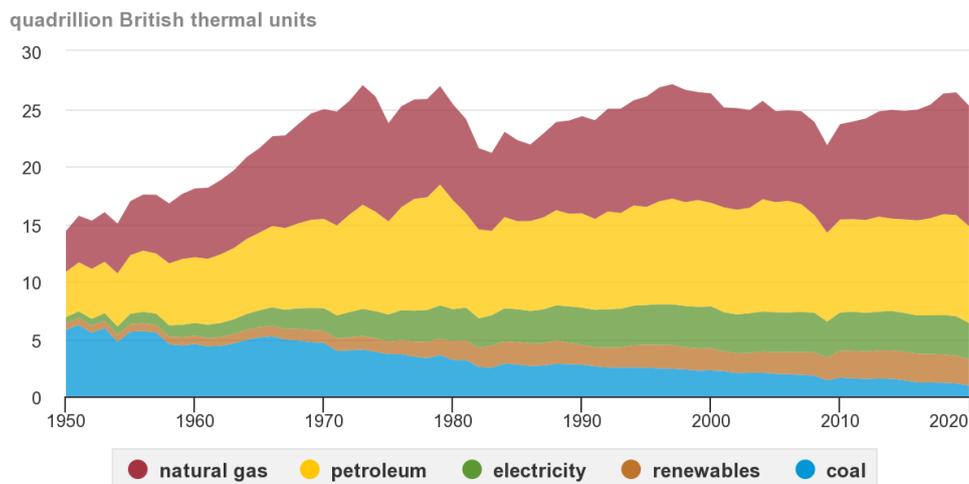
contemporary society. As discussed in the previous case study, cars *can* fulfil a biological purpose and *can* be utilised in the mode of *labour*, and therefore any factory that produces them is also fulfilling a biological need in society to some extent. Perhaps more directly, my open notion of manufacturing also includes other factories and power plants, which produce explicitly biological goods and services: from the power plants that produce the necessary electricity to keep society (and therefore biological metabolism *on the whole*) provided with energy, to the factories producing other necessary objects including food, housing, and clothing, manufacturing can mass produce many contemporary biological goods. Of course, this does not have to be the case, and factories can also produce non-necessary goods but for the purposes of this case study, it is sufficient that manufacturing *can* be undertaken in, or to serve, the mode of *labour*, either through *what* is produced or the paid employment included *within* it.

However, manufacturing can also interact with the mode of *labour* in problematic and detrimental ways for the agents involved, or for humanity at large. The simplification of a manufacturing task via an automated machine isn't necessarily a problem in itself (Keohane 2015), but can result in detrimental mental and physical effects on the affected worker. Where automated technologies get incredibly sophisticated, but human agents remain employed for specific menial tasks, then the human agents can become bored, emotionally drained, or somewhat subservient to the machine being used (Ware 1982), to the point of either feeling or

becoming largely 'useless' (Topf 2020). The emotional and mental stress that this can cause agents is significant (Hochschild 1983; Veltman 2016), especially when it coincides with unemployment or poor working conditions. If the application of automation is mismanaged, then involved human agents can become reduced to 'cogs' in the process, having to meet inhuman production quotas and operate in increasingly difficult working conditions while the industry becomes increasingly *displaced*. A key example here is the logistical factories of Amazon's 'fulfilment centres' (Richardson et al 2020), which employ extremely lean methods in conjunction with automated technologies, to the detriment of the human agents involved.

On a more global scale, power plants undoubtedly provide a biologically significant resource: but many have used, and indeed still use, fuels that are environmentally unsustainable, and as a result fulfil an immediate biological need at the cost of longer term biological welfare for society as a whole. While there is a shift occurring towards renewable and sustainable energy sources, factories and power plants that rely on coal, gas, or petroleum, or those that use large amounts of plastic, are antithetical to the biological welfare of humanity as a whole.

### U.S. industrial sector energy use by source, 1950-2020



Note: Includes energy sources used as feedstocks in manufacturing products. Electricity is retail sales of electricity to the sector and excludes electric system energy losses associated with the retail sales.  
Source: U.S. Energy Information Administration, *Monthly Energy Review*, Table 2.4, April 2021

**Figure 18.** Use of fuel sources in US factories between 1950 and 2020 (EIA 2021).

Given the global ecological impact of manufacturing industries, factories and manufacturing plants have a duty to acknowledge and respond to their environmental effects (Chang and Sam 2015). However, it is not only factories that have a negative ecological impact, and an effect on the global conditions of *labour*, but also mass-farming (Capper et al 2009; Blanchette 2019), transportation systems (Kohn and Brodin 2008; Condurat et al 2017), and even digital manufacturing plants, such as cryptocurrency (Egiyi and Ofoegbu 2020; Goodkind et al 2020). Concerns for the future of ecological sustainability, which is foundational to the mode of *labour* and biological welfare, often cite manufacturing as a key area in need of redress (Barnes 2016; Thunberg 2019; Wallace-Wells 2019). A clear connection between manufacturing and *labour* is therefore undeniable, but is not necessarily an inherently positive one.

### 4.3.3. The Discourse on Manufacturing

The literature surrounding the automation of manufacturing highlights this tension between global necessity and detrimental implementation. The presence of automation in manufacturing and its continued effect on employment have generated much discussion surrounding technological unemployment in these industries. There are frequent stories in news media regarding the growing and threatened unemployment created by automating factories and plants, particularly in light of the further difficulties presented by Covid-19. Stories claiming that automation is being adopted “faster than expected” in Wales, and that 8 million UK jobs could be lost to automation by 2030 are being published by news outlets including the BBC (Price 2021) and Forbes (Gaskell 2020); similar concerns are raised across academia in relation to technological unemployment in factories (Carr 2014; Ford 2015; Blanchflower 2019) and the service sector (Prassl 2018; Sharma et al 2021). The impact that automation has on the meaningfulness of manufacturing jobs, regardless of employment levels, has also been raised, with the simplification and deskilling of these jobs being held as inherently detrimental to the involved agents’ welfare (Wall et al 1987; Wood 1987; Autor 2015; Mueller 2021). There is a concern that either the jobs available in manufacturing are not beneficial for the workers involved, or that the jobs *are* conducive to welfare, but that they’re being taken away by automated machines.

On the other hand, scholars have also argued that while manufacturing does support the biological metabolism of those involved,

active engagement in such processes is not itself necessary, and thereby the automation of such industries can be beneficial. 'Post-work' theorists often cite the automation of manufacturing as a key moment for social and economic change, so that our biologically necessary goods can be produced without us actually having to do anything (Bastani 2019; Danaher 2019; Benanav 2020). For others, it is that these jobs are now largely meaningless, boring, and draining in some way that renders their automation a net positive for the newly displaced agents (Srnicke and Williams 2015; Graeber 2018). The automation of manufacturing has been a consistent presence in the philosophy of work since Marx's time of writing (Bennett 1979; Noble 1984; Bennett 1993) and his own positivity regarding the automation of the factory as a moment of political and social emancipation (Marx 1858; 1867; Engels 1880) has been echoed and repeated by more recent scholars (Rifkin 1995; Frase 2016).

Between these two viewpoints of automation of manufacturing being either wholly good or wholly bad lies an aspect of the literature that advocates for a middle ground, one of 'human-centric' automation. In this aspect, the biological necessity of manufacturing is acknowledged, as well as the currently draining and detrimental jobs found in the manufacturing industry, and arguments are made for the implementation of automation to relieve pressure and mundanity, but also to still include human action in manufacturing processes (Billings and Graeber 1989; Agrawal et al 2018; Korinek and Stiglitz 2021). A human-centric response to these utopian and dystopian imaginaries of automated manufacturing futures is similar to my

own: dystopian futures of technological unemployment and  
meaninglessness are entirely too narrow, demanding immediate practical  
responses to various crises without concern for the greater emerging  
future of manufacturing and *labour*; and that utopian imaginaries of  
endless leisure and freedom are “displaced too much onto the field of the  
‘imaginary’” (Turchetto, 1991), and neglect the reality of such jobs *now*. I  
argue that the literature is overly focused on a contingent function of  
automation in the manufacturing industry, basing generic claims regarding  
automation on the whole on narrow and limited examples, thereby  
neglecting a holistic view of the issue in its entirety.

#### 4.3.4. Reconsidering Manufacturing

How might my definitions of automation, as the enclosing of a task  
from further human intervention, and *labour*, as a mode of activity  
primarily intended towards the biological welfare of affected agents, be  
interjected into the literature on this issue? Let’s reflect on the automation  
of manufacturing in relation to these two notions.

If we strip back both the positive and negative view of the  
automation of manufacturing, particularly those of technological  
unemployment and ‘post-work’, we can see that there is a fundamental  
assumption being made: automation *can and will* replace *all* human labour  
in manufacturing industries. The reality of contemporary manufacturing is  
that certain robotic and automated systems can perform set physical and  
digital functions but that a huge number of tasks still require human

agents. Far from being perfect instances of automation as I define it, contemporary automated manufacturing creates additional tasks for humans to complete: although this will not replace the jobs lost through the implementation of automated machinery, it does not fully enclose the industry from human intervention. Often these tasks are simple for human beings to perform, but are very difficult to train machines to do: simplistic tasks like pattern and picture recognition are easy for human beings, but require huge data sets before machines can perform them (Altenried 2022). The automated machines that are being employed in factories and plants have an underclass of poorly paid human trainers guiding their AI, far from the full automation or complete unemployment predicted by scholars (Jones 2021). While the automation of manufacturing certainly reflects some of the qualities of automation, it is lacking others.

The relation between manufacturing and *labour* is particularly interesting. If a wholly automated factory continues to produce or provide the biologically necessary object or service, then it might still be wholly acceptable in terms of operation in the mode of *labour*. A canned food factory, car factory, or power plant will provide the goods whether automated or not. If these factories are instead seen to produce additional biologically necessary services such as stable wages that remain economically necessary under contemporary conditions, then their automation must coincide with a replacement of this service. This might be UBI or some type of state-provided wage or subsidy but equally, other novel solutions might be developed, such as *replaced/displaced* agents

being paid a portion of whatever the automated technology that replaced them produces. Agents would then be somewhat responsible for 'their' machine, or part of the machine that *replaced/displaced* them, earning a wage through the same methods as previously. In this example, the factory would still provide the biologically necessary goods or service, the owner of the factory would still be able to extract a biologically necessary wage from their ownership, and the affected agents could maintain a semblance of biologically necessary employment. In such terms, the job itself is not biologically necessary, but the economic wage gained through it is: we need not adopt 'post-work' or 'anti-work' policies, but *could* instead develop forms of automation that simply revolutionise employment. After all, why should it only be business owners that directly benefit from automation?

This final point should also serve to further emphasise the problem with adopting a narrow and reified prediction of automation in manufacturing in the first instance. There is nothing intrinsic to the implementation of robotic arms, digital supervisors, or algorithmic processes in a factory that determine what any subsequent economic, political, or social structures will look like. Nowhere within the enclosure of a productive task from further human intervention is it written that the affected human agent setting it in motion (as opposed to the owner of the machine) cannot still collect or benefit from the produced goods, in line with their biological necessity. Rather than focusing on the essential nature of automation, accounts of technological unemployment or automated

utopia that focus on the cases of the automation of manufacturing are based on overly narrow cases: a 'fully' automated factory, or a society populated entirely by 'fully' automated factories, is *just as easily* read as a communist utopia as it is a capitalist dystopia, and as a communist dystopia and a capitalist utopia.

This is compounded by the difficulty in moving from the automation of manufacturing to other industries. Manufacturing, even in the broad manner that I have defined it, has its own peculiarities and specificities, and as a result any technological advances made will not be readily applicable to other industries. The building of a car, for example, requires relatively straightforward automation: the movements of the human agents can be mimicked and changed by robotic arms and machines. Those same arms cannot be intrinsically repurposed into other factories or industries. Moreover, the automation of the production of other goods is not so easily automated: the production of art and music, of buildings, or of education cannot be automated as though they occur in a factory. Any predicted job losses or social changes that occur within the manufacturing industry will be specific to that industry, which affords us the opportunity to respond to those issues as they appear in that industry, in light of automation and *labour* as I define them, but does not necessarily translate to society at large.

Finally, while I offer a novel evaluative framework for considering the automation of manufacturing, it might become clear that some forms

of manufacturing are dangerous or detrimental and the complete removal of human beings from these processes is desirable. Any manufacturing process that uses dangerous chemicals, unpredictable and dangerous machinery, or requires levels of menial repetition that aren't suited to human involvement can still be wholly automated on my view: the novel evaluative framework being developed here is intended to interject on *all* cases of automation and work, regardless of its specific content.

Manufacturing fulfils a clear biological purpose in contemporary society, and therefore can be undertaken in the mode of *labour*. Approaching the issue through the definitions I have offered can reveal when the process itself produces biologically necessary goods, and when the process *is* the biologically necessary good. More dynamic approaches to automation need to be developed that reflect this dualistic nature of manufacturing, and indeed acts of *labour* more generally, given the centrality and ubiquity of manufacturing in contemporary society. Just as with self-driving cars, approaching the issue of manufacturing with these definitions in mind can reveal useful and novel approaches to its automation.

#### **4.4. Case Study 3: Interpersonal Care Labour**

Self-driving cars and manufacturing are relatively intuitive examples of both automation and *labour*, and the two concepts are considered in conjunction, as well as individually, across the literature. These cases clearly have a technological component, can be understood in a similar

manner when automated and unautomated, and relate to both biological necessity and economic conditioning in a straightforward way. Case-specific concerns can be put aside without necessarily losing anything from the example: we can consider self-driving cars purely as a means of transportation, and we can consider manufacturing strictly in terms of the goods it produces and the biological necessities to which it relates.

However, not all instances of *labour* can be stripped of their associated values in such a direct manner, and not all cases of automation lend themselves to essentialist and evaluative consideration in the first instance. It would therefore be dishonest to say that my definition can be applied to any case of automation and *labour* without any further considerations being made. This is perhaps most directly related to instances of *labour* that might seem to contain additional value judgements beyond biological necessity in a strictly survivalist sense, in particular, acts of *labour* that involve or require a level of care and caring, which relate to services or transformations that are not wholly reducible to a specific external object or value. As discussed earlier, many tasks that fall into care and caring are unpaid, often referred to as ‘reproductive’ labour,<sup>27</sup> and do not invite the process of automation in as obvious a way as factories or self-driving cars do. Furthermore, such instances are much more difficult to separate from

---

<sup>27</sup> To reiterate, I avoid using the term ‘reproductive labour’ to differentiate distinct modes of activity, because it draws an arbitrary distinction based on the contingent economic quality and value of the act. Biologically necessary acts will endure after the end of capitalism, and the meaningful aspects of contemporary jobs can still be achieved after automation: distinguishing between productive and reproductive labour is therefore precisely the kind of contingent formulations of activities that I am trying to avoid.

the specific values that accompany them, because in many ways the activities are intrinsically linked to the values attached to them: caring for someone denotes a particular stance towards that person, or towards the act of caring itself, and the bare motions of the act cannot always sufficiently provide a complete version of it. It might seem that reducing acts of care, or any other form of *labour* that is less strictly mechanical, in that way that I advocated for self-driving cars and manufacturing is unsatisfactory. As a result, such cases might seem to break my definition, or denote a clear limit to its usage. To reiterate, I am not trying to completely eliminate these additional considerations of automated work, but rather to approach these questions through a novel evaluative framework that does not focus on a narrow and limited understanding, definition, or set of examples. In order to assuage these concerns, let's consider the automation of interpersonal care in the mode of *labour*.

Within the term 'interpersonal care' I am including any form of activity that involves an agent actively interacting with, caring for, or concerning themselves with the biological metabolism of another agent, including their physiological welfare, their mental and emotional wellbeing, and so on. Industries that fall under such a categorisation therefore include healthcare, parenting, and sex work, although additional industries such as service work might also be considered. Using such a broad and open term is a deliberate move away from other more common terminology deployed across the literature. One other key categorisation of some of the related acts is 'reproductive labour', which is a term that I have previously noted

my avoidance of. The term 'reproductive labour' is particularly insufficient here: it draws an arbitrary distinction between 'productive labour', ignoring the reality that many acts of interpersonal care *do* produce *something*; it contains an implicit judgement regarding the frequent lack of pay in these acts, which (while an important issue) only applies to certain cases; it frames the concept more clearly in relation to what is being produced, rather than to the process itself. Moreover, the use of the term 'labour' is at odds with my own usage, which will inevitably cause confusion as the discussion progresses, and is the same reason that I will avoid relying on related terms for my own analysis, such as 'sex work'. By using the term interpersonal care, I hope to include considerations for all cases that fall into this definition, and will draw attention to specific industries where necessary. On the whole, my interest in interpersonal care here is as a form of *labour* which seems to include additional concerns regarding the provider or recipient's biological metabolism, beyond their basic survival.

It is precisely because of this additional level of care, affection, concern, or trust that raises questions regarding the possible inclusion of automation. Caring is a distinctly human act, emotion, or disposition, and if care is fundamental to the act in question, then including automation might seem to strip it of its very essence. But this has not stopped scholars and developers considering the types of technologies that might be used in these technologies, including sex robots (Richardson 2015; Danaher and McArthur 2017; Owsianik 2021) and automated healthcare technologies

(Majumder et al 2017; Davenport and Kalakota 2019; Sharma et al 2021).

The difficulty in applying my phenomenological reduction is that we can strip back contingent moral and ethical concerns for the *use* of such technologies, but if these scholars are highlighting the centrality of moral and ethical concerns *to the acts themselves*, then such a reduction seems overly destructive. Rather than simply avoiding asking if displacing actors is a good or bad thing, which I would argue is contingent to the central issue itself, interpersonal care seems to raise the question of whether such tools can successfully enclose the act at all (Laitinen et al 2019; Lancaster 2019), or whether they can only ever mimic it in a lesser, and therefore less successful, form (Turkle 2011; Nyholm and Frank 2019). Let's first consider the interplay between interpersonal care and my definitions of automation and *labour*, before considering and responding to the literature on the subject.

#### 4.4.1. Interpersonal Care and Automation

The first clarification necessary is that many acts of interpersonal care already involve high levels of technological mediation, and it is not the presence of technology in interpersonal care that potentially poses a problem for my definitions. In the paradigmatic example of healthcare, carers utilise various tools and technologies to achieve their desired goals. These can be relatively simple artefacts, such as crutches or a gurney, to more specific and specialised medical technologies such as stethoscopes, ultrasound devices, or fMRI (functional Magnetic Resonance Imaging) machines. Even in the most unautomated and least technologically

mediated cases of healthcare, learned techniques will be employed, and basic tools might still be needed. While any such tool might ease, regulate, or enhance the healthcare task in question, such devices can only ever automate certain sub-tasks, and even in such cases still require the carer to use their knowledge and skills to interpret and respond to the results or process. Despite high levels of technological mediation, a human carer largely remains in control of, and in interaction with, the act. Given the large and somewhat vague nature of healthcare, a patient's needs cannot be wholly met with a single technological device: putting a patient on a gurney or in an fMRI machine does not fully meet *all* of the patient's needs, and even a healthcare robot that can diagnose and respond in a wholly automated manner will still have to utilise additional technologies to fully treat the patient. A medical bed system that allows a patient to get in and out of bed without the need of human assistance is definitely automating one sub-task, which might have important implications for the ease of the carer and patient, but doesn't equate to the automation of the entire process. An fMRI device might give a result in an automated manner, but there is still the need for human analysis: even in proposed scenarios where the analysis and diagnosis of patients falls to automated means (Susskind and Susskind 2017), the patient might still desire a human interaction, perhaps a doctor explaining the automated diagnosis to them. The use of automation in healthcare might afford recipients more accurate and reliable results, more regulated and trustworthy examinations, and more specialised and open-ended care that isn't tied to economic or social

constraints (including staffing and training), but cannot replace the human interaction that occurs in interpersonal care. Such artefacts are being designed with consideration for patients' needs for dignity and humanhood (Laitinen et al 2019), and to replicate the human interaction as closely as possible (Lancaster 2019), but at its core it will always change the dynamic of such care from human-to-human, into robot-to-human. An enduring necessity of human involvement is intrinsic to interpersonal care in order to properly count the example under my definition of interpersonal care.

This is the unique aspect of interpersonal care that seems to pose a significant issue for my definitions. Central to examples of interpersonal care are not only the necessary movements of the act, but also these additional values: trust must be built between provider and recipient for the act to be wholly successful; affection or attentive care must be given in order for the patient to feel wholly cared for; and the provider of care must invest some emotional component in their engagement, beyond the mechanical motions of the act, for better or worse. Stripping these facets of the task away removes the actual 'care' in question. This might seem to pose a significant issue for my definitions and might seem to be a practical counterexample to the model I'm building. However this does not need to be the case: what is required is to understand the additional values as *functional* facets of the task itself. Rather than framing the issue as "investing emotionally in care leads to a good or better standard of care", we can instead say that "the building of trust and emotional investment is a functional condition of successful care". The trust and affection provided

by humans cannot be replicated in machines precisely because it is *human* trust and affection. Specifically *automated* trust and care *can* be developed, if it is a standard reflected in the design and operation of the machine in question. Moreover, rather than trying to replace human carers in a like-for-like manner, automated healthcare tools can create new forms of trust, care, and affection that are not possible through human means. Such devices will generate their own anxieties: automated machines have the risk of being recorded, or of having data stolen and sold, which are not as prevalent with human care, and leaving the patient to worry about these things will result in a significantly lower standard of care. These issues can be solved within the design of the automated tool in question, in purely functional terms, without committing to a narrow picture regarding the essence of such technologies.

Healthcare is not the only form of interpersonal care featuring high levels of technological mediation. Many instances of interpersonal care take place at home: caring for elderly relatives; caring for people who are suffering from illness, accident, or debilitating conditions; parenting; and even some forms of sex work all take place from home, and employ a wide range of technologies. That they sometimes take place at home and sometimes in a more explicitly medical setting depends more on severity, economic standing, and social/cultural practices than it does on conceptual type. The same types of technological mediation might be seen with home-based care *labour*, because similar technologies of wheelchairs, medical beds, specialised feeding and cleaning artefacts can be found both in

hospitals and at home. The same types of ‘full’ automation might be possible in home based interpersonal care as in hospital based interpersonal care; the public discussion of home based interpersonal care also features similar devices, including personal welfare devices, over-the-counter remedies, specialised healthcare machines, and robotic nannies (Jones 2019). Indeed, popular culture contains many such instances of home based automated healthcare devices, such as *Baymax* from *Big Hero 6* (Hall and Williams 2014). These imagined technologies are distinct from the realities of actual automated healthcare devices, in both scope and feasibility, and operate more like synthetic humans than automated technologies. Where an automated healthcare robot might help a patient get in and out of bed, *Baymax* can apparently do everything required by its owner, mimicking human care in a non-human body.



**Figure 19.** The fully automated healthcare robot *Baymax* from the 2014 Disney film *Big Hero 6* (Hall and Williams 2014).

The automation of interpersonal care is a gendered issue because these forms of private, ‘reproductive’ care *labour* often fall

disproportionately to women. The implementation of automated care devices is often discussed in terms of their capacity to redress this imbalance (Parks 2010), or to further deepen it (Eubanks 2019). This is perhaps most clear with sex work, which is a highly contested area of discussion. Some aspects of sex work are highly technologically mediated, when acts occur online or over the phone, but other instances have little to no technological mediation (Hardy and Barbagallo 2021). The development of automated tools in this area has been met with its own stock of moral and ethical questions (Nyholm and Frank 2019; van Grunsven and van Wynsberghe 2019), but the industry itself is also full of additional issues that can't simply be stripped back: gendered violence, human-trafficking, and exploitation can be facts of life for some sex workers, and reducing such instances to their essential core might neglect these important components. The implementation of automated devices might also produce a corollary industry in which genuine human sexual interaction garners new value, in opposition to the simulated interactions achievable through automated means, just as sex robots might generate an interested user base precisely because of their robotic and inhuman nature. The development of automated technologies within these industries is going to come up against these practical considerations and constraints, not only as contingent *uses* of neutral technologies, but as devices *responding to the specifics of this industry*. This is an extension of the need for considerations of trust and affection in automated healthcare technologies: a functional condition of healthcare is that it provides trust and affection, just as a

functional condition of automated sex technologies is that they do not engage in gendered violence or trafficking, while also building necessary trust and intimacy. While the implementation of automation in these cases is less straightforward than automating an automobile factory, it still remains possible: by acknowledging *what these technologies are intended towards*, the devices can be designed to properly enclose the task from further human mediation, *while still* successfully completing all the necessary functions of the task in question.

#### 4.4.2. Interpersonal Care and *Labour*

Interpersonal care contains more additional values than other forms of *labour*, as discussed above. The implementation of automation in such tasks must therefore be performed in a more sensitive way to ensure that the various functions of each task are properly met. What is clearer with such tasks, however, is their relation to the mode of *labour*. Indeed, one of the fundamental conditions of having a biological metabolism is that it requires care: sometimes an agent's metabolism cannot be maintained by that agent, and requires the care of others. This appears in two ways. The first is as a direct biological intention, wherein an agent engages with the activities to directly fulfil or maintain their biological metabolisms or of their families, or the whole human race. Parenting, caring for elderly relatives, and looking after oneself during illness or injury all fit into this notion of interpersonal care, as healthcare does to some extent. Such forms of care are universal to all human beings, and would endure in the human condition in a post-capitalist and a 'post-work' society, just as they

have existed throughout history. Such biologically necessary forms of interpersonal care, that directly intend towards an agent's physical, mental, emotional, and social welfare, are also cyclical, lasting for as long as the agents are alive, and continuing across the human condition for as long as human beings exist. Looking after an elderly relative or a young child serves both the recipient's biological metabolism, and perhaps a biological concern of the agent to care for their family or those around them. Sex work can also be seen to operate in this form because it concerns a biological appetite or desire: although different to healthcare, in that agents *can* survive without sex, the fulfilment of an agent's sexual desires can be beneficial to their welfare. Moreover, in a post-capitalist society, in principle sex work could be restructured to ensure that it was biologically fulfilling for both parties without the exchange of money. This type of interpersonal care is often referred to as 'reproductive labour', and providing such care is historically gendered. Expectations of looking after children often disproportionately fall to women, along with caring for elderly or disabled relatives (Irigaray 1993; Folbre 1994; Langhamer 2000; Ferguson 2019), while also frequently being unpaid. Because this is not intrinsic to the activities of care itself, and could be enclosed in a fairer manner, I will explore this concern in the following sections. Regardless, interpersonal care clearly fits into the biological necessity of *labour* in a direct manner.

The second way in which interpersonal care appears is as economically necessary activity, wherein the biological metabolisms of the

agents involved and affected are supported through the economic value generated in, or provided by, an act of interpersonal care. Providers of interpersonal care are examples of this, with sex workers and healthcare providers perhaps being clear and intuitive cases of agents who extract economically necessary goods from engagement in interpersonal care. Rather than a direct care for their own biological conditions that are in need of care, providers of interpersonal care *can* instead be primarily motivated by the money that can be earned through their participation. Such engagement is still cyclical, because the earning of a wage is a universal and constant pressure under contemporary economic conditions, just as there will always be people in need of care. Economically motivated care still relates to the biological welfare of the agent being cared for, but is less directly connected to the metabolism of the care giver: the earning of a wage can still be used to fulfil biological necessities, but does not have to be. If a carer is engaging in paid interpersonal care motivated for a direct concern for their own welfare, then it clearly fits into the act of *labour*. The economic remuneration of such activities is somewhat arbitrary, and might dissipate in future societies if they are not governed by economic necessity: in such cases, this second form of interpersonal care might collapse into the first, with care falling to family, friends, or caring people within a community. Regardless of the economic remuneration of such activities, or lack thereof, they occur within spatial, temporal, and interpersonal conditions, and demonstrate the qualities of cyclicity, universality, and biological necessity that categorise an act as occurring in

the mode of *labour*. It is precisely the additional value concerns of trust, affection, and necessity that were posed as issues in the previous section that render interpersonal care such an intuitive case of *labour*.

#### 4.4.3. The Discourse on Interpersonal Care

The above descriptions of interpersonal care are largely stripped of their case-specific values, but the literature surrounding interpersonal care and its automation focuses more directly on such moral, ethical, and ontological questions. In healthcare and elderly care, concerns have been raised regarding how automated care technologies, such as robots, can properly demonstrate values of care (Umbrello et al 2021), and how collected data will be stored and used (Mulvenna et al 2021; Semel 2021). As previously discussed, these issues *can* be approached as purely functional conditions of interpersonal care tasks, but are often pursued in the literature with regard to their practical implications. On the contrary, other scholars believe that utilising robotic and automated care technologies may help to alleviate pressure on both patients and human carers, and will therefore allow a higher quality of human-to-human care in other, non-automated, areas (Coeckelbergh 2015). Parallels might be drawn between medical and familial healthcare and the types of *labour* found in the service industry. The adoption of more clearly automated technologies in customer facing, service based industries has grown over the past two decades, with the adoption of self-service checkout machines in supermarkets and fast food restaurants (Sharma et al 2021) and the implementation of (almost) fully automated call centres (Russell 2008).

Interestingly, other services, such as delivery and logistics, have not seen the same level of automated technological mediation, and instead remain firmly performed by human agents, albeit with a high level of non-automated technological mediation (Smith 2020). What has emerged is a divergence within industries that employ these automated machines: rather than replacing *all* desire for human *labour*, their implementation is desired in some instances (such as fast food) but isn't in others (such as 'high-end' dining establishments). Because of the deeply personal and intrinsically human nature of interpersonal care, particularly in the biologically necessary mode of *labour*, some scholars question whether the intrinsic human quality of care work can actually be replicated at all (Klawiter 1990), and indeed whether it even *should* be (Andrade et al 2018; Chen 2020).

Discussing interpersonal care in terms detached from notions of *labour* which relate to paid employment or commonly accepted forms of work ties into another key area in the literature surrounding sex work, and indeed 'reproductive labour' on the whole. The term 'sex work' takes on a particular economic dynamic, because the word itself includes a necessary economic component: the agent is being paid for their service, rather than giving it for strictly physiological or emotional reasons (Carlisle 2021). In such formulations that are stripped of any additional value judgements, sex work can be compared to other instances of interpersonal care, with the directly biological component of healthcare and the additional interpersonal component of service work: the agent is providing an

embodied service of interpersonal care that can be motivated by a biological concern for earning a wage, while fulfilling a biological desire for the recipient. Sex work requires skill, can involve some level of technological mediation, and is cyclical and somewhat universal. Stripping back the additional judgements attached to sex work reveals that they are not inherently part of the act itself, and any additional moral or ethical judgements about the sex worker has no basis in the act itself, any more than they do to a waiter or a shop assistant. Understanding interpersonal care in such a broad manner, to include service work and sex work, highlights these comparisons:

The service worker can thus learn a lot from her sex-working comrades. Paid for fucking and getting fucked, and often paid in cash, she is no more the living death of labour than the waitress or the Uber driver... Far from being refuse or sewage, the sex worker is a figure of life itself, wageless but unbowed. (McClanahan and Settell 2021, p.511)

As with other instances of paid employment, “much sex work is tedious more than it is abject or thrilling” (Berg 2021, p.485), and so broad analyses of *waged labour* can include sex work without issue just as they can include instances of paid interpersonal care. Investigating sex work, and by extension other forms of interpersonal care (particularly unpaid ‘reproductive labour’), in light of its connections to other forms of *waged labour*, as well as those connections that are commonly missed or ignored, highlights the unequal distribution of legal protection, social acceptance, and economic remuneration that pervades interpersonal care. Precisely because it *can* be understood in relation to healthcare and service work

can allow us to question *how* it might be better accounted for, and *why* it isn't currently. This is not only true of sex work, but also of unpaid forms of interpersonal care, such as parenting. With the previous two cases, there was unanimity between individual cases: multiple self-driving cars are being proposed, but they're all seen in the same light and are all equally expected to cost money, just as manufacturing is always paid, and always accepted as a valid form of employment. Interpersonal care, by contrast, is heavily laden with presuppositions, value judgements, and contingent concerns depending on the example, and as a result the central similarities between interpersonal care in the mode of *labour* can become lost. By drawing the various literatures together, and by stripping back these additional value judgements, I believe that a more universally applicable standard can be deployed across instances of interpersonal care, one that does not rely on arbitrary economic remuneration or increasingly antiquated social expectations.

#### 4.4.4. Reconsidering Interpersonal Care

I have already highlighted some of the potential issues with applying a phenomenological reduction to cases of interpersonal care. Chief amongst these is the centrality of certain values to the acts themselves: trust is necessary across *all* forms of interpersonal care, as well as a need for affection, care (in the intuitive sense of the word), and personability, or at the very least their replication or simulation. Moreover, while the two other cases can occur in isolation, with the user of a self-driving car and the recipient of manufactured goods not requiring any

further human interaction to successfully complete their task, interpersonal care occurs between two agents. As a result, there are two intentions at play in any one task: the recipient of care has a biological concern for whatever facet of their metabolism is being cared for, and the provider of care is seeking to gain something from their engagement, be it a biological concern for family or an economic concern for wage-earning. So precisely how can we go about enclosing acts of interpersonal care so that one of the human beings involved is entirely replaced or displaced?

One response here is to reiterate the role of trust, care, and affection as a fundamental function or condition of these tasks, and then pursue technological developments that still fulfil these conditions. As already discussed, caring, compassion, affection, and concern are all tenets of healthcare and parenting (Chambers and Ryder 2009), while other forms of interpersonal care have additional emotional involvements, including service work (Hochschild 1983; Williams 2003). Sex work has a clear emotional component for the recipient, but has additional emotional and mental components for the providers, including gendered and sexual violence (Sanders 2001; Shannon et al 2009), stigma (Armstrong 2019), and poverty (Monroe 2005; Dasgupta 2013; Overs 2014). By applying my definition of automation, as the enclosure of a task from any further intervention, one response is to simply design care technologies that satisfy these conditions as functional components of the task itself, providing the positive conditions for recipients and removing the negative conditions for providers. Robotic doctors would therefore have specific

trust-building interfaces, and perhaps even human-esque physical forms; automated parenting tools would be as soothing and tactile as their human counterparts; automated sex technologies would provide the desired physical interaction while sparing the newly replaced human agent from any additional emotional, mental, and physical costs. Such forms of technological development could proceed as either *replacement* or *displacement*, with the tasks either maintaining a similar shape to when human agents were involved, or changing completely with new technological possibilities. The biological necessities of the recipients would be maintained, and the newly *replaced* or *displaced* agents could be supported by other means, such as UBI (Universal Basic Income) or retraining.

This is not the only avenue of possibility when considering the interaction of my definitions with this case. If we accept that the emotional components of care, trust, and affection are paramount to the task itself, then we do not necessarily need to replicate these facets in the desired automated technologies. Instead, we could accept that interpersonal care requires some human intervention, and instead design automated technologies in the form of *augmenting and extending*, removing human intervention from certain sub-tasks, but leaving human agents to engage with the uniquely human components. This is not a weakening of my definition: valuing human interaction is perfectly acceptable on my account, because I am not committed to a picture of automation being *inherently better or more capable* than human agency. Just as we might not

replace all human interaction with the creation of art, music, or politics, so might we retain human interaction in instances of interpersonal care. The resultant automated tools would not 'fully' replace human beings, and would not wholly meet the ideal standard set by my definition, but would instead enclose the difficult, demeaning, or unwanted tasks from human intervention. In healthcare, the developed technologies might therefore perform the lifting, cleaning, or calming of patients, leaving human carers to engage with the facets of the task that are more functionally value-laden; in parenting or familial care, relevant technologies might also perform lifting and cleaning, but also perhaps midnight soothing or assistance while the carer is at work, leaving parents and familial carers to focus more wholly on the emotional components of care; with sex work, such technologies might be deployed to redress trafficking, abuse, and poverty, leaving sex workers to engage with the industry in a non-coerced manner, choosing their engagement more freely. Approaching the automation of these tasks in this (or a similar) manner acknowledges and respects the emotional success criteria of the act, while also implementing automation in ways that still benefit the included agents.

As with all instances of instantiating automation in a given *labour* process, there will be the opening of new possibilities and capacities combined with the simultaneous foreclosing of previous opportunities. The real and imagined cases of *labouring* robots in various interpersonal care industries will undoubtedly create the opportunities for new forms of care to emerge, but simultaneously foreclose pre-existing, non-automated

forms of caring. The positive foreclosing of sexual trafficking and abusive healthcare might occur, but so might the negative foreclosing of economically necessary sex work, for example. What is important is that all forms of interpersonal care will persist into an automated future, and so pursuing automation to wholly remove human agents from such tasks neglects current unfair and unequal distributions or formulations of care (Eubanks 2019), and threatens to remove the very acts that might be desired in a fully automated utopia (Carr 2016).

By approaching these issues in light of my definitions of *labour* and automation, I have shown that, while varied and various, the important emotional facets of interpersonal care can be respected while also adequately and effectively deploying automation. We can avoid committing to overly narrow predictions regarding the future of interpersonal care while still redressing its endemic issues, getting the most out of such tasks for recipients and providers.

#### **4.5. Towards Work**

These case studies have shown how the automation of *labour* in practical examples can be reconsidered beyond current discussions, and how my definitions of *labour* and automation might be used. Rather than becoming fixated on moral, ethical, and normative issues in the first instance, I believe that alternate forms of technological development and

social organisation will become clear by reconsidering the issue through the novel evaluative framework I am proposing.

Is this the only way in which we can understand these examples? By moving away from categories of action, and toward modes of activity, we can examine the same task or activity in varying ways. The evaluative framework I'm proposing accounts for two modes of activity: where we have instances of *labour*, as discussed here, so too can we have instances of *work*. One of the key features missing from the discussion thus far, which might strike the reader as an oversight, is a consideration of 'meaningful work'. Let's now consider a definition of *work*, before returning to these case studies in Chapter 6 in light of this alternate mode.

## **Section 3 – What is Work?**

### **5. Work**

*Fundamentally, one now feels at the sight of work - one always means by 'work' that hard industriousness from early till late - that such work is the best policeman, that it keeps everyone in bounds and can mightily hinder the development of reason, covetousness, desire for independence. For it uses up an extraordinary amount of nervous energy, which is thus denied to reflection, brooding, dreaming, worrying, loving, hating; it sets a small goal always in sight and guarantees easy and regular satisfactions (Nietzsche 1881).*

#### **5.1. From Labour to Work**

Thus far in the thesis, I have offered an account of automation as a means of enclosing a task from further human intervention, and of *labour* as a universal mode of activity concerned with the cyclical maintenance of an agent's biological metabolism. The final term in need of definition is the antipode of *labour* in my twofold account of human activity: *work*. The account of *labour* offered and defended in the previous two chapters undoubtedly encompasses a large portion of the activities we undertake on a daily basis but it is by no means comprehensive or exhaustive. The activities that we *must* undertake in order to live are not the only endeavours in which an agent expends their time and effort. In many respects, meaningful activities are often those that escape or subvert the biological necessity of *labour*. While *labour* provides the means of survival, it does not offer the tools for leading a meaningful life beyond this survival.

As Andrea Veltman argues:

Labour is an existential tedium, essential only as a means of living. Without labour, life cannot continue. But labouring to preserve life cannot provide a reason as to *why* one lives, and labour is therein inessential within a philosophical arena of non-utilitarian

value...meaning cannot [only] be found in the satisfaction of the material demands of life itself. (Veltman 2010, p.57, my bracketing).

In many ways, necessity constrains meaningful expression and self-articulation, because we are tied to the things we *have to do*, rather than those activities from which we might gain meaningfulness. The second mode of activity, which I am defining as *work*, is therefore one that is not concerned with necessity, survival, or biological welfare at all: *work* is the mode of activity in which meaningful non-necessary activities take place, and through which the agents can articulate themselves *beyond* their biological conditions. Under contemporary conditions, jobs might not **always** occur in this mode, with many agents having to engage in paid employment simply in order to make ends meet but what is vital here is that many jobs **can** be undertaken in the mode of *work*, under the right conditions, or that *work* can be engaged with beyond paid employment. Even the most meaningful and fulfilling job will have days in which the involved agent is purely motivated by their need for a wage, but the task might also have the versatility to be engaged in in an alternate mode. This reflects the lived experience of engaging in activities of *labour* and *work*, and is wholly acceptable within my framework because I am offering an ideal set of heuristic definitions, rather than a metaphysical or ontological claim regarding the scientific or material reality of *labour* and *work*.

This focus on meaningful and expressive activity is by no means unique in the literature; many scholars offer accounts of 'meaningful work', usually in contradistinction to repetitive, meaningless, or economically

necessary jobs (Carr 2014; Autor 2015; Stiegler 2016; Susskind and Susskind 2017; Graeber 2018). Such distinctions can be found in the writings of Arendt (1958) and the arguments of Marxist scholars (Fuchs 2020), as well as across the mainstream media (Keohane 2015). As with my definition of *labour*, the account I am offering here does not centre on specific jobs or activities, but is instead formulated as another *mode of activity*, which encompasses the contextual horizon from which the activity emerges, the activity itself, and the conditions surrounding the activity. In a similar manner to my definition of *labour*, the mode of *work* will be defined as an ideal type: an artificial and impossible standard to which real-world cases can be compared, highlighting the ways in which they both do and do not align with the definition. Such an approach is particularly important when the realities of automating meaningful *work* are considered: the introduction of devices that enclose tasks from further human intervention risk foreclosing the very spaces of articulation required for meaningful *work*. Pushing the contextual horizon of an act in one direction inevitably results in the foreclosing of other possibilities, and given that the intended goals of *labour* and *work* are categorically different, there is a risk that wholly automating towards one will negate the possibility of engaging in the other.

In order to properly consider how these two modes can be reflected in practical cases, let's first establish a robust definition of *work* in its own right.

## 5.2. Defining Work

I define *work* as the mode of activity primarily concerned with the meaningful engagement with a task, one in which the agent can meaningfully articulate their selfhood. *Work* is therefore not concerned with the biological necessity of *labour*, and does not occur in a cyclical manner, instead taking place within delimited acts that stand independently of one another. As a mode of activity, cases of *work* can be the same activities as those undertaken in the mode of *labour*, but are distinguished by the mode in which the task is undertaken. Acts of *work* are not therefore of a distinct set to those of *labour*, but instead distinguish a wholly different mode of undertaking the task in question. The definition of *work* that I am offering here involves three key elements: (1) a motivation towards meaningful self-articulation through meaningful engagement with a task; (2) a limited temporal structure that does not fall into cyclical repetition; and (3) a universal presence in the human condition. Let's consider each element in turn.

### 5.2.1. Meaningful, But Not Necessary

The desire to engage in meaningful *work*, that satisfies both our biological necessities but also allows us to engage in meaningful, virtuous, or fulfilling pursuits, is a common desire in the contemporary world (Bowie 2019; Steger 2019). In light of Covid-19 and its resultant lockdowns, the question of meaningful *work* is more present in the public imaginary than perhaps ever before in history (Savage 2020; Soojung-Kim Pang 2020b; Lipman 2021). However, under contemporary economic conditions, many

people must settle for paid employment that *only* satisfies their biological necessities, and pursue meaningful activities beyond their jobs (Keohane 2015). People often have to perform mundane or undesirable job roles to earn a living, but a pervading and persistent inclination to perform acts that mean something greater than economic subsistence is consistent among many people. This meaningfulness can take multiple forms: it can be the expression of a political or moral belief; the demonstration of a virtuous quality of the agent themselves; an inclination or value that the agent holds towards the world; a fulfilling pursuit beyond their own survival, and so on. The agent is therefore engaging in the given act to achieve this meaningfulness, because they hold the value, idea, or inclination to be meaningful, worthy, and desirable. Through such an activity, the agent engages in self-articulation, and identifies themselves as the one that is acting, and thereby expresses the given sentiment or idea. This opposes an act of *labour*, in which it is only possible to articulate the agent's biological necessity. Even if their efforts belong to a greater cause or campaign, or take place in a small-scale or private setting, the agent engaging in *work* individuates themselves as an agent in their own right, distinct from their biological necessity. Of course, such acts are still *supported* by a biological metabolism: even great political leaders and artists have to eat and take care of themselves, but their acting cannot be reduced to this biological necessity, and the meaningful expression takes place beyond their conditions of necessity.

Such acts are highly personal, and will look very different depending on who is undertaking them, where and why they are being undertaken, and the conditions under which they appear, but consistent within all examples of *work* is a motivation to engage in an activity in a way that is meaningful and articulates something about the agent themselves, beyond a concern for biological welfare. This is not to say that all acts of *work* are *opposed* to the agent's welfare, but rather that the agent's welfare *is not of primary concern* in the act: meaningful expression and engagement with the task at hand are the primary concern of *work*. *Work* is therefore specifically human, universal as a mode of activity within the human condition, but deeply subjective. In theory a society *could* survive without *work*, with the biological welfare of its citizens being the only concern and *labour* the only mode of activity available as a result. *Work* is, by definition, not concerned with necessity, nor does it generate its value because it is a necessity to human life. Activities of *work* are non-necessary, generating their value from *what* is being expressed and articulated, or *that* something is being expressed and articulated, rather than the fact that something *must be* expressed or articulated.

An important clarification is that I am not defining *work* as rational action and *labour* as un- or pre-rational. It is not the case that a human being engaging in *labour* is completely, comprehensively, and inescapably beholden to their biological impulses and drives and is therefore acting without rationality; nor is the mode of *work* the only means by which an agent can fully appreciate, understand, and intend their action in a rational

and intellectual manner. Both *labouring* and *working* are rational deliberate acts that engage rational intentionality and conscious thought. The human body will engage in 'sub-personal' processes in *both* modes, including digestion and circulating blood, but these can't be described as acting *per se*. Eating in the mode of *labour* and singing in the mode of *work* will both require the use of facial musculature, vocal cords, and mental processes, and all human acts emerge from the sub-personal processes of breathing, digesting, and circulating blood. The modes of activity I am describing emerge *from* these sub-personal processes, in deliberate and intentional ways. That we have organs that elicit hunger does not mean that we have to eat, just as having the capacity to speak doesn't mean we have to say anything. I am not offering a Kantian distinction between rational humans and animals, described by H. J. Paton as follows:

Kant is trying to mark a real difference between human conduct and animal behaviour. In acting, a human being does not, unless in very exceptional circumstances, respond blindly to impulse. He knows what he is doing; he recognises the quality of his actions; and he could not do this without some concept, however vague, of the principle on which he acts (Paton 1947, p.61–62).

Neither *labour* nor *work* occur through animalistic impulse: both are deliberate, rational, and intentional modes of activity.<sup>28</sup>

As a result of this rationality and the lack of biological necessity primarily guiding acts of *work*, they **can** be posed against the biological welfare of the agent (but do not have to be). Some activities that appear in

---

<sup>28</sup> It might be argued that automated tools do not *act* as I am describing it, but instead simply *move*.

the mode of *work* might require the agent to ignore or subvert their biological necessity in order to achieve meaningful expression. Because the agent is not being driven by a primary concern for their biological metabolism, this is not problematic in the same way as acts of *labour* that demand that the agent ignores their biological necessity. Examples of such tasks might include hunger strikes undertaken in the mode of *work* to communicate a political message (Scanlan et al 2008), such as those undertaken by Irish Republican political prisoners in 1981 (Hennessey 2014). The agent is exercising a capacity to articulate a political or moral belief about the world, without a necessary concern for their biological welfare, and is expressing both the political message and a reflection of their own identity, given that subverting their metabolism in this way requires a huge amount of willpower and physical, mental, and emotional endurance. Perhaps the most extreme example is the famous demonstration by Buddhist Monk Thích Quảng Đức, who engaged in self-immolation to protest at the treatment of Buddhists in Vietnam in the 1960s. In this example, the agent completely ignored his biological metabolism to make a powerful political point, giving his life to the single act of meaningful self-articulation. Of course, most acts of *work* will not be so extreme but this extreme example serves to prove the limits of the definition, and to reinforce the lack of biological concern and necessity included in acts of *work*.



**Figure 20.** Thích Quảng Đức engaging in self-immolation to protest at the persecution of Buddhists in Vietnam, photographed by Malcolm Browne in 1963 (Witty 2012).

#### 5.2.1.1. What is Meaningful Work?

The term ‘meaningful work’ is often found in the academic literature and mainstream media, usually in distinction to non-meaningful or menial jobs (Graeber 2018; Harding 2019), although there are some difficulties surrounding the empirical study of the precise difference (Mercurio 2020). *Work* that is meaningful offers the agent something beyond paid employment, allowing them to secure other sources of meaning that cannot be reduced to biological or economic necessity (O’Brien 1996) by allowing agents to express their individuality and autonomy (Roessler 2012; Breen 2019), or by allowing them to engage practically with a meaningful pursuit (Hofmeister 2019). Paradigmatic examples of meaningful *work* include types of *work* that allow the participant to work in a morally or socially desirable manner, or for a morally or socially responsible cause or company; jobs that demonstrate

their skill, intelligence, or capability; activities that help others; *work* that contributes to a morally or socially just overarching structure; and generally job roles in which the worker is valued for their skill and identity, roles that are not *entirely* reducible to their economic remuneration. Such jobs often make the worker feel proud; enjoyment from or uplifted by their engagement furnishes the participant with extraneous non-economic value in addition to any monetary wage (Yeoman 2021). Indeed, for some scholars it is the very fact of working fulltime itself, regardless of the job in hand, that is a source of meaningfulness in contemporary society (Attfield 2001).

Importantly, meaningful *work* can also occur outside of paid employment. Agents can find meaning by volunteering their time with a charity or socially responsible company, by actively participating in their local community, or by expending their efforts in creative pursuits, including art and music (Bailey et al 2017; Lips-Wiersma 2019). Combining notions of paid employment with meaningful *work* is inherently limiting, and therefore I describe meaningful *work* as *any task or activity from which the worker gains extraneous moral, ethical, social, emotional, personal, or political value, which cannot be entirely reduced to the financial remuneration or biological necessity that it may also fulfil* (Hofmeister 2019; Mei 2019). Importantly, meaningful *work* as I describe it does not have an antipode of 'meaningless work'. If an act contains no capacity for meaningful engagement, then it is not *work* on my account: an act that that is enclosed so that it offers **no** motivation for engagement beyond the

earning of a wage is an instance of *labour*; an act of *work* that **fails** in its meaningful articulation, but retains the opportunity to engage with it meaningfully, is still an example of *work*, because there is no success criteria on my definition; an act that **can** or **sometimes** facilitates meaningful engagement remains open to the mode of *work*, and can have its conditions altered to make it more readily conducive to meaningful engagement. I argue that the types of jobs scholars usually refer to as ‘meaningless work’ are either instances of economically necessary (but otherwise meaningless) *labour*, or might be defined as problematic instances of *work*. The paradigmatic example of boring and draining office work that is often referred to as ‘meaningless work’ is, on my account, either a task wholly enclosed in the mode of *labour*, one that offers **no** meaningful engagement beyond economic remuneration or it is a problematic instance of *work*, one that promises meaningful engagement but offers none in return, operating more closely the mode of *labour* (which will be discussed later).

All human beings have the capacity to pursue, discover, create, and reveal these sorts of meaningful activities which occur beyond necessity, and the self-articulation achieved through them will be inherently subjective, differentiated, and unique (Scripter 2018). As with *labour*, meaningful *work* occurs within a contextual horizon which encompasses cultural and social conditions, individual traits and qualities of the agent, the motivations and desires of the agent, the movements of the task, and so on. The term ‘meaningful’ (and its synonyms ‘valuable’, ‘worthwhile’,

and ‘fulfilling’) is vague and broad, and will have a wide range of uses depending on who is using the term and how it is being used. This openness is important in its own right (Veltman 2016), because I am not offering a prescriptive or comprehensive account of what the *content* of meaningful *work* will be: as long as an agent is undertaking an act to articulate something about themselves that goes beyond biological necessity, the act is occurring in the mode of *work*. Where one agent might find meaning in donating time and money to a charity, another might find meaning in the pursuit of artistic expression. They are intending towards the same form of self-articulation, but are achieving it in very different ways. This is true even if that meaningful engagement is occurring within paid, or otherwise biologically necessary, acts: when an agent undertakes an activity in the mode of *work*, primarily concerned with meaningful engagement and expression, any secondary or additional concerns are of lesser importance, and do not necessarily detract from the meaningful articulation achieved. The same act can be undertaken in both the modes of *labour* **and** of *work* in turn, depending on the additional contextual conditions.

The ‘meaning’ found in meaningful *work* is different from taking pride or pleasure in a job or activity. Acts that occur in the mode of *labour* can still be undertaken in ways that are enjoyable or make the agent feel proud: I can cook a meal that satisfies my biological necessity while also singing in the kitchen, or by preparing a delicious meal to the best of my ability (Langhamer 2000) rather than grabbing fast food, even if my singing

and cooking skills are limited. Acknowledging that we are biologically conditioned beings and actively partaking in the maintenance of that biological condition **does not** occur in a purely mechanical way, and an agent can take pride in the related activities that emerge from these necessities: I can engage in *labour* in a way that makes me proud, while still only being primarily concerned with my biological necessity. This might be meaningful to the agent in some regard, but would be a form of enjoyable or prideful *labour*, rather than meaningful *work*, because at its heart the primary drive is still the maintenance of their biological metabolism rather than the articulation of something *beyond* that metabolism. The scope of the expression is inherently limited in such acts, because it is always tied to the condition of biological necessity rather than to the expansive realm of political, artistic, ontological, philosophical, and personal states, ideas, beliefs, and desires. If the act of cooking or singing is undertaken for the purpose of self-articulation, rather than primarily to satisfy the agent's biological needs, then we're dealing with an act of *work* rather than *labour*<sup>29</sup>. Because I'm discussing modes rather than catalogues of activities, the same activity can be undertaken in the two different modes, and attention must be paid to the contextual horizon, rather than solely to the movements of the act.

---

<sup>29</sup> One potentially complicated example might be that of sex. Sex is an act that is motivated by a biological appetite, but not necessarily survival, and can be engaged in recreationally rather than out of necessity. I argue that my definitions still function here, because sex **can** be undertaken in the mode of *labour* (for procreation) and **can** be undertaken in the mode of *work* (for artistic or expressive purpose), but is an example where perhaps a third mode – *leisure* - is appropriate. While not refuting my definitions, this is certainly a case that might generate further research.

Importantly, the meaningfulness of a given task can arise in both the process of undertaking the task, as well as in the final product or action. This means that *work* can be meaningful if it is unproductive or if it fails in its productive endeavours. An unfinished piece of art can still be meaningful if the unfinished process is articulatory for the agent engaging in it. Acts of *work* can be collaborative; involved agents can drop out before the final product is completed but can still find meaning in their limited participation. A failed political campaign, an unheard or unfinished conversation, or a misunderstood book can all be meaningful for the agent who produces or engages in them, even if they 'fail' in their desired or intended purpose. An agent who volunteers their time in a charity shop can find their participation meaningful, and can articulate something about themselves even if the shop fails to produce any money. As with *labour*, meaningfulness is not tied to a given set of activities, and so what is meaningful under one set of conditions might not be under another. If the charity shop in question is enclosed in conditions that facilitate meaningful engagement then its volunteers can engage in the mode of *work*, while it serves the *labour* needs of its beneficiaries.

An important distinction arises here regarding the extensions of individual meaningfulness. Two extreme but important counterexamples might be raised here: extreme greed and violent/hateful acts. It might be questioned in what mode an agent is operating who engages in generating huge amounts of money, or who offers poor working conditions for employees in order to save money for personal gain. It is not wholly a

concern for their biological welfare because the money generated might go far beyond their actual needs, and is diametrically opposed to the welfare of the poorly treated employees. Moreover, if the employer is held in high regard within their industry for having the virtues related to generating huge amounts of money, they might take further meaning from the position their act affords them. It might therefore be argued that the employer finds meaning in the generation of large amounts of money, and that this is an act of *work*. I argue instead that such acts can be seen as corruptions of the mode of *labour* and *work* respectively, because the generation of money is an imperfect end in itself. As Aristotle argues:

As for the life of the businessman, it does not give him much freedom of action. Besides, wealth is obviously not the good we seek, because it serves only as a means, i.e. for getting something else (Aristotle 340, p.1096).

Let's consider the two ways in which extreme wealth generation can be considered corruptions of *labour* and *work*.

In Chapter 3, I established that biological necessity extends to the generation of money under contemporary economic conditions. An agent who therefore desires financial gain in order to provide for themselves can be said to be operating in the mode of *labour*, out of a concern for their biological welfare. The desire to generate huge amounts of money in its own right could be argued to be a perversion of biological necessity as it appears in contemporary economic conditions. When taken to its furthest extreme, an agent might be so concerned for their continued biological welfare (having enough food, having enough savings 'just in case', not

wasting money) that they amass a huge amount of money that could be spent elsewhere. The agent can be said to be incredibly greedy, but is perhaps more anxious about their continued survival, and that of their family and loved ones, than the other things that could be done with the money they're hoarding (Robertson 2001). This is not meaningful as I describe it in the mode of *work*, precisely because the agent is wholly concerned with their biological metabolism, albeit under peculiar contemporary conditions. Conversely if an agent feels a particular emotional, mental, or social lack in their life, they might pursue the accumulation of wealth as a way of feeling more complete or fulfilled. I argue that generating wealth as an attempt to alleviate an existential sense of lacking or emptiness (D'Souza 2015) is a biological concern for welfare and wellbeing: the agent is still operating in the mode of *labour* because they are essentially trying to 'cure' an unwanted condition of their metabolism (ie: not feeling empty). In either case, the agent is not operating meaningfully in the mode of *work*.

However, some cases of extreme wealth generation **can** be seen as extreme perversions of *work*. Some agents hold that the generation of extreme levels of wealth is a meaningful end in its own right, and seek to either live an extremely luxurious life, or simply seek to generate huge amounts of money to set themselves apart from others. This extreme covetous wealth generation is less of a concern for the agent's biological metabolism and is instead a veneration of money above all other pursuits. There has been much philosophical interest in money over time (Dick

2020), but an overarching rejection of money as a meaningful pursuit. Soren Kierkegaard said that money “will be the one thing people will desire” and that young people (at his time of writing) “hardly envies anyone his gifts, his art... [only] his money” (Kierkegaard 1846, p.4). Equally, Arthur Schopenhauer said “wealth is like sea-water: the more we drink the thirstier we become” (Schopenhauer 1851, p.29), and Paul Tillich claimed that the pursuit of money was a misguided and futile concern, one that fails to result in meaningful ultimate concern (Tillich 1956). Perhaps most foundationally, Aristotle rejected the pursuit of financial gain as being honourable or meaningful, saying that “the wealthy are insolent and arrogant, being mentally affected by the acquisition of wealth, for they seem to think that they possess all good things” (Aristotle 335, p.1390b) and that “the life of money-making is one undertaken under compulsion, and wealth is evidently not the good we are seeking; for it is merely useful and for the sake of something else” (Aristotle 340, p.1732). Agents dedicating themselves to the generation of money are engaging in an inherently cyclical act because there is always a need for further money, and are missing something fundamentally meaningful from their actions: rather than expressing a moral or political value, they are beholden to a desire and an appetite. Contemporary economic conditions might make the pursuit of wealth **seem** meaningful, but I disagree that it is an act of *work*, because it lacks the definitive temporality and the meaningful engagement, in line with the other philosophical critiques mentioned above.

The second potentially problematic counterexample is that of violent or hateful acts. An agent might act in a deliberately cruel or malicious way, by stealing something, harming someone, or committing structural injustices, under the guise of expressing a certain political or moral position through their actions. It could be argued that when totalitarian, communist, or nationalistic governments carry out genocide or xenophobic campaigns, the governing agents are expressing a given belief or ideal about the world (Donà 2019). In a similar way to the pursuit of money, these types of pursuits are corruptions of both the mode of *labour* and of *work*. In relation to *labour*, violent or hateful acts can be an extension of an perceived or fabricated ‘threat’ to the group or government’s biological condition: recently and historically, far-right discourse often disguises their hateful acts under a notion of ‘protecting their race’ from threats posed by minority populations or alternate religious and social groups (Bytwerk 2005; Bernhard 2017). Their actions are then wrongly justified as biologically necessary when, as with the hoarder of wealth, they **could** continue to survive without behaving in such a violent way. This is different from a starving person stealing food: in a case of starvation, stealing food is not a corruption of *labour* but is an extreme example of concern for survival; whereas nationalist, totalitarian, or communist governments **could** continue to operate without persecuting other populations, despite whatever challenges or changes this might bring.

In relation to *work*, violent and hateful acts pass a threshold of meaningful expression to become corruptions of the act. Political organisation, for whatever political or moral cause, can be understood as meaningful articulation and engagement, even if the precise political message is disagreed with.<sup>30</sup> Agents organising and expressing values and beliefs about the world, through political or artistic means, is not in itself an issue but when that organisation spills over into violence, hateful discourse, or unjust structural persecution, then those agents are behaving in a manner similar to the agents who covet wealth above all else. They might justify their actions through political or moral language, but are engaging in a cyclical and endless process of destroying others to assert themselves. This is inherently problematic because there will always be a need to destroy others, but only a finite number of others to destroy. Moreover, these acts do not stand independently of one another, and do not express anything about the actor beyond their hatefulness. While such movements might **appear** to operate in the mode of *work*, they fail to satisfy the conditions of meaningfulness as I define it.

### 5.2.3. The Temporality of *Work*

The meaningful activities of *work* have a very different temporality from the biologically necessary acts of *labour*. Where biologically intended

---

<sup>30</sup> A distinction could be made between disagreeable political organisations and movements surrounding conspiracy theories. Rather than occurring in the mode of *work*, movements like the reactionary 'anti-vax' and 'anti-5G' movements could be seen as extreme corruptions of *labour*: a concern for biological welfare is compounded by ignorance of scientific fact and given a veneer of political organisation, but simply reflect a desperate fear for survival in a world that isn't fully understood by participants.

*labour* is inherently cyclical, following the movements and rhythms of biological metabolism which need constant attention, instances of *work* will have a determinate and demonstrable end. This is a point in the activity at which the agent can locate the meaningful expression that is paramount in acts of *work*, which may be the end of the process or a part of the process itself. Further action might be required once the meaningfulness of a task has been achieved, but this does not detract from the meaningfulness of that given moment. A poignant political speech, a piece of art, or an important moment of personal identification doesn't become subsumed in an overarching process in the same way as, for example, a meal eaten out of sheer hunger. Even where such instances belong to longer processes, such as a political speech or an art exhibition, the individual act can be taken as meaningful in its own right. Such acts might require repetitive, menial, and strenuous preparation, which might suggest that the act belongs to the mode of *labour*, but preparatory sub-tasks that are intended towards the meaningful self-articulation of the agent occur in a different mode to those of *labour*. If the repetitive and menial sub-tasks are pursued with the intention of achieving something meaningful and self-articulating, they are occurring in a very different manner to those pursued for the continued survival of the agent. Learning an instrument or skill, working on a piece of writing or art, or building an object can all occur in the mode of *work*, precisely because standout and definitive moments of meaningfulness will emerge out of the repetition that are not re-subsumed into the process. I can spend hours repetitively

learning an instrument that culminates in my being able to play a certain song to express an emotional state or political inclination: I do not then necessarily need to continue practising or learning the instrument if the moment of self-articulation was the only goal of the act.

*Work* can be said to be determinate, despite sometimes requiring the cyclical repetition of practice and learning. Because we are again focusing on a mode of activity rather than a catalogue of activities, we can also consider acts that relate to biological metabolism. Take the example of meal preparation: in the mode of *labour*, each step is taken with a direct concern for the affected agent's biological welfare, but if such an act was undertaken in the mode of *work*, the same movements would take place but the contextual horizon is intended towards meaningful articulation. The meal being prepared might reflect social or cultural practices that are significant to the agent, or express a political message through the process. The meal in question can be taken *in isolation* as a meaningful expression *in its own right*, without it becoming subsumed into the biological metabolisms of the affected agents. If an agent lives in a different country, then preparing food from their home for people who have never eaten it has more meaningful significance than simply eating because they're hungry; just as someone who has never eaten Westernised fast food might find their first experience of eating in McDonald's meaningful in a way that a local agent might not. This can be seen in fine dining as well as in cooking practices that are explicitly political, such as environmentally sustainable or distinctly traditional forms of cooking. In such cases, the act is definitive in

its expression, and can be referred to as a specific moment of articulation which holds a different or additional significance beyond biological necessity, precisely because it isn't immediately swept up into the never-ending cycle of the agent's biological metabolism.

This example might be one in which **both** *labour* and *work* are taking place. The meal at a wedding definitely serves to ease the guests' hunger, but also has a lasting meaningfulness that distinguishes it from other meals in the guests' lives. It might be the case that the pursuit of one meaningful task is occurring in an overall process of biological necessity, such as in paid employment. An agent can find meaningfulness in one day's employment, but they will still have to continue to *labour* at that job for economic necessity, regardless of whether the next day is as meaningful. This is the reality of meaningful activity: each individual act can be articulatory in its own right, regardless of the larger process that it belongs to, and the individual moments of meaningful self-articulation can appear in processes that are usually performed *laboriously*. This is perhaps most clear in monastic routines, in which generally *laborious* tasks are undertaken in meditative ways, imbuing them with meaningfulness beyond biological necessity. Acts of cleaning, cooking, and bodily preparation transcend their biological remit, and take on additional religious significance when undertaken in certain conditions of enclosure (Wijayaratna 1990; Hoffman 2007). Tasks can be formulated in such a way as to allow engagement in **both** modes, with no task inherently being entirely given over to one mode or the other.

Meaning might be derived from an individual act or sub-act, without concern for the larger macro- or meta-process. Under contemporary economic conditions, certain tasks are made necessary, but can still facilitate meaningful engagement, just as some jobs would disappear under different economic conditions. A fully automated 'post-work' society might eliminate the need for professional academics, and perhaps academic research in the mode of *labour* (undertaken to secure a wage), but might still allow for academic research in the mode of *work*, undertaken because the agent finds it inherently meaningful to do so. Equally, economically necessary industries might also disappear: human engagement in factories might be made redundant if machines perform all the necessary functions, as discussed in Chapter 4, and therefore the opportunity for agents to meaningfully engage in manufacturing might disappear. In both instances, under certain conditions the task in question will be open to both modes of *labour* and *work*, and while the broader conditions of society and economics might change, as tasks arise they can be undertaken meaningfully and/or out of necessity. A person can therefore engage in their paid employment in a meaningful way if the conditions of the task allow it on one day, without having to do so on the next day. Precisely because *work* is not primarily intended towards their survival, an agent can ignore the fear of being fired or of alienating their fellow agents, and can undertake the task with only meaningfulness in mind. The opposite might equally be true, wherein the individual acts are **not** found to be meaningful, but the overall process is. If an agent

volunteers their time at a charity, the day-to-day activities of their volunteering might be mundane, but the agent might find meaning in the overall process of helping the charity itself. Equally, the agent might not care for the charitable organisation itself, but might find meditative or social meaning in the activities ascribed to them. In both instances, meaning is being generated in a determinate and non-reproductive manner: the first agent's day of meaningful self-articulation holds significance regardless of whether they do it again tomorrow, and the second agent could stop volunteering without changing the meaningfulness of the time they spent at the charity.

These processes might seem cyclical in their own right: some form of employment, whether meaningful or otherwise, is a constant feature of contemporary life, just as political campaigns are constantly evolving and aiming at different issues - even the meaningful meal gives way to a need to eat again. The definitiveness of acts of *work* allows us to investigate these individual acts of meaningful self-articulation in isolation, in light of what the agent was expressing. That further action might be required or might occur is contingent and unimportant: the agent could die as soon as the self-articulation occurs, and we would still be able to understand the determinate act in its own right. This is not true of cyclical *labour*, because the meaning of one act is always subsumed into the next.

#### 5.2.4. Universal Expression and Articulation

Central to the notion of determinate action that generates meaningfulness is the notion of expression or self-articulation, because this is the manner in which meaningfulness is achieved in acts of *work*. By articulation, expression, and communication, I mean something different to simply performing a task to the best of one's ability. All human action occurs within the condition of a biological existence, and so all acts will, to some degree, express and reflect the biological nature and capacities of the agent. All acts can reflect an aspect of the agent's biological nature: hunger, tiredness, desire, intention, or capacity of some kind, but for an act to be self-articulatory in a meaningful sense, something beyond biological necessity and metabolism has to be communicated, articulated, or demonstrated. Universal to all human beings is the capacity to act in some way, in addition to the capacity to have beliefs, ideas, emotions, dispositions, concerns, and so on. While some skills and means of expressing oneself might require training, practice, or technological mediation, the capacity to articulate is, *in itself*, universal to the human condition and available to all human beings. When operating in the mode of *work*, an agent's engagement in a task can express such an idea, value, disposition etc.

In the most straightforward case, meaningful acts of *work* can be, or can be accompanied by, a speech act. In such cases, the agent can vocally or linguistically articulate the idea or value that they are expressing via their action, and the action can itself then demonstrate that value. The

act of speaking in itself can be an act of *work*, in the case of political speeches or artistic performances. Speech acts that communicate a meaningful and personal idea or state allow the speaker to be understood as an individual person, or to identify themselves in relation to membership within a given group, organisation, or position, divorced from their biological necessity, in relation to whatever value is being expressed. This can be a wholly individual expression, in which the agent identifies themselves as a lone character, or in a broader manner as relating to a political group, culture, social organisation, tribe, family, and so on: meaningful expression does not need to be individualistic in a neoliberal sense, and can reflect the communal (and tribal) nature of human society, without entirely relating to biological necessity (Fukuyama 2011; Fukuyama 2014).<sup>31</sup> In examples of speech acts, an agent can “show who [we] really are, reveal actively their unique personal identities and thus make [an] appearance in the human world” (Arendt 1958, p.179). Not all meaningful *work* needs to occur through or with an explicit speech act. This is a key distinction between my approach and that of Hannah Arendt’s, because for

---

<sup>31</sup> By including cultural and social notions of identity, a potential problematic question might arise here regarding duty. It might be argued that duty is a motivational context for engaging in tasks which is necessary in a manner beyond the biological necessity of *labour*, and meaningful in a different way to *work*. I offer two responses. The first is that duty might well align with my definition of *labour*: a necessity of engagement, encouraged by the wellbeing of your social or familial group, might simply be an extension of biological metabolism in the broad manner I describe it. Equally, inclusions of duty might also be coercive ways to encourage engagement in, particularly, paid employment, and not a reflection of the Ancient Greek ideals (Patrick 2012). My second response is that my definitions are open to the inclusion of additional modes, because they are heuristic in nature, and not comprehensive or scientific. An additional mode already suggested is that of leisure, but *duty* might be a further suggestion, perhaps in line with virtue ethics (see for example Foot 1978; MacIntyre 1981).

Arendt “speechless action would no longer be action because there would no longer be an agent, and the agent, the doer of deeds is possible only if he is at the same time the speaker of words” (ibid.). Of course, all acts occur within a linguistic context, because we as humans can always understand, analyse, appreciate, and discuss each other’s actions but for Arendt, this communicative category of activities occurs in a manner that is *entirely distinct* from utility and necessity, and is one paradigmatically defined by political organisation. I do not draw such a sharp distinction: in moving away from categories of activity, I argue that meaningful engagement can occur within an act that is wholly useful or necessary. What changes with the task operating in different modes is the wider contextual horizon and conditions of enclosure, so that the engaged agent undertakes the task in very different ways, but the task itself can still be productive, useful, or necessary. An agent who expresses their political or environmental beliefs by not eating meat is still satisfying their hunger, but does not have to be doing so as part of a demonstration: instead, they can cook a meal at home, perhaps for a carnivorous friend, to show them an alternative dietary preference. The agent is then undertaking the act in a way that communicates their values, wherein the biological utility of eating **is of secondary concern but might still be fulfilled**. It doesn’t matter if the friend likes, or even eats, the meal because the meaningful engagement is in the act of cooking and sharing the meal, rather than in satisfying their hunger. Rather than being limited to a specifically political, and narrowly practical, category of activity, I argue that meaningful engagement can

occur with almost any task if the conditions of enclosure allow for it, and does not have to be *explicitly* linguistic.

A further resistance to the Arendtian model is that meaningful engagement with a task includes political motivations, but is not limited to such cases. Mundane and simple acts can also be engaged with in an articulatory and meaningful manner: affection, admiration, support, and so on can all be expressed and articulated through the simple act of sharing a meal, or of buying someone a present (Mauss 1925). Indeed, even relatively simple acts such as cooking in a culturally specific manner can take on additional meaning if they're undertaken in an expressive manner, for example to demonstrate cultural values to a different audience, or in defiance of a persecuting government. The fights of many indigenous peoples around the world to preserve their cultural heritage might operate between or across the modes of *labour* and *work* because their biological survival is combined with an expression and preservation of a set of cultural ideals and beliefs (Tuhiwai Smith 1999). Meaningful acts of *work* therefore involve a disclosure of 'who' the agent is in contradistinction to 'what' somebody is (ibid.). The tension between *labour* and *work* in such instances is particularly interesting and productive: we can question the conditions surrounding these cultures having to engage with their own survival, and reflect upon what meaning is being/can be drawn from it, alongside any personal or cultural articulation that is taking place. Perhaps the best example of this meaningful tension between *labour* and *work* is the famous 'sit-in' protests of the 1960s American Civil Rights movement,

in which the simple act of trying to eat lunch became entirely political, shifting from *labour* to *work*.



**Figure 21.** The Greensboro sit-in, depicting students and activists protesting at the segregation in the USA at the time, photographed by Jack Moebes in 1960 (Eskin 2010).

Of course, Arendt would wholly accept such protests as political but because they occur within the category of *action* for Arendt, they must be distinguished from their utility or necessity. In practice this becomes very difficult to maintain, and can lead us to question when an instance of Arendtian *action* can actually take place if it must be wholly divorced from utility or necessity. Such an extreme example serves to highlight the importance of including meaningful and articulatory engagement in tasks that are also useful or necessary: on my account, the important component is not the act itself but the contextual horizon in which it arises.

This resistance to Arendt's category of *action*, which occurs in a manner wholly divorced from utility and necessity, should also serve to pre-emptively answer any critiques from other linguistic notions of expression, particularly from speech act theory. It might be argued here

that I should better consider John Langshaw Austin's notion of a speech act's capacity to concomitantly perform a locutionary, illocutionary, and perlocutionary function (Austin 1955), and the further clarifications made by John Searle regarding the intentionality of illocutionary speech acts (Searle 1969), to reflect on the ways in which communication arises through self-articulatory and communicative actions (Allwood 1977). Indeed, I argue that these models and forms of inquiry have validity and importance in their own field but I am not concerned here with the manner in which communication functions linguistically or grammatically. Precisely because the communication is occurring through a meaningful activity, the role of semantic importance of the locutionary, illocutionary, or perlocutionary functions of the act are unimportant, and would not further enhance the analysis. Analysing meaningful acts of *work* through the methods of speech act theory might therefore be interesting, but would be a wholly different project.

### **5.3. Against Post-Work Imaginaries**

The definition of *work* offered here, that of a determinate and universal mode of activity that directly concerns the meaningful self-articulation of the agent, stands in direct opposition to the 'post-work' theorists discussed in Chapter 2. Indeed, proponents of 'post-work' futures generally advocate for the removal of 'work' from the human condition, often at the hands of automated technologies, so that human beings are

then free to spend their time as they see fit (Srnicsek and Williams 2015; Bastani 2019; Danaher 2019; Benanav 2020). Such arguments rest on very narrow, intuitive, and practically problematic notions of work, often tied to paid employment. The key question that can be raised is “what distinguishes the work that is being automated from the activities that will be left in a ‘post-work’ society?”

The most intuitive use of the term ‘work’ in contemporary conditions refers to paid employment. Paid employment is necessary, but may be boring, menial, and unfulfilling, resulting in many advocates of automation and post-capitalism citing this ‘work’ as needing to be removed from society. Scholars therefore claim that productive industrial jobs (Bastani 2019), technical and skilled jobs (Susskind and Susskind 2017), and the menial and non-productive jobs unique to contemporary capitalist society (Graeber 2018) should be automated, referring to these activities as ‘work’. The underlying drive is to also reform or remove capitalism from society (Frase 2016; Mason 2016), or even to expand the very notion of humanhood with increasing technological advancements (Huxley 1957; Danaher 2019). In either case, it is argued that by automating these forms of ‘work’ we will be free to spend our time and energy in creative (Bregman 2016), political (Srnicsek and Williams 2015), or generally fulfilling activities (Suzman 2019), which, importantly, do not fall into the category of ‘work’.

My first critique of 'post-work' theories is therefore simply a linguistic or conceptual one. I offer a very broad, open, and inclusive definition of work, framed as a mode of activity rather than a catalogue of activities, in which the additional contextual conditions are included in consideration. However, 'post-work' theories tend to offer very narrow accounts, usually surrounding employment. It can be argued that 'post-work' theorists should rename themselves 'post-employment' or 'post-*contemporary-work*' theorists and offer qualified and limited suggestions and predications regarding the future of employment, rather than sweeping arguments surrounding the future of 'work'.

But this too is wholly unsatisfactory, because it inherently neglects **unpaid** work that does not fall under employment. As a result, everyone with a 9-5 job would be free to spend their time as they see fit in this newly automated utopia, but the necessary labours that disproportionately fall to women would endure. This has been noted by other scholars (Blanchflower 2019; Deranty 2021), but highlights a key gap in the literature which I am seeking to redress: it's not just our jobs that need to fall under the category of 'work' and that we should be considering for automation, precisely because removing employment (or, by extension capitalism) does not eliminate either *work* or *labour* (as I define them).

This leads to my second critique. If we accept that the intuitive notion of 'work' used in 'post-work' theories is inherently limited, what metric should instead be used to define 'work', and to distinguish what

activities should and should not be automated? Even if we accept that employment and economic remuneration are too limited, it might be suggested that we should be targeting the menial and boring nature of certain jobs (Stiegler 2016; Graeber 2018). This would better account for boring unpaid labour, as well as boring paid employment. Where then is the line drawn? By removing **all** boring and menial tasks for human engagement, we remove the very foundations from which some meaningful activities are achieved. Chopping vegetables is boring and menial, but allows us to create delicious and artful meals; practising an instrument or a sport can be a tiresome and repetitive endeavour, but allows for the meaningful engagement in art and leisure; editing pieces of writing *can* be dull and thankless, but is an integral facet of creating meaningful books and research. Moreover, boredom and meniality are not objective standards, and fully automating the tasks that one person finds boring will undoubtedly foreclose the meaningful practices of another. The very creative, artistic, political, or leisurely tasks predicated as filling our days in fully automated societies require some repetitive practice or training, some menial preparation, and some boring engagement, alongside a host of biologically necessary (but previously unpaid and under-acknowledged) tasks.

Conversely, we might inadvertently arrive at a transhumanist 'utopia', in which **all** tasks, activities, and jobs that involve **any** semblance of difficulty or repetition are performed by machines including, it must be argued, childbirth, childcare, and all artistic and academic pursuits. It might

be accepted that the first step in this direction is almost universally desirable: removing boring 9-5 jobs that agents only engage with due to economic necessity, along with difficult and tiresome housework, might be seen as an inherently good thing. The process cannot stop there, because other acts remain boring, difficult, or tiresome, and so they would be next in line to be automated. Precisely because the intuitive notion of ‘work’ being employed is so narrow, and the adoption of automation so broad, there is simply not enough nuance in the theory to result in the types of automated future we might actually want. An automated future must be an automated future for all, otherwise it will exacerbate and continue injustice and inequality, and not be a utopian vision at all. To do so, we require much more nuanced understandings of work (as *work*), and better clarification regarding what is really at stake. Rather than trying to remove ‘work’ from human society, understanding it as I have defined it, as *work* in conjunction with *labour*, will allow for a much more dynamic interaction with automation today.

#### **5.4. Enclosing Work**

As with the definition of *labour* presented in Chapter 3, the mode of *work* has thus far been described in terms of a contextual horizon. In practice there are additional considerations regarding the conditions of the task in question: the way in which the task is practically enclosed. This is not to make a Platonic or transcendental claim regarding a perfect ideal of

each task that is then poorly replicated in practice, but rather to suggest that the conceptual tenets of the definition take on an additional conditional dimension when enacted in practice. The ways in which the spatial, temporal, and articulatory conditions shape a task can significantly alter its process and outcome. Perhaps the most important condition to consider in the mode of *work* is the inclusion of a monetary wage because this introduces an economically necessary component to the analysis, which might affect the type of meaningful articulation that can be achieved through it. This will be discussed in the following sections, but for now it will suffice to say that the inclusion of economic remuneration for an act of *work*, as with any other condition of a task's enclosure, is not *inherently* problematic, and does not essentially pose a problem for acts of *work*, as long as meaningful engagement and expression through the task are still allowed. Of course, such affectations of a task's conditions *can* cause issues for the meaningful articulation achieved through it, but does not have to. Moreover, where the enclosure of *labour* was perhaps more intuitive, the conditions that enclose acts of *work* might be slightly more difficult to understand in the first instance. I will consider each condition in turn, before returning in the next chapter to the case studies from Chapter 4, to reassess them in light of the definition of *work* discussed here.

#### 5.4.1. The Spatial Enclosure of Work

The spatial enclosing of *work* describes the same facet of actualised activity discussed with reference to *labour*. The spatial enclosure of *work* encompasses the physical, mechanical, and spatial conditions of a task:

where it is taking place, what tools, objects, or artefacts it is utilising, and what movements and physical effects/repercussions it entails. Spatial conditions include the physical or digital space in which the task is occurring, the technological artefacts being employed, any movements or motions, and so on. Under contemporary technological conditions, the spatial conditions of self-articulatory and meaningful acts of *work* can differ widely: I can employ a microphone in a room full of people, or work with the person next to me; I can connect to the internet through a device which broadcasts my *work* to thousands of people all over the world, or even to people in space!

Paramount to the spatial enclosure of *work* is that it facilitates expression, meaningful engagement, and self-articulation in some way. If spaces are too closed off or compartmentalised, meaningful interaction between agents might be impossible. If spaces are too open, agents might struggle to focus and concentrate on their articulatory tasks. If technological artefacts are employed, there are risks that articulation will be hampered if the tool is too difficult to use, or not properly designed to accommodate meaningful engagement; or, conversely, the agent's articulation might be enhanced and extended, either by reaching more people, or by allowing them to better interact with the task at hand. The design of buildings and physical spaces can greatly shape meaningful engagement with and within them, with some contemporary spaces not lending themselves to meaningful articulation by design (Castells 1996), including airports and shopping centres which are designed to be passed

through, rather than meaningfully engaged with (Augé 1995). Of course, this is not necessarily an issue for an airport: its function is one of transporting people from one place to another, but because such spaces lack the *capacity* for meaningful engagement, they are *always* bound to be passed through, not facilitating **any** further forms of interaction<sup>32</sup>. Digital spaces have had an equally critical analysis with regard to their utility for genuine meaningful interaction and activity in recent years: some scholars have cited fears over the simulation of connectedness rather than genuine interaction, citing social media as particularly problematic (Turkle 2011) and addictive (Alter 2017); others praise digital spaces as sufficient and satisfactory spaces of connection (Danaher 2019), particularly in light of Covid-19. Recent developments in so-called ‘post-truth’ digital communications further complicate the achievement of meaningful expressive interactions online, because doubt and misinformation are now more widely distributed and criticised in online spaces (d’Ancona 2017; McIntyre 2018). Of course, the attention paid to spaces of work pre-dates digital forms of *work*, and much research has been conducted into the benefits and detriments of traditional workspaces compared to offices designed around employees’ needs (Meel and Vos 2001; Oseland 2009; Stewart 2013; Richardson et al 2017). In light of Covid-19, and a widespread move to working from home, further questions have been raised surrounding precisely *where* work should and does take place (Kari

---

<sup>32</sup> For example, Singapore’s Jewel Changi Airport features a famous indoor waterfall and luscious green space, facilitating the *labour* needs of passengers and also facilitating additional forms of interaction.

2020; Roy 2020; Soojung-Kim Pang 2020b; Jones and Winder 2021).

Interest in shorter working weeks has been reignited and further in recent years, with pilot schemes of a 4-day workweek being tested in Belgium, Spain, and Scotland (Fraser 2021; Kassam 2021; Boffey 2022). Following the pandemic, many scholars have called for the normalisation of working from home, due to its reduction of commuting and better flexibility with familial responsibilities (Soojung-Kim Pang 2020a). Other scholars express fears that a lack of properly defined spatial conditions between work and leisure leads to non-stop engagement and ill health among workers (Crary 2014). This is particularly interesting in light of ‘reproductive labour’, leisure, and work, because historically many women have had to engage in both paid employment *and* laborious childcare and housework, but have also found ways to include leisure activities, such as listening to the radio (Langhamer 2000). Clearly defined spatial conditions might therefore be beneficial to workers.

Throughout history reflections on working conditions often cite the spatial conditions of employment as the most detrimental. When the working norm in the UK shifted during the Industrial Revolution from agricultural and home-based workshops to factories, many scholars have argued that a significant and detrimental shift occurred, in which workers were now subject to “arbitrary interference of new masters... [and] the organisation of the workplace according to rules that [the worker] themselves had little influence in shaping” (Gourevitch 2013, p.595). The contemporary corollary of the office is seemingly susceptible to similar

arbitrary interference, with many scholars arguing that working practices and working hours do not properly reflect the needs or capabilities of employees (Stronge and Harper 2019; Stronge and Lewis 2021; Hester and Srnicek 2023). This does not necessarily mean that standards of living were better prior to the Industrial Revolution, when agricultural work was more the norm, because the Industrial Revolution also brought about a number of medical and social improvements to the quality of life in the UK (Taylor 1975). I am arguing that the spatial conditions of a task can greatly shape its progression and possible outcomes.

Such discussions are guilty of reducing the entirety of *work* to paid employment. If we consider meaningful and articulatory activities in addition to traditional forms of paid employment, it becomes clear that the spatial conditions of such activities differ widely. Political, creative, and artistic forms of *work* might take place at home, in a bedroom, a kitchen, or an office, without issue. Access to a workshop, studio, or shared creative space might also facilitate the achievement of meaningful articulatory activities. The spatial conditions of a task do not have to be limiting or constraining and can facilitate additional articulatory meaning: working on a play in a theatre with other people watching and helping might allow you to create a much clearer and more enjoyable piece than working on it alone, just as working on a shared project in a workshop with colleagues might also help or hinder your expressive progress. By considering the ways in which an act is enclosed in a spatial sense, we can see what facets

of the space, technological mediation, and movements of the task are conducive to meaningful self-articulation, and which are not.

#### 5.4.2. The Temporal Enclosure of *Work*

Intertwined with the spatial conditions of *work* are the ways in which a task is enclosed temporally. As already discussed in the definition of *work*, acts of *work* are temporally limited and finite in ways that cyclical acts of *labour* are not, but this does not mean that all acts of *work* will be temporally closed off or constrained. While the mode of activity is determinate, with the articulation achieved through or by an act standing for its own right in a definitive and enduring manner, the acts of *work* themselves still occur within a temporal condition. The temporal enclosure of an act concerns the manner in which a task proceeds in time, and can describe the time required to complete a task, as well as the ways in which that time is extended, reduced, mediated, or altered through technological, technical, and social means. The clearest example of the temporal enclosure of *work* is the working day, or the hours generally given over to paid employment in a country or society on a given day or week. In the UK, the norm for a working day of paid employment tends to be 8 hours, between 9am and 5pm, punctuated with legislated breaks, and bookended by a commute of some type (perhaps not if working from home). An articulatory act of *work* might be conditioned to fit into this type of time frame, and could be extended with the inclusion of additional tasks, or reduced if the task can be completed in less time, as suggested by advocates of a shorter working week (Barnes 2020).

The spatial and temporal conditions of an act are interlinked. The spatial enclosure of a task will inevitably have an impact on the emergent temporal condition: moving a workplace outside of the home brings with it the temporal effect of a morning and evening commute, for example, just as working from home might eliminate a commute time but extend the working day into the evening through the use of portable smart technologies (Crary 2014). Campaigns for a shorter working week often intersect with campaigns regarding the spatial conditions of the related tasks: the demand for a 4-day working week is often rationalised through the alteration of an act's movements and motions, or the implementation of more flexibility in spatial conditions, such as working from home (Stronge and Harper 2019). Technological improvements that save time often do so by regulating movements, or by displacing the human agent from the workspace for certain aspects of the act. If the temporal condition of a task can be shortened, time is available for other activities, if the act itself is not articulatory, or more time to spend in articulating through the act (without pressure) if it is articulatory.

On the contrary, the temporal conditions of a task can also be extended or augmented to the detriment of the worker. Not only do email-enabled devices allow the working day to continue past its established norms, but the working day can be temporally formulated in particularly negative ways. In the 1800s, British factories employed a "relay system" to avoid the maximum working time of 12 hours a day, as it was legislated in the 1830s. A loophole allowed factories to divide shifts into shorter

staggered times, so that workers would be on site for 16 hours (the maximum working day) without working over their permitted 12 hours. Employers did not provide a rest or communal space, so the affected workers couldn't spend their non-shift time in meaningful activities, and were instead forced to wait outside the factory gates for (unpaid) hours at a time (Hutchins and Harrison 1911).

Beyond these examples of paid employment, the temporal conditioning of other articulatory acts of work can also significantly impact their outcome and experience. A person who is writing a book or research paper out of a passion for the area might spend long hours in the library, and still more time writing it out by hand, or they might use a computer and the internet to perform the same tasks in a shorter time. The result might be that they spend more hours of the day in the task, because they use the same device to write, research, respond to emails, watch videos, and view websites (Kessler 2019; Jones and Winder 2021). Importantly for determinate *work*, the meaning and expression of a task or object can be temporally divorced from the original agent in ways that can't occur to the same degree in acts of *labour*. For some activities of *work*, the agent might enact a speech act and be directly connected to the meaning but for others, the produced object might only be discovered later in their life, or even after they have died. In such instances, the agent might find value in the writing of the research paper, but it might only be found or published at a later point, when the opportunity for misunderstanding and misinterpretation grows. For example, Friedrich Nietzsche (1844-1900)

undoubtedly found meaning from the writing and lecturing he performed in his lifetime, but some of his key texts were finished shortly before he suffered debilitating illness before his death. Consequently, his popularity grew during a period when he could not further articulate beyond his written works. During this period, his sister, Elisabeth Förster-Nietzsche, cherry-picked and altered his unpublished manuscripts into a form that Nietzsche himself did not authorise or intend, resulting in Nietzsche becoming a poster-child for the rising fascism in Western Europe (Montinari 1997; Diethe 2003). This does not detract from the meaning that Friedrich Nietzsche himself found in his writing, but allowed his sister to articulate her own selfhood in a perverse manner. Articulatory acts do not need to be successful to be meaningful, because they can generate meaning through their creative process, but it is equally important to note the temporal dimension of articulation when formulating tasks.

The temporal conditions of a task can greatly affect the articulation possible through it. If an agent is rushed, pressured, or overworked, the resultant expression might not be of the form originally intended. Moreover, if a technological mediator is employed which is not conducive to the accurate and effective facilitation of articulation, as Neil Postman argued television was for political discourse, then the resultant articulation will again be changed (Postman 1987). Because the nature of articulatory *work* is so irregular (in the sense of not being guaranteed, precise, perfect, or mechanically regulated), the temporal conditions of tasks will differ widely, and there is no homogenous technological means of ensuring

constant and consistent articulation for human agents. Given the intersection between the spatial and temporal conditions of articulatory and meaningful *work*, it must be noted that altering one can have an important effect on the other, and that both have a direct result on the produced articulation. As previously, these heuristic definitions are intended to promote critical reflection, rather than scientific response.

#### 5.4.3. The Enclosure of Articulation

In addition to the spatial and temporal conditions of an act of *work*, the way in which the self-articulation, expression, and meaningfulness of an act is enclosed can also significantly affect its outcome. Such conditions concern the intended expression of an act, the ways in which that expression is undertaken, what forms of expression are possible or facilitated, and the final self-articulation itself. Social, economic, cultural, historical, and technological influences on the conditions of an act of *work* can significantly shape and alter the intended message or product, and must be considered with regard to the automation of meaningful *work*: how does including certain technologies shape meaningful engagement in acts of work, and what opportunities for articulation are created or foreclosed? Prior to the invention of the telephone, writing a letter was accompanied with a specific set of conditions, which changed as communication became more digital, just as the limits of artistic expression have changed in each cultural and historical epoch. Analysing acts of *work* in this way is not necessarily intended to give a scientific or formulaic answer to precisely 'when' or 'how' articulation occurs, but investigates

the conditions of *work* tasks with a primary consideration for the ways in which they facilitate meaningful engagement. An example here is the overarching economic condition to articulatory and meaningful *work*, wherein an agent is paid a high wage for their engagement, but that wage comes with certain constraints. A television news presenter might have personal views on a particular story, but has to follow certain guidelines during the broadcast, and is thereby limited in what they can say.

Conversely, the anonymity of online communication might prompt agents to say things to others that they would never think about saying in person.

This is further complicated with repetition. Acts of *work* might be conducive to meaningful engagement in isolation, or the first time they are undertaken, but lose that significance if they are repeated, or are enclosed in ways that are boring, repetitive, or mundane. Unlike *labour*, in which repetition and mundanity do not necessarily negatively impact engagement, an agent made to engage in a similar, or the same, act repeatedly can greatly impact meaningful engagement. Having to fight the same political battle repeatedly, with no change in outcome, or having to make exactly the same art work without changing anything, thereby having to identify yourself in the same way to the same people, will undoubtedly reduce the meaningful engagement possible in that task. If a writer is made to repeat the same story, perhaps only varying the names of the characters or the setting of the story, without ever dramatically changing any of the key aspects, their meaningful engagement with that task will inherently be lesser, regardless of any economic value extracted from it. The facilitation

of meaningful engagement in *work* requires more openness to change and new articulation than acts of *labour* which are inherently cyclical and repeatable.

Such examples are not the only forms of articulatory enclosure, and many examples will be conducive or augmentative to the agent's initial intention. In an ideal instance of self-articulatory *work*, the intended message would occur within technological, social, cultural, and personal conditions which allow the agent to easily express and engage with their desired intention. An architect using new creative software might facilitate an agent to express themselves in ways that they couldn't before, just as learning a new musical instrument or style might open opportunities for articulation that weren't previously available to the agent. These conditions might also then retroactively and reciprocally shape the types of articulation that take place, by shaping the forms of articulation that are possible and normalised. Equally, such acts might also include some level of repetition or mundanity: the process of writing a book necessitates the editing of multiple drafts, proofreading, and altering the story if issues are noted by reviewers or editors, but the ultimate outcome can still be one of meaningful engagement and articulation. There is no success criterion here: an agent can learn the necessary skills to a sufficient level to articulate themselves, either in the process or in the outcome, without needing to become a professional in that field.

This may appear to be another area in which I am distinctly Arendtian. Hannah Arendt also presents a particularly articulatory account of her category of *action*, writing that:

To act, in its most general sense, means to take an initiative, to begin... to set something in motion... this character of startling unexpectedness is inherent in all beginnings and all origins... the new always happens against the overwhelming odds of statistical laws and their probability... the new always appears in the guise of a miracle. The fact that man is capable of action means that the unexpected can be expected from him, that he is able to perform what is infinitely improbable (Arendt 1958, p.177–178).

This capacity to set something completely new in motion is a capacity universal to the human condition echoed in my own definitions, and is one of the main reasons that mundanity in acts of *work* can be problematic: repetition can be stifling for articulation and meaningful engagement, in a way that is not true for biological necessity. This is noted by other Arendtian scholars, including Rosalyn Diprose and Ewa Ziarek, who write that:

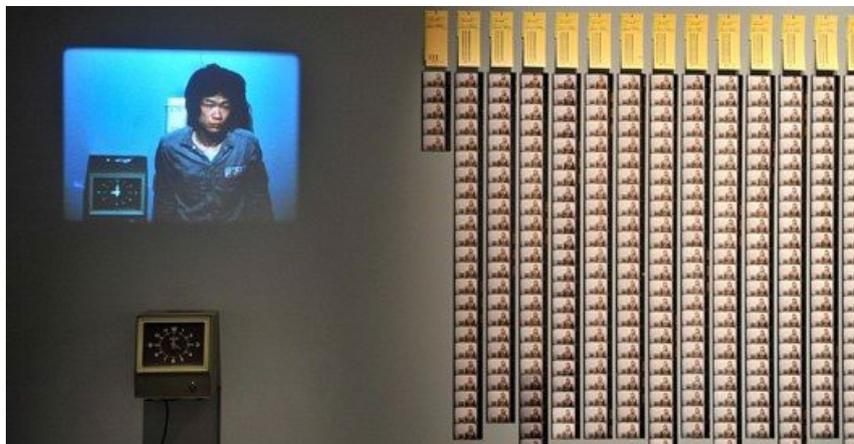
The focus on ‘behaviour’, mundane work and the preservation and reproduction of human ‘life’ [as labour] is normalising in the sense of fostering conformity and limiting the capacity of beginning something new (Diprose and Ziarek 2018, p.112, my bracketing).

I agree in principle with this Arendtian notion of acting, but I disagree that such articulatory activities occur within their own category, and I resist arguments that self-articulation and meaningful engagement must only occur through “word and deed” (Arendt 1958, p.176) without additional concerns for utility or necessity. The use of speech acts can be highly constraining to genuine articulation, because some industries, including service work and call centres, require agents to speak and express

themselves, but in ways that do not necessarily reflect their own beliefs and values (Hochschild 1983; Russell 2008).

Moreover, genuine articulation and meaningful engagement in acts of *work* can occur *alongside* utility and necessity. The 'startling unexpectedness' that Arendt reserves for the category of *action* can also be found in objects that she might commit to the realms of utility or necessity. Tehching Hsieh's year-long piece *Time Clock Piece (One Year Performance 1980-1981)* saw the artist punching into a clocking-in machine and taking a picture of himself *every hour* for a year. The piece is undoubtedly expressive, and the artist certainly demonstrates a meaningful engagement with the process and product, with a clear political message being made regarding contemporary society and working practices but the piece is displayed in museums or galleries, earning the artist and curators financial gain. Hsieh's elevation of mundanity, with the repeated photos and torturous conditions aren't political *action*, as Arendt would define it, but can't be fully explained within her categories of 'work' or 'labour'. Because it is an artwork, there might be debate surrounding its utility, so perhaps a more 'useful' example is a video game like *Papers, Please*. In it, the agent plays as a border guard in a fictional dystopian country, forced to make increasingly difficult moral decisions while juggling increasingly strict and changeable rules, while being reminded that any mistakes will result in their family being punished. Precisely because it is a game, *Papers, Please* is a useful object, one that initially might seem to intend towards the leisure and relaxation of the player; simultaneously it is

an expressive articulatory game that presents the player with clear moral and political questions. A final example is Andy Warhol's famous repeated pop culture images, in which he transforms mundane objects of *labour* into articulatory artistic messages regarding advertising and mass consumerism. All three examples occur within a linguistic framework, being talked about or being accompanied by written explanations, and their articulation does not take place within a speech act or without an explicitly political demonstration. These useful objects produce financial gain for the creators, *while also* clearly expressing a meaningful message.



**Figure 22.** Tehching Hsieh's year-long piece *Time Clock Piece (One Year Performance 1980-1981)*, in which he 'clocked in' and took a Polaroid photograph every hour for a year (Cummins 2017).



**Figure 23.** A still from Lucas Pope’s game *Papers, Please* (2013), in which the player must traverse the increasingly complex life of a border guard (Pope 2013).



**Figure 24.** The repeating image of the Campbell’s Soup can, used by Andy Warhol (Warhol 1962).

The conditions of enclosure surrounding these acts all greatly shape the resultant articulation and engagement: Tehching Hsieh’s year-long performance might appear very different if it took place over a live stream, rather than a Polaroid camera and a clocking-in device, just as Lucas Pope’s video game would be a radically different experience if it was a TV series. The conditions surrounding how an act of *work* facilitates articulation can greatly impact the ways in which agents can meaningfully engage with it and what meaning can be drawn from it, but their significance is not

negated by the presence of additional concerns. If the act is undertaken *with the primary intention of meaningful engagement*, then we can investigate it in relation to the mode of *work*.

#### 5.4.4. Problematic Instances of Enclosure

It is also important to note the ways in which acts of *work* can be enclosed that are *not* conducive to meaningful engagement, or when instances of *work* become problematic and detrimental to the agent. As with the mode of *labour*, instances of *work* can be usurped, exploited, and manipulated for alternative ends, with the overpowering presence of mundanity being one such way in which the opportunity for articulation can be stifled. Given that *work* has a direct relationship to meaningful engagement, it is something that we naturally desire and hold to be virtuous and good. Activities, particularly paid jobs, might be advertised as fulfilling this desire for meaningful *work*, when in reality they are not conducive to meaningful engagement. An employer might appear or purport to outwardly align with a given political belief, but then operate in an opposing manner behind closed doors. One such example is businesses that declare their support for LGBTQ+ and BAME (Black, Asian, and Minority Ethnic) communities in public advertisements, but do little or nothing to change their business practices to better represent these communities: an agent might look to engage with such a business in order to express their political beliefs, but find that they are unable to do so (Fan 2019; Ramaswamy 2021; Fraser 2022).

Such instances can be called problematic cases of *work*, because the ultimate goal of articulation through the act is no longer achieved or achievable. Such instances might in fact turn out to be closer to *labour*, with the employer only concerned for financial gain rather than articulation, and the agent reduced to earning a wage being the only motivation for continued engagement. Cases of the problematic enclosure of *work* occur when an agent's desire to articulate something about themselves is used to achieve a different goal, by either another agent or, more broadly, a structure. A clear example of this might be customer-facing employment in an industry such as hospitality or retail, in which the articulatory movements of the agent are used to achieve economic ends for a company, shop, or restaurant, as well as for the agent themselves. In extreme instances, agents are employed to undertake 'emotional labour', in which their bodies and voices are used to sell products or perform services, regardless of their own intentions towards such products or services (Korczynski 2003). Airlie Hochschild discusses the experiences of airline cabin crew, and argues that the type of 'emotional labour' they undertake:

... requires one to induce or suppress feelings in order to sustain the outward countenance that produces the proper state of mind in others... this kind of labour calls for a coordination of mind and feeling, and it sometimes draws on a source of self that we honour as deep and integral to our individuality... the worker can become estranged or alienated from an aspect of self – either the body or the margins of the soul – that is *used* to do the work (Hochschild 1983, p.7).

Such a job might appear to allow for free and equal interaction with passengers, when in reality cabin crew must always display specific emotional states and behave in specific ways, regardless of how unkind or difficult a passenger is being. Equally, when a hospitality worker has to deal with an unpleasant customer in a polite and apologetic way, they might be suppressing their true feelings and simulating an emotional state, rather than actually experiencing it (Biron and van Veldhoven 2012). Such jobs can still be meaningful if the agent is able to have genuine interactions and is able properly to articulate their own identity, but the conditions of the task might be such that this is incidental or precarious, because the central aim of the task does not concern itself with the included agent's meaningful engagement. Whether an agent engages with the task meaningfully is incidental: the task will proceed in the same way whether or not the agent's engagement is meaningful.

A more complicated example of problematic articulation can be found in advertising. Many contemporary adverts use poignant and current values to advertise their products, despite the products, company, and practices not necessarily being in line with the chosen message. While perhaps not as explicit as the doctoring of Nietzsche's manuscripts by his sister, such cases still rely on the popularity and inherent desirability of meaningful articulation, but use it to generate economic wealth rather than to necessarily support the articulated end. Recent social trends towards outward support of LGBTQ+ and BAME communities and Black civil rights struggles (eg: Black Lives Matter) have seen most companies

publicly expressing their support. In stores and on their related social media sites, rainbow flags and slogans of support for Black political movements can often be seen but sometimes this, and some perfunctory diversity policies, is as far as the support goes (Um 2012; Oca et al 2020; Chitnis 2021). This is an interesting reciprocal process as social norms evolve over time and are gradually reflected in economic practices. Diversity is a key tenet of contemporary politics, and is therefore being reflected in advertising whereas the values depicted in advertising 50 years ago were very different, reflecting the predominant values of the time. As such, there is always give-and-take with advertising as it progresses over time, displaying and reciprocally influencing the values at the time.

An instance of this give-and-take can be seen in the controversial 2017 Pepsi advert, which tried to emulate the values of the time, but in a tone-deaf manner. In the advert, Kendall Jenner was depicted calming a heated street protest by offering both sides a can of Pepsi (Batchelor and Hooton 2017; Victor 2017). The advert mirrored the scenes of Black Lives Matter protests that were growing in prominence and urgency at the time of its creation (Lowery 2017); the advert tried to replicate and demonstrate the growing social unrest and desire for social justice emerging around the world. However, Pepsi faced huge backlash for co-opting such a serious and urgent political movement to sell a soft drink (Victor 2017), and the advert was quickly withdrawn. A satirical example, one that parodies the outward support of social justice causes by large companies via social media, can be found in the *Black Mirror* episode *Fifteen Million Merits*

(2011). In it, the character of Bing has a justified rage at the dystopian system he lives under, and displays this in a talent show, hijacking the light entertainment programme for distinctly political reasons. However, his demonstration becomes commodified by the very same system, and he finishes the episode with his own program of commodified rage, which produces a range of digital commodities in which citizens can dress their digital avatars. The initial intention of the character is to have his dissidence against the social media and television-driven structure heard, but it becomes co-opted as its own segment in the structure he is railing against (Byron and Brake 2019).



**Figure 25.** A still from the withdrawn 2017 Pepsi advert, depicting Kendall Jenner calming a heated protest with a can of Pepsi (Batchelor and Hooton 2017).



**Figure 26.** Daniel Kaluuya portrays Bing, whose violent and angry rant against the dystopian system he lives in become commodified by the same system, as its own show (Lyn 2011).

Both examples given here have a distinct economic dimension to them, with a company co-opting and manipulating a genuine (albeit fictional in the latter case) value and political ideal to generate biologically necessary value of some kind. However, this problematic form of enclosure is not a facet only of capitalism, and can occur under other conditions: fascist, communist, and nationalist regimes can co-opt the articulation and expression of non-related and dissident agents to further their own causes, employing propaganda in a similar manner to contemporary advertising, just as Nietzsche's manuscripts were posthumously published by his sister and taken up by the Nazis (Diethe 2003). While I am not suggesting that these types of enclosure are the norm with *work*, they are important to bear in mind, particularly in view of automation, to ensure that meaningful interaction with *work* is not replaced by false advertising, engagement

born from fear for their own life, or economic exploitation in work (Duffy 2015).

Having established the definition of *work* being used, it is pertinent to explore how these tasks can be automated in practice. In order to answer this question, let's return to the three case studies offered in Chapter 4, and re-examine them in light of the definition of *work* developed here.

## **6. Automating Work**

*Jobseeker! Can of Strongbow, I'm a mess/Desperately clutching onto a leaflet on depression/Supplied to me by the NHS/Is anyone's guess how I got here?/Anyone's guess how I go?/I suck on a roll-up - pull your jeans up - Fuck off, I'm going home!*  
*Jobseeker! (Sleaford Mods 2020)*

### **6.1. Revisiting the Case Studies**

In Chapter 4, I discussed the ways in which the automation of travel, manufacturing, and interpersonal care might be realised in the mode of *labour*. I argued that each activity has a clear biological intention which can be achieved through the use of a fully automated device that wholly encloses the task from further human intervention. For travel, I argued that an automated public transport system might be more conducive to the biological metabolism of the world as a whole, as opposed to individual autonomous vehicles. For manufacturing, I argued that the *replacement* or *displacement* of human agents from such processes must reflect the dualistic nature in which manufacturing both directly supports the biological welfare of agents (by producing necessary goods) but also supplies the means of satisfying economic necessity (by providing a wage), and therefore these dualistic effects, in whatever political or economic forms emerge after the fact, must be acknowledged. Finally, for interpersonal care, I argued that the implementation of automation might have natural limits regarding the functionality of the tasks in question, with certain sub-tasks needing to remain in human hands, and therefore automated technologies could be designed to better

*extend* or *augment* these sub-tasks, without fully *replacing* or *displacing* human agents.

In each analysis, I also argued that automating a task in the direction of *labour*, focusing wholly on the satisfaction of biological necessity and welfare, will have a reciprocal effect of foreclosing the opportunity to engage in the same task in alternate modes. Having defined *work* as an opposing mode of activity to *labour*, it is pertinent to consider the three case studies presented in Chapter 4 in light of also engaging in the mode of *work*. This is important because I argue that automated machines do not act in the modes of *labour* and *work* in the same ways as human beings, and therefore foreclosing a task entirely in the mode of *labour* could make engaging in that task in the mode of *work* impossible: such a loss of meaningful engagement and articulation is antithetical to the types of utopian life imagined in ‘post-work’ scholarship. Because the meaningful articulation and engagement of *work* are distinctly human pursuits, an automated machine could only ever replicate such movements to a lesser degree, and something intrinsic to the act (and to human experience) would become lost. Regardless of how sophisticated a machine is, it does not actively operate in either modes of *labour* or *work*, but comprises conditions and functional components that operate as part of such a mode. Automated machines can therefore mimic the movements of meaningful *work*, and appear to produce expressive and articulatory objects, but the self-articulation of meaningful *work* as I am describing is a wholly human act, not possible in the same way by machines or animals.

Questions of whether advanced humanoid robots or highly intelligent AI systems might be able to self-articulate something in a different mode, their identity or ‘machine-ness’ (or even an animal’s ‘animal-ness’), will be bracketed out here due to the scope of investigation. We might *judge* machines and animals to engage in articulatory actions, and might even enjoy listening to machine-written music and looking at machine-generated art, but I would contend that a fundamental facet of articulation and engagement has been lost: the automated machine is simply having articulation read into their movements, rather than having intended it of its own accord. I am therefore concerned here with human *labour* and human *work*.

The question of implementing automation in acts of *work* is therefore of current importance: as automated devices are designed and implemented to make human life easier, safer, and more equitable for everyone, there is a risk that we are also sterilising and foreclosing the very opportunities that we hope to dedicate our lives to ‘post-work’. Equally, we cannot simply leave all acts un-automated for fear of preventing engagement in *work*. Instead, I argue that the dualistic definitions of *labour* and *work* afford us the opportunity to engage with **both** modes, if the resultant devices allow such open-endedness. As such, let’s reconsider the case studies from Chapter 4.

## **6.2. Case Study 1: Self-Driving Cars**

The automation of travel in the mode of *labour* is clear: such automated devices would transport agents to their biologically necessary destinations in a safe, effective, easy, and environmentally sustainable manner, protecting and sustaining the metabolism of the individual actor and the human race as a whole. Because agents require travel to commute to paid employment, biologically necessary shops, and to access essential healthcare, there is a clear need for travelling, and for its automation, given the personal and environmental dangers associated with driving. On the surface, it would seem that self-driving cars properly fulfil these requirements. I concluded the previous case study by arguing that other technologies also reflect these personal and environmental needs for travel in a biologically sustaining way, and do so in a more globally sustainable and practically implementable manner. I argued that an automated public transportation system would better serve the needs of *all* agents in a society, because it is cheaper to participate in for individuals, easier and safer to operate for cities or nations, and does not result in the same types of ethical and moral dilemmas relating to moral responsibility. However, an automated public transport system of buses and trains is not the only answer to this issue: there are a range of (somewhat satirical and fanciful) examples of such automated transportation systems in science fiction, such as the human-sized ‘tube system’ imagined in *Futurama* (which also features interstellar space travel powered by completely clean biological fuel sources) or the personal teleportation systems imagined in *Star Trek*,

both of which can move individuals and goods to where they need to be without any sort of actual vehicular mediation<sup>33</sup>.



**Figure 27.** An example of the imagined solutions to the necessity of transportation in science-fiction, with the ‘tube-travel’ infrastructure imagined in *Futurama* (FreshPrint 2016).

There is clearly a range of contingent issues with such technologies: a huge amount of trust must be placed in the developing companies to properly maintain, update, and operate self-driving cars (Jin 2021), and there are moral and ethical questions surrounding responsibility and response in cases of malfunction or accident (Mladenovic and McPherson 2016; Borenstein et al 2019). Moreover, their feasibility has been called into question, with some rejecting self-driving cars as an advertising trick more than a genuine technological goal (Metz 2021a; 2021b). I cite a

---

<sup>33</sup> The satire might have been lost on SpaceX, who have proposed a realised version of ‘tube travel’ in the form of the futuristically-named ‘hypertube’.

deeper issue with these technologies: they *might* function in a perfectly acceptable manner in the mode of *labour* but they might not properly reflect the needs of meaningful engagement in the mode of *work*. In order to properly unpack this criticism, let's first consider how driving can be undertaken in the mode of *work*.

#### 6.2.1. Driving as *work*

Just as driving is possible in the mode of *labour*, to complete biologically necessary tasks and as a biologically necessary process in its own right (in the case of an ambulance), driving can also be undertaken as a meaningful, expressive, political, and artistic task. Rather than simply transporting the agent from A to B, driving in the mode of *work* is primarily intended towards either the completion of a meaningful goal, or as the meaningful communication of a given intention in its own right. Let's consider three cases of driving in the mode of *work* that a self-driving car (or indeed an automated public transport system or science-fiction 'tube' system) would not properly reflect.

The first case is a counterexample proposed in Chapter 4: sport racing. Driving for the purposes of sport can take many forms, and is distributed across a range of leagues, championships, and pursuits. At the highest and most public levels, championships including the various single-seater motorsports that fall under the 'Formulae' category, including Formula 1 or the more recent electric series Formula E, offer drivers the opportunity to demonstrate their skill, training, and intentionality on an

international stage. Such acts are inherently self-articulatory, with drivers able to articulate various mental and physical attributes, aspects of their character, or their beliefs regarding automotive technologies (Klarica 2001), and engineers are able to engage with technological development in meaningful ways beyond biological necessity (Young 2012). Ethical ideas can be demonstrated in instances of high risk or danger, with agents taking care of one another on the track, and the limits of technological advancement can be pushed in an articulatory manner by engineers (Austin 2014). These forms of articulation can also be achieved in other formulations of sport driving. Nationally significant championships, including NASCAR and Indy series in the USA or Japan's Super Formula Championship, offer a similar, albeit smaller, platform for the same types of self-articulation. Even local races, series, and events also afford the agents the opportunity to actively engage in driving in a way that is meaningful and self-articulatory. It is not the destination that is important in sport racing, it is the way in which the driver actively engages with the act of driving, against their fellow racers on a public stage, which imparts meaningfulness to the act and allows the agent an opportunity for self-articulation.

Such an act would be *completely* changed with the inclusion of self-driving cars. By design, an automated vehicle transforms the agent from a driver to a passenger, and perhaps even to cargo in some instances. The very means by which the driver can articulate themselves are wholly foreclosed by the use of a self-driving car, and therefore the space of

meaningful engagement disappears. It might be argued that self-driving cars would be kept away from sport racing, but then questions can be raised over *how* agents would get into racing in the first place: if cars are not common on the road, and the act of driving not a part of everyday life, then many people who discover a passion for driving today might not have those same opportunities in the future. Considering the issue legally, it might become the case that the prevalence of safe automated vehicles transforms the human act of driving into something immoral, because it is actively undertaking risks to both the driver and any passengers or pedestrians (Kranak 2020). Moreover, further questions might be raised about why anyone would actually *want* to still actively drive a car if a completely safe and secure alternative is available. On the contrary, new forms of sport racing might emerge, more akin to drone racing. Engineers and designers might design and alter self-driving vehicles to race against each other, thereby transforming the agent into a 'pilot' rather than driver. This might facilitate a different sort of articulation and meaningful engagement (Foehn et al 2021), but nevertheless results in the foreclosing of sport racing as it is currently understood.

However, the case of sport driving is problematic in itself. Racing for sport is often accompanied by some sort of monetary prize or reward, particularly at higher and more prestigious levels. Drivers are often racing in order to win a prize, with some sports/teams rewarding their most successful drivers with incredibly high wages and winnings (Jenkins et al 2016). It might therefore be argued that sport racing is not occurring in the

mode of *work* at all, but is instead an extension or corruption of the mode of *labour*. If the driver is participating in the act in order to earn a living, either through winning prizes or by being paid by a manufacturing company or sponsor, this is clearly occurring in the mode of *labour*: their engagement is biologically motivated, and not motivated by meaningful engagement or expression. This might be argued even at the highest levels, where top racing drivers earn huge amounts of money. Winning millions of dollars in Formula 1 might not be *directly* biologically necessary, but might be the same corruption of *labour* as the hoarder who sits on huge amounts of wealth in order to always have 'enough', as discussed in Chapter 5. The inclusion of a monetary wage or economic remuneration does not *necessarily* transform an act of *work* into that of *labour*: if the agent is still able to engage in the act with a primary motivation towards meaningful articulation, then the monetary value attached is of secondary importance. However, if the attached monetary value overrules this intention, and instead forces engagement based primarily on economic concerns, then we have stepped back into a corruption of *labour*. I am not arguing that all sport racing occurs in the mode of *labour*, but am noting that such a criticism can be made.

The second example might be more straightforward and unproblematic: driving as artistic expression. This can occur in two ways: driving as the object of the artistic expression, and driving as artistic expression in itself. Many pieces of mainstream artistic expression involve some form of driving: the Disney Pixar film *Cars* might be read as an

expression of self-driving cars in a particularly novel way. But elsewhere in film, literature, and music, driving is sometimes used to denote love, reflection, and expressions of affection (Laderman 2002) either of others or of the technologies themselves (Vidal 2013). The stereotypical trope of a young lovesick person, separated from their beloved, driving through the night to get back to them is one that appears across many forms of media. Roy Orbison's 1987 song *I Drove All Night*, or the final scene of *Good Will Hunting* (in which the eponymous character drives off into the sunset, saying "I had to go see about a girl") garner their significance from the act of driving: the character is expending time, effort, and discomfort because they are driven by love. But this significance requires a *human* agent. The act loses its significance if the agent is not directly acting in their travel and is passive in the process. Sitting in a self-driving car loses much of its meaning, because the agent is entirely passive: to a contemporary ear, saying "I sat in a self-driving car all night to get to you" is remarkably less expressive than saying "I drove all night to get to you." Even using public transport has more active connotations, because the agent might have to run between trains, or chase after a bus: a self-driving car requires the agent to get in it at home, tell it where to go, and then arrive. This is true of the depictions of driving in media and in everyday life: individual agents can perform the same articulations as are depicted in art, all of which would be negated and foreclosed by self-driving cars.

However, artistic depictions (and real-world uses) of driving are not always positive and affectionate. J. G. Ballard's 1973 novel *Crash* depicted

driving as a traumatic, sensual, and deeply existential experience (Byatt 2012), through which Ballard was able to question modern trends in technological developments, social structures, and architecture (Groes 2012), while also throwing a sharp light on the violence and fetishisation that cars can incur (Beckman 2010). Such explorations of human experience and reflections on the contemporary age might not be possible through automated transportation devices, because they remove the human as an active agent. Indeed, it is the dangers of driving depicted in *Crash* that would be eliminated with self-driving cars, or at least made unintentional. Such wholly automated devices therefore remove the very topics discussed in art and, although they might create new artistic and articulatory possibilities, there is still a foreclosing of meaningful forms of engagement.



**Figure 28.** A still from the 2006 Disney Pixar film *Cars*, which might unintentionally present a particularly novel image of the self-driving car (Bethel 2017).



**Figure 29.** A still from the final scene of *Good Will Hunting*, in which the eponymous character drives away to chase a love interest (Hadadi 2020).

Driving also occurs as a form of artistic expression in its own right, and it is perhaps in this way that automating driving in the mode of *labour* is shown to be most damaging to meaningful engagement in the mode of *work*. David Hockney used the driven routes to and from his studio in California as an inspiration for painted works, including 1980's *Mulholland Drive: The Road to the Studio*, but also developed that same drive as a curated art piece in its own right. Paired with music, particularly the works of Richard Wagner, Hockney's route through the mountains of Santa Monica can be recreated, as a repeatable driven art installation (Ross 2021). The route is designed to be *driven*, rather than simply travelled along, and something is lost if the route is simply programmed into a self-driving car and experienced as a passenger: the spirit of Hockney's journey to and from the studio is somewhat lost in an autonomous vehicle, an experience perhaps more akin to a fixed-route rollercoaster than a genuine artistic journey. For others, the act of driving is articulatory precisely

because it is enacted, but not repeatable. Artist Tony Smith describes illegally driving along the New Jersey Turnpike before it was completed as “a revealing experience” that “couldn’t be called a work of art... [yet] it did something to me that art had never done” (Wagstaff, Jr. 1966, p.19, my bracketing). The experience was not one of *labour*, because there was no biological intention behind it: indeed, the lack of rails and lighting made it particularly dangerous. Instead, it was the self-articulatory and meaningful experience of driving along an unfinished road which was intended to be driven on *at some point* that facilitated an articulatory and meaningful event. Such experiences would be impossible, because a self-driving car would be bound by satellite navigation, and would presumably lack an ‘off-road’ or ‘illegal-driving’ function. While not a physical act itself, the act of driving features as an important thought experiment and explanatory tool across philosophical literature: for example, Dominic Smith uses the analogy of driving along a road to explore the various accounts of technology offered across the literature, with the driver being urged to speed up or slow down, or to “look to the sky, for a God to save us” (Smith 2018, p.1). The act of driving, of actively operating a vehicle, is therefore used in a number of significant ways, both practically and metaphorically, and despite fulfilling the biological purpose of driving in a perfectly acceptable manner, something meaningful is lost if *all* driving is performed autonomously.



**Figure 30.** David Hockney's *Mulholland Drive: The Road to the Studio* (Hockney 1980)

The final case of driving in the mode of *work* is that of political driving. In a similar manner to the use of driving as an artistic expression, political agents can use the operation of a vehicle to communicate a political point, or to participate in a political process, rather than solely concerning themselves with getting from A to B. As with driving as artistic expression, driving itself can be the object of political discourse, or it can be the process by which political articulation is achieved. As the object of political discourse, an example might be the 'Yellow Vest' demonstrations in France between 2018 and 2020 (Kipfer 2019), which grew from anger at economic inequality and fuel prices into larger demands for political and social reform. Within this political movement, the practices surrounding and conditions governing driving were held as political objects: while the practices and legalities surrounding self-driving cars might also be demonstrated for/against in a similar way, the content and form would be very different. In transforming human agents from active drivers to passive owners, the resultant forms of political organisation and demonstration would be significantly different.

Driving can also be used as a tool for political expression, rather than as the object of political discourse. In 2022 there have been a number of right-wing political demonstrations using vehicles, including the 'Freedom Convoys' to protest at Covid-19 regulations in USA, Canada, and New Zealand (Graham-Harrison and Lindeman 2022). Regardless of the specific view taken of such demonstrations, their political motivation is clear: the use of driving, or of operating vehicles in such a way as to deny others the capacity to drive, has been used as a tool for demonstration, particularly when combined with speeches, rallies, and additional demonstrations. These protests in particular have surrounded responses to Covid-19, and an overarching libertarian political movement that resists government mandates regarding movement and employment. It might be argued that because these protests concern Covid-19, and therefore biological wellbeing and healthcare, that they are actually operating in the mode of *labour*, but I would argue that they remain political in nature, and offer an opportunity for participants to actively articulate their political values in a public setting that they find meaningful (even if the content of that articulation is disagreed with). A further example is that of the Montgomery Bus Boycotts during the 1950s Civil Rights Movement in America: driving, or access to vehicular transportation, was used as a political tool to articulate values from which participants drew explicit meaning (Gibson Robinson 1987; Burns 1997). Such demonstrations might not be possible with fully autonomous vehicles, precisely because they involve a subversion of the standard uses of the vehicles. Programming

such uses into a self-driving car would be almost impossible, so it is more likely that these uses will simply be foreclosed in favour of automating travelling entirely in the mode of *labour*.

It is clear that driving can be undertaken in the mode of *work* and that self-driving cars and other autonomous transport systems might not properly reflect these meaningful uses. How then do we approach the automation of travel?

### 6.2.2. Automating Driving for Work and Labour?

Driving fulfils a biologically necessary purpose, and for an automated technological tool to be effective it must still satisfy this need: autonomous vehicles cannot therefore be developed in a way that *does not reflect the needs of labour*. Equally, such devices must respect, reflect, and actively engage with the possibility of driving to be undertaken in the mode of *work*. By implementing the definitions of automation, *labour*, and *work* developed here, however novel they might seem at first, I argue that opportunities for technological development *that facilitates both modes of labour and work* in acts of driving will become clear and possible.

One possible response is that the fully autonomous function of the car could be optional, allowing the owning agent to switch it on or off. Although this comes with its own safety concerns, it would allow the operating agent to fully enclose the task of driving as and when they desire. An agent wholly operating in the mode of *labour* could therefore engage the autonomous driving capacities of the car and transform

themselves into a passenger; an agent wholly operating in the mode of *work* could retain control of the car to achieve their desired meaningful articulation and engagement. This also seems feasible because lane-assistance, speed-control, and ‘autopilot’ technologies are already available (Tigadi et al 2016). While not a complete reflection of my definition of automation, it would certainly enclose the task from further intervention *when required and desired*, but would still allow ample opportunity for the agent to remove themselves. This would also go some way to responding to the concerns regarding moral, ethical, and legal responsibility: when actively engaging the car the driver might assume responsibility for the actions of the car, and the manufacturer might assume responsibility when the autopilot is engaged.

Much of the literature surrounding self-driving cars concerns these moral, ethical, and legal questions. Uncertainty surrounding responsibility in the event of a crash (Coeckelbergh 2016; Bhargava and Kim 2017; Borenstein et al 2019) has led to questions about programming moral decision making in self-driving cars, but there is deep uncertainty as to how this would be performed (Gurney 2017; Miller 2017; Wolkenstein 2018; Nees 2019; Lawlor 2021). Comparisons are often drawn to autonomous weapon systems and the types of life-or-death decisions that can, should, and might fall to technological agents (Strawser 2013; Linden 2016; Kahn 2017; Schwarz 2018; Häyry 2020). These moral and ethical questions might have no satisfactory answers so perhaps there is a way of designing around them. Instead of the car being self-driving at all times, the agent might be

allowed to take over in situations of extreme risk and, by extension, situations in which meaningful engagement is possible or desired. This would therefore not foreclose opportunities for sport racing, artistic expression, or meaningful political engagement, while still satisfying some tenets of *labour*.

This too might be deemed unsatisfactory, imperfect, or opposed to the types of technologies that we wish to develop. If human drivers have to take over in situations of extreme danger, then arguably the device is no safer than those entirely operated by human agents. It might be argued that a fear of foreclosing opportunities to drive in the mode of *work* have negated the utility of the device in the mode of *labour*. This in itself is unsatisfactory because the device now operates poorly in both modes, rather than properly operating in one at the cost of the other: in such a situation, it might be argued that there is no need to develop such a device and it is better left alone. However, there may be another avenue for development, one that combines the conclusions in Chapter 4 with the concerns discussed here. If the intention of driving in the mode of *labour* is safe and effective travel from A to B but the intention of driving in the mode of *work* is incompatible with this, perhaps two forms of technological development are required. A fully autonomous public transport system might be developed, that safely transports agents to their biologically necessary destinations in an affordable and reliable manner, while human-operated individual vehicles remain available for engagement in the mode of *work*. This would still facilitate sport racing as it is now, rather than

forms of drone racing, and would still allow for artistic and political engagement with driving, alongside any other engagement with driving in the mode of *work*.

The development of an autonomous device, one that entirely encloses an act from further human intervention, must reflect and facilitate the biologically necessary needs of *labour* and the meaningfully articulatory needs of *work*: if these cannot be appeased in a single device, then specific devices for each mode must be considered. Without doing so, the development of an autonomous device entirely in one mode might result in the foreclosing of engagement in the other. It may appear that developing a technology which encloses engagement in one mode but leaves engagement untouched in the other is a misuse of these definitions, one that is not in line with the approach I have been advocating. It is important to remember that I am not arguing that the adoption of automation in every task is appropriate: the *replacement* or *displacement* of human agents in some tasks, and those tasks' complete enclosure by automated technologies, might change agents in ways that do not properly reflect their intended outcomes. If human agents actively engaging in driving is fundamental for driving in the mode of *work*, then we should be pursuing automated tools that *enhance and augment* that engagement, rather than entirely enclose it. This could be combined with specific autonomous tools for driving in the mode of *labour* which fulfil all of our biological needs. This might entail redesigning urban spaces to resemble the distinction between land and river spaces: urban areas might be

connected by autonomous transportation systems, with car owners keeping their human-operated vehicles in 'docks' surrounding open road spaces upon which they can engage in their meaningful and articulatory driving.

These suggestions are not prescriptive, but instead seek to demonstrate the use of my definitions in practice. We should not reject self-driving cars outright because they clearly have a use in society, but equally, we should not become beholden to these devices as *the only* way of automating transportation. By applying my definitions and methodology, I argue that a more nuanced and dynamic approach to this issue can be developed that better reflects the varied nature of *labour* and *work*, and that effective responses can be developed which do not entirely foreclose engagement in either mode.

### **6.3. Case Study 2: Manufacturing**

Where certain aspects and facets of self-driving cars have become realised in recent years, they are still predominantly only proposed technologies, at least in their 'full' form. The concerns for ethical, moral, and practical implications are speculative at this juncture, and my phenomenological reduction has been applied to a proposed example: a fully self-driving car, whether it operates in the mode of *labour* or *work*, has yet to be produced, so we can discuss speculative concerns endlessly without yet having to reference or confront a real technological case.

However, this does not properly account for the automated technologies that have been practically realised and implemented, which are much closer to achieving intuitive notions of ‘full’ automation, if they have not already done so. The second case study presented in Chapter 4, that of manufacturing and production, is one that is more ‘real’ because many factories have already adopted automated technologies and practices, wholly *replacing* (and *displacing*) human agents. Manufacturing is an industry that has undergone great technological change since the Industrial Revolution, and the increasing automation of manufacturing has been of keen interest to philosophical figures including Karl Marx (Marx 1846; 1858; 1867), and for historians of technological development, as already discussed (Ashton 1948; Hobsbawm 1975; Noble 1984; More 2000; Griffin 2010; 2014).

The picture of a fully automated factory populated by autonomous robotic arms and minimal human beings is pervasive: on film and TV, the automated factory appears as a source of comedy, satire, and social commentary (Chaplin 1936; Dahl 1964; Asimov 1967); in news media, the automation of factories is a forewarning for potential unemployment in other industries (Cellan-Jones 2019; Collinson 2019; Semuels 2020); and politically, factories have long been a site of organisation and demonstration, both historically (Hutchins and Harrison 1911), famously with the Luddites’ resistance to newly automated machines (Sale 1995; Binfield 2015), and in recent years (Käckenhoff and Inverardi 2021), with some scholars advocating for a reclamation of the Luddite approach to

contemporary technologies (Mills 2007; Mueller 2021). The automation of manufacturing might therefore seem much more definitive and determinate than that of self-driving cars.

Despite the varied ways in which manufacturing is becoming automated, it appears to predominantly be occurring in the mode of *labour*. In Chapter 4, I argued that manufacturing fulfils two biological necessities: it can produce biologically necessary goods and services (including food and power), and it can provide agents with economically necessary wages through employment. The *replacement* and *displacement* of human agents might not have any effect on this first biological function, but the second economic function of manufacturing is a clear issue that needs consideration. While many potential outcomes and predicted futures offered across the literature relate to the removal of human agents from manufacturing, I do not advocate any one over another: this additional economic function of manufacturing must be considered and responded to, in whatever way best serves the biological needs of those affected. I suggested that the human agents unemployed by automated machines could 'own' part of the machine that *replaces* or *displaces* them, earning a wage in a similar way as previously but without having to fulfil the same role. I suggest that *any* response to technological unemployment is possible, and that none are intrinsic to the application of automation in its own right.

Mass-manufacturing is a condition of contemporary society, but it might seem that this form of production is inherently tied to *labour*, and offers no opportunities for meaningful engagement beyond biological necessity. As I have argued previously, all acts can be undertaken in both modes described in this thesis. Let's now consider how manufacturing can occur in the mode of *work*.

### 6.3.1. Manufacturing as *Work*

As already discussed, there is much political organisation that arises around manufacturing. Rather than being directly concerned for the biological necessity of manufacturing, there have been many instances in which manufacturing is used as a focal point for larger meaningful and articulatory political campaigns surrounding economic, political, and social justice. Perhaps the most obvious and intuitive example of this is the Marxist discussion of manufacturing. For Marx, manufacturing has a clear biological intent: in a positive sense, manufacturing relates to biologically necessary goods and the provision of employment and economic income; in a negative sense, manufacturing under capital can damage the biological welfare of affected agents through poor pay, dangerous working conditions, and long hours. Moreover, the Marxist notions of alienation and exploitation also have a direct negative effect on the affected agents' welfare, but something more fundamental is happening through Marxist discussions of manufacturing. The human capacity for labouring, as Marx defines it, is a quintessential human quality and Marx's political reading of manufacturing as relating to class struggle, human nature, and meaningful

articulation (or the lack thereof under capitalism) might seem to align with my definition of *work*, despite having a clear biological concern.

In many ways the Marxist approach to manufacturing is one that holds manufacturing as the *object* of political discourse, rather than as an inherently political or meaningful act in its own right. While Marxist approaches to manufacturing are undoubtedly political, they are primarily concerned with better reflecting the biological nature of human beings as labourers, rather than facilitating the myriad meaningful articulations I define under *work*. If the issues in manufacturing that Marxists cite are 'solved', either through communist revolution or the adoption of full automation, then the need and capacity for political engagement dissipates. Indeed, Marx and Engels both predict the withering away of contemporary forms of politics because their content (working conditions) will eventually be solved by revolutionary means (Engels 1880). The Marxist approach to manufacturing, and indeed any political discourse surrounding conditions in manufacturing, is not necessarily a concern for *work* as I define it, but rather a concern for the biological welfare of affected actors that takes place in a meaningful way. The related and emergent political campaigns then occur in the mode of *work*, but will disappear as soon as the central issue is 'solved'.

Beyond the Marxist approach, I argue that manufacturing can take place in two ways, similar to driving: firstly, the manufactured object can be one of meaningful engagement and articulation, thereby is a product of

*work*; secondly, the process by which the object is manufactured can be meaningful and articulatory, thereby is a process of *work*. An intuitive example that aligns with both might be that of artistic creation because the artist can create a meaningful object in a meaningful manner, but as I discussed in Chapter 4, manufacturing refers to large scale processes that cannot be reduced to individual productive capacities, and therefore such examples don't wholly align with manufacturing as I am considering it.<sup>34</sup>

An example of a mass-produced object that is articulatory and intended for meaningful engagement is the publication of children's books. Literacy for children is a vital skill which greatly impacts on their ability to learn, speak, and write for the rest of their lives; many scholars suggest that instilling enjoyment and interest in reading at an early age can greatly help children as they grow (Niklas et al 2016). Equally, literacy rates among children can differ widely depending on a number of socioeconomic conditions, meaning that some children have less access to resources and support than others, depending on the conditions in which they live (Quigley 2020). This doesn't stop literacy being a fundamental skill for children (Nunes and Bryant 2004), so a publishing house that manufactures books intended to help children improve and enjoy literacy is mass-produced goods with an articulatory and meaningful purpose. For example, Ransom Publishing manufactures children's books that are specifically

---

<sup>34</sup> This is not intended to discount or ignore problematic instances of manufacturing, including sweatshops or poorly paid outsourced manufacturing. Such cases clearly fall under problematic instances of *labour* as I define it, just as any dangerous, demeaning, or damaging form of individual production or creation would also fall under the definition of problematic *labour*.

aimed at supporting 'reluctant readers', and increasing confidence in and enjoyment of reading amongst children. Publishers such as this manufacture and distribute huge amounts of books, for profit by selling them to customers, but also supplying libraries, classrooms, and youth centres. The fundamentality of literacy might suggest that it is biologically necessary, rather than a condition of meaningful articulation but I contend that a biologically sufficient life, even within the broad terms in which I describe biological necessity, *can* be fulfilled without literacy. An agent can arguably still eat, socialise, build, and sustain themselves without the capacity to read and write. While it might be a useful tool for certain contemporary formulations of biological necessity (such as undertaking certain jobs), literacy is a fundamental condition of *work*, because it directly facilitates many forms of meaningful expression and articulation. Campaigns to increase literacy amongst children, particularly those that target the socioeconomic distinctions between children's abilities to engage in and enjoy reading, have a specifically articulatory purpose in the same way that the relevant publishing houses do (Read On. Get On. 2014). Mass producing these goods does, of course, serve an economic purpose for the publishing company, but in doing so *also* fulfils an important articulatory purpose. Because no company can easily operate without generating revenue under contemporary conditions of capitalism, we must identify meaningful intentions and objects beyond their economic impacts (Monahan 2002): children's book publishing is a case of meaningful *and* profitable manufacturing. The implementation of automation in this form

of manufacturing might be entirely acceptable if it still produces the meaningful object of *work*: a fully automated factory with no human intervention that supplies children with books which encourage and assist literacy is still operating in the mode of *work*.

Where children's book publication manufactures *objects* of *work*, other forms of manufacturing can facilitate meaningful and articulatory engagement in the *process* of manufacturing. Given the current environmental conditions around the globe, a clear example of such articulatory manufacturing processes are those that are directly intended towards environmental sustainability. Companies that utilise recycled materials or manufacture their goods in carbon neutral ways are articulating, by their actions, a moral and ethical position regarding the environment. Environmental sustainability is clearly a biological concern for the biological metabolism of the Earth as a whole, but contemporary economic and political conditions have rendered environmentalism a political act, and therefore agents who actively participate in an act with a clear environmental concern can be said to be operating in the mode of *work*. A cynical view of these types of manufacturing processes might be that companies are engaging in performative but minimalistic changes to their manufacturing processes, to retain an increasingly ecologically-aware customer base and to avoid public criticism. Some critics describe such actions as "woke capitalism" (Fan 2019; Ramaswamy 2021; Fraser 2022). As with the example of children's book publication, the nature of capitalist production means that there will always be an economic component to the

decisions made by a company, and therefore there will always be the opportunity to understand articulatory practices as primarily economic decisions. This tension between economic concern and meaningful engagement is precisely why my definitions are formulated as ideal types, open to both heuristic application to an actor's own experiences and to structural analysis: if the inclusion of economic incentives completely overshadows any meaningful engagement, and agents become primarily focused on the money earned through the act, it is clear that the tension has shifted more wholly towards *labour* than *work*; but if the tension allows for engagement in *both* modes equally then the task is formulated in an acceptable manner, leaving openness to all forms of engagement.

However, a less cynical case would be the implementation of 'Fair-trade' schemes, or the employment of marginalised groups, such as women's co-operatives (Luo et al 2020; Gurumurthy et al 2021). Such practices articulate a clear ontological stance towards employees, as well as demonstrating a political stance regarding the economic inequality forced onto third-world food producers and garment makers, for example (Fairtrade International 2021). The object in question is still mass-produced, but the way in which it is achieved articulates a position by the company, facilitating more meaningful engagement in the act for the affected workers than offered by other more demeaning or problematic manufacturing processes. This is true regardless of the value being expressed or the marginalised group being employed. A company that only employs anarchists or libertarians is articulating a clear political stance, just

as companies that support and employ agents who belong to marginalised demographics are, despite the opposite political values.

A practical example of this is the company Pallet, which produces flat-pack, durable temporary homes to help combat homelessness and assist with recovery after natural disasters. These objects are brightly coloured, attractive, and designed to reflect the human users in the best way possible, further facilitating meaningful engagement with them beyond simply satisfying a clear biological need. The object is therefore one of *work* to some degree (although there is a tension between the political nature of homelessness and the clear biological concern) but so too is the process: Pallet employs marginalised agents, including those who have been incarcerated, hospitalised, or made homeless at some point in their lives, and the company utilises recycled and sustainable materials to produce goods with a specific social purpose (Howarth 2021). There is a clear political stance regarding contemporary socioeconomic conditions and environmental issues. Of course, there is still an enduring economic component to these manufacturing processes, as is the case with any company operating in a capitalist system but the articulatory nature of companies like Pallet is undeniable, both in object and process, despite the presence of an economic incentive. Indeed, the employed agents might only engage with the process in the mode of *labour*, in order to earn a wage that other companies are not offering them, but the process itself

can be said to be one of *work*, along with the resultant objects manufactured.<sup>35</sup>



**Figure 31.** Pallet’s temporary homes deployed in Los Angeles to alleviate homelessness, in conjunction with Lehrer Architects (Howarth 2021).

---

<sup>35</sup> This highlights a further dynamic in engagement in the mode of *labour*: an employer can operate in the mode of *work*, setting up a meaningful activity for a meaningful outcome, but the employee can engage in that act in the mode of *labour*, only caring for their own biological welfare. Due to the heuristic nature of my definitions, this can be explained by the acts tasks being distinct: the employer is engaging the task of meaningfully expressing themselves through whatever process is at hand, and the labourer is engaging in the task of earning a living. That these two engagements in distinct modes occur in the same activity is interesting, and might highlight the ways in which different agents engage with the ‘same’ act differently, and what additional conditions are at play.

### 6.3.2. Automating Manufacturing for *Work* and *Labour*

How might automation therefore reflect this dualistic nature of manufacturing producing meaningful objects of *work* but also being a meaningful process in its own right?

There are two clear responses that approaching this case in light of my account of *labour* and *work* reveals. The first relates to the production of meaningful objects of *work*. In such cases, like children's book publication, the process can entirely *displace*, *replace*, or *augment* the human agents involved as long as the meaningful object in question is still produced, and still able to be used for the articulatory purposes that it is designed for. Precisely because the *object itself* is meaningful and articulatory, the process does not necessarily matter to the same degree: indeed, it might even be revealed that implementing automation to *displace* human agents is preferable, if it allows for the manufacturing of a higher number or higher quality of meaningful objects. Given the articulatory and distinctly political nature of such manufacturing companies, there might be an additional implementation of measures to support the newly *displaced* agents, such as UBI (Universal Basic Income) to avoid austerity and unemployment (Bregman 2016; Arnold et al 2018), but this is not intrinsic or necessary to the automation of *work* in this way. We accept that meaningful engagement *in the process of manufacturing* is being foreclosed but that the resultant object is sufficiently meaningful to warrant this foreclosing. A 'lights-out' factory may be built, which produces

a constant stream of children's books that serve a meaningful and articulatory goal, without the involvement of human agents.

The second response is to acknowledge and respect the meaningful engagement in the process itself, therefore not to seek to *replace* or *displace* agents from the manufacturing process but instead to *augment* or *extend* their involvement. Automated tools would therefore perform certain sub-tasks without human intervention, leaving ample opportunities for meaningful engagement by the included human agents. This would allow the human agent to engage in the process of manufacturing *in both modes*, in line with their desired intention. Such automated devices might complete particularly repetitive, boring, or mechanised tasks, plus those that human agents physically can't do. This would obviously differ depending on the factory or process, but might also be scalable depending on the human agent's desires in a given situation: as with the example of the self-driving car designed in the mode of *work*, the human agent might be able to 'switch off' the fully automated capacities of the related technologies in order to meaningfully engage with the task, but 'switch them on' when the primary motivation is one of *labour*. If the resulting product is the same or similar, there is no reason why the employing company would be damaged by the interplay between human agents and automated technologies. This might even transform the managerial activities of the factory, and redistribute *all* tasks in a factory to a combination of human agents and automated technologies (Chiodo 2021).

Of course, the practicalities of such an example might seem farfetched or impossible, and any automation that takes place within a capitalist economic system would desire regulation, uniformity, and the maximisation of profits: allowing human agents to participate in the productive process when they wanted to meaningfully engage with it, and to disengage themselves when they didn't, but still pay them a wage throughout, might strike a capitalist reader as completely impractical. The key point is that such formulations are theoretically possible. Moreover, such fanciful propositions better reflect the dualistic modes of *labour* and *work* in a way that wholly automating a factory does not. Manufacturing may be predominantly intended towards the satisfaction of biological necessity, but to *completely* automate manufacturing in this mode would *entirely* foreclose the possibility of engaging with the related processes in any other way, and would lessen the human condition as a result. While it might be tempting to simply adopt automation that *replaces* and *displaces* human agents in favour of increasing productivity or greater sustenance of biological metabolism, the application of my definitions highlights the foreclosing that occurs between engagement in alternate modes, and this must be actively considered in *all* applications of automation.

#### **6.4. Case Study 3: Interpersonal Care**

The case studies of self-driving cars and manufacturing have highlighted the meaningful engagement possible through both the object

and process of a task, and both can be stripped of any contingent concerns regarding utility or desirability in a relatively straightforward manner. The final case study, interpersonal care, presents a case in which the *replacement* or *displacement* of the human agent would appear to pose a significant transformation of the act itself.

For automating interpersonal care in the mode of *labour*, this proved to be particularly problematic. Interpersonal care clearly has a biological concern and operates within biological necessity and in relation to biological metabolism, and acts of interpersonal care often include additional non-biological values at their core. Interpersonal care seems to be fundamentally human, and to express something about the human being that is doing the caring. By removing the human agent from acts of interpersonal care, the act becomes significantly changed: not necessarily made impossible, but significantly altered. Acts of care *can* be reduced to their basic movements, but seem to include additional necessary features regarding trust, intimacy, care, and connection (Pavlish et al 2019). These qualities seem to escape the mode of *labour* but it is these exact qualities that might fit unproblematically in the mode of *work*.

I concluded my analysis of interpersonal care in the mode of *labour* by arguing that interaction between human beings might be seen as a crucial success condition of interpersonal care, and that the development of successful automated tools in these acts would be ones that *extend* and *augment* the role played by human agents, rather than ones that wholly

*replace* or *displace* them. Automated technologies might therefore enclose the repetitive, difficult, or emotionally draining sub-tasks of interpersonal care, including lifting, cleaning, and restraining but might also still facilitate human engagement in more emotionally or mentally significant tasks, including discussing and calming. Automated technologies *could* be developed that *entirely* enclose these tasks, but they would have to do so in the form of *replacement*, with automated technologies filling the same types of roles previously completed by humans, mimicking the emotional and mental connections made in interpersonal care, rather than transforming the act into a wholly mechanical one.

However, underpinning these discussions of interpersonal care was also a rejection of narrow views of interpersonal care, and my definition was deliberately broad enough to include both paid and unpaid care, including parenting, healthcare, and sex work. It might seem that automated technologies cannot satisfy the conditions of all of these varied tasks in a similar way, but I believe that by applying my definitions we can establish a more nuanced understanding of the various modes in which interpersonal care is undertaken, and suggest appropriate automated technologies. Rather than pre-emptively discussing how to automate interpersonal care, or raising moral and ethical questions surrounding whether care even *should* be automated (Coeckelbergh 2015; Laitinen et al 2019), let's first explore how interpersonal care appears in the mode of *work*, having already discussed its emergence in the mode of *labour*.

#### 6.4.1. Interpersonal Care and *Work*

While caring for children and relatives, providing healthcare to patients, and engaging in sex work all have clear biological intentions and conditions, acts of interpersonal care are also highly articulatory, and can be undertaken in deeply meaningful ways by the engaged agents. In perhaps the clearest way, interpersonal care is articulatory of the emotional values held by the providing agent: engaging in interpersonal care articulates that the agent cares. In different formulations, different emotional states and dispositions toward the recipient can also be expressed: compassion, mercy, concern, love, and affection. However, acts of interpersonal care may not always be positive. Under certain conditions, the provider of care might express other emotional and mental states: anger, hatred, maliciousness, cruelty, a *lack* of care, and so on. Whether positive or negative, acts of interpersonal care are highly articulatory of the participating agent's inner state, rather than just their biological condition. Such articulation might not be true for the recipient of the care. The patient in need of healthcare, the child in need of parental care, and the recipient of sex work are perhaps all more clearly operating in the mode of *labour*, concerned with the maintenance of various conditions of the biological metabolisms.

Part of the articulatory nature of interpersonal care is because it is often accompanied by, or made up of, explicit speech acts. Parents must instruct and explain themselves to their children, and healthcare workers must converse with patients to ensure that the care being given is

sufficient and satisfactory. Service and sex work also both have distinctly linguistic components, sometimes taking place wholly over the phone, or via written communication (Russell 2008). Caring requires reassurance, explanation, and even bargaining, so it fits firmly into notions of articulatory action, both linguistically and non-linguistically (Elliott and Wright 2001; Schmidt et al 2009; Brindley and Reynolds 2011; Ahmed 2020). In all of these cases, there is more opportunity and space for explicit articulation of the personal states of the carer and recipient, alongside the articulatory nature of the acts themselves.

The inclusion of sex work here might be held as problematic. Healthcare, parenting, service work, and familial care can be readily understood as meaningful for the participating agents, but it might be argued that sex work is always taking place in the mode of *labour*, precisely because it has a direct biological intention. However, I would argue that such conceptions are overly narrow, and neglect the ways in which sex work can be undertaken in the mode of *work* as a meaningful and articulatory act for the sex worker: if the contextual horizon in which an act of sex work takes place is one of particularly puritan social norms, dogmatically religious institutions, or traditionally totalitarian political systems, then partaking in sex work might be a deliberately political or metaphysical act that communicates something fundamental about human nature in opposition to restrictive governance. Moreover, if a country has made homosexuality or transgender identity illegal, then LGBTQ+ agents who partake in sex work might also be expressing a positive affirmation

regarding the normality of homosexuality, as well as a political critique of the ruling government. If agents are being told to behave in a certain way (to live a 'traditional' or puritanical life, or to adopt a certain gender or sexual identity, regardless of the agent's own identity, for example), then sex work offers a way of expressing and articulating an agent's own selfhood, and of meaningfully engaging with themselves and others. Of course, there might also be economic components to sex work that further reinforce its placement in the mode of *labour* but the presence of an economic value does not *necessarily* confine the act to the mode of *labour*, and nor does the distinctly biological nature of sex work. The musician who is meaningfully articulating themselves on stage is engaging in a deeply embodied act, but can also clearly operate in the mode of *work*, and the same is true for sex work.

Sex work has had distinctly political uses across art, literature, theatre, and music as a form of meaningful expression, and has also been used in explicitly political ways: 'sex strikes' have been a tool to bring attention and reform to a number of political issues, from the sexual boycotting of the Peloponnesian War in Aristophanes' *Lysistrata* (Aristophanes 411), to more recent uses of 'sex strikes' to protest at the unfair treatment of women across the world (Ghitis 2012; Zuckerberg 2019). Sex workers can be credited with a number of political movements in recent history, and often engage in the types of political articulatory expression that I define as belonging wholly to the mode of *work*, from the

Stonewall riots to the more recent Reclaim The Streets demonstrations (Chateauvert 2013).

With the previous two cases, I drew a distinction between the object of *work* and the process of *work*, but such a distinction does not apply as readily to cases of interpersonal care. Caring doesn't explicitly produce an 'object' in the strictest sense because it relates to another human agent and the process and resultant object are often one and the same: helping someone to recover from an illness produces someone that you have helped to recover from an illness. Meaningful engagement arises from the interaction with the recipient of the care, rather than in a produced or manufactured object or value. The conditions of the activity sometimes are not conducive to meaningful engagement, particularly under contemporary economic conditions, in which some interpersonal care is undertaken by paid agents and the job can be demanding on the emotional and mental states of the agents. Care often intersects with emotionally difficult situations, from serious illness in healthcare, to the constant emotional strain of parenting, and the abuse of sex workers. Interpersonal carers in healthcare and sex work often face physical and verbal abuse as part of their job (Ward and McMurray 2016), and can also participate in the abuse of the recipient of care. Airlie Hochschild details the alienation experienced by airline staff in her 1983 book *The Managed Heart: Commercialisation of Human Feeling*, in which she argues that the additional emotional labour of service work requires an agent to display specific emotional states, regardless of their genuine existence, so that the

agent becomes alienated from their own smile (Hochschild 1983). These forms of 'emotional labour', which are often presupposed in tasks and disproportionately undertaken by women (Hartley 2018), are particularly prevalent in nursing, in which agents have to display huge amounts of care in very delicate and difficult situations, to a high number of people (Smith 1992; Theodosius 2008). If the quality of emotional investment is missing, agents might be judged to be unhappy, unfulfilled, constrained, or even cruel, and their experience of the task might be equally meaningless. This is true of other interpersonal care, including parenting, with some scholars calling for radical changes to parenting, including sharing parental responsibilities communally, and framing childbirth as a productive endeavour, rather than a reproductive act (Lewis 2019).

Interpersonal care *can* be undertaken in the mode of *work* if the conditions of the task are conducive to meaningful engagement and articulation for the participating agent. Given the difficult and draining nature of interpersonal care, the implementation of automation has been met with a range of responses. Some scholars fear that making such acts overly technical and automated will either make the role of human carers impossible (Smith 2011), or will result in significantly poorer levels of care, which miss the fundamental component of human interaction (Hoorn and Winter 2018; Bertolaso and Rocchi 2020; Chen 2020; Mulvenna et al 2021). However, other scholars argue that the implementation of automation can lead to significantly better standards of care, either by aiding human carers (Topol 2019) or by redistributing the emotional expectations of care to

reduce the strain on carers (Parks 2010). Some arguments are made that the automation of care would result in more autonomy for recipients (Topol 2015), and wouldn't be as different from human care as is often presumed in the literature (Meacham and Studley 2017; Lancaster 2019). Given the tension between the recipient's biological necessities, the potential for meaningful engagement by the providing agent, and the overarching economic conditions of contemporary care, I believe that there is a need to apply my definitions of *labour* and *work* in order to properly navigate the case.

#### 6.4.2. Automating Interpersonal Care for Labour and Work

There is a need, desire, and opportunity to automate some instances of interpersonal care, or at least some necessary sub-tasks. Including automated technologies in care processes could lead to a higher standard of care for those who require it; an overcoming of economic and social inequality in practical cases of care; and the removal of dangerous, demeaning, and draining facets of care that detract from the important emotional and mental connections made in and through care. These more specific concerns should not be considered without first understanding how care relates to the modes of *labour* and *work*, and that a nuanced, dynamic, and wholly effective set of automated care technologies cannot be developed if care is framed entirely in relation to one of the two modes.

There are a range of automated care technologies discussed across the literature, from sex robots (Ghosh 2020) to automated doctors (Hoorn

and Winter 2018). These devices must be critically reflected upon in relation to their effects on the two modes I am describing here. A sex robot might remove the danger of gender violence, coercion, and servitude, but might also unintentionally result in economic precarity, and a loss of intimate human connection that could arise in other formulations of automated sex work. One response here might be that fully automated sex robots could be designed to operate in areas or industries that are dangerous, violent, or coercive (Carlisle 2021; Hardy and Barbagallo 2021; McClanahan and Settell 2021), while human sex work could employ automated technologies to *augment* and *enhance* certain sub-tasks, perhaps regarding safety or healthcare. Similarly with automated service work, the space for meaningful human articulation could be protected if the sub-tasks that actively detract from it are wholly automated, such as those that are menial, repetitive, or dangerous, which would leave human agents to better interact with customers (Hochschild 1983; Hall 1993; Williams 2003). Finally, automated technologies in the healthcare industry could follow a similar principle and be deployed in conjunction with human agents to remove the difficult and demeaning aspects of healthcare, while improving the accuracy of diagnosis and support (Majumder et al 2017; Susskind and Susskind 2017). Rather than designing technologies that fully *replace* or *displace* human agents, automation could be targeted to improve the experience of human agents, while also providing higher standards of care for recipients, in with the tenets of both *labour* and *work*.

Nowhere is this clearer than in the implementation of automation in familial care and parenting. Automating parenting might be more conceptually difficult to consider, because the idea of removing human agents from the process of parenting seems intuitively wrong. While a number of scholars are calling for a radical overhaul of parenting (Mullin 2005; Lewis 2019), there is a general acceptance that human agents should remain involved but that the tasks should be better distributed, recognised socially and economically, and less confining for women. The use of automation is advocated in parenting and familial care as a tool to *enhance* care, by *assisting* human agents rather than *replacing* or *displacing* them (Elder 2017; Alnajjar et al 2020). For example, an automated system could be developed that could monitor and respond to children overnight, enabling parents to get more sleep; just as a system that assists with manual tasks such as lifting, cleaning, and restraining elderly or disabled family members, would allow human agents to spend more time and energy developing emotional and mental connections and providing higher quality distinctly human care.

For acts of care to be successful, they require either genuine or successfully imitated forms of human interconnection. Although automated technologies *could* be designed to mimic human emotions, it might be better to direct time and energy at technologies to assist humans who are already engaging in interpersonal care, rather than creating automated machines to remove them. Of course, the implementation of automation always involves the risk of foreclosing forms of meaningful

engagement, and this is true of the automation of sub-tasks. The difficult and demeaning activities of parenting that cause sleeplessness and discomfort might be an integral part of forming the emotional facets of care, just as a holistic form of healthcare might only be achievable if human agents engage in all tasks regardless of their difficulty. Moreover, the implementation of automated sex robots might divide opinions among the users of sex work, creating new forms of attraction towards the automated devices that are not affected by the continued existence of human sex workers. This tension between opening new possibilities and foreclosing previous possibilities is true of every instantiation of automation and, perhaps more importantly, human beings will **always** engage in care, even in 'post-work' societies in which all other forms of interpersonal care are fully automated. Until the most extreme post-humanist ideal becomes a reality, human beings will always have the capacity to care for family, friends, and humanity as a whole, and the development of automated technologies in this field must acknowledge and reflect that.

Just because a fully automated care robot *can* be created, doesn't mean that it *needs* to be created: the functional components of the activities of interpersonal care can be achieved as successfully, and in an easier manner open to engagement in both modes of activity described here, by developing tools that do not seek to *replace* or *displace* human carers, but rather to assist them. By approaching cases of interpersonal care through the novel evaluative framework developed in this thesis, a

more nuanced, practically useful, and non-reified approach to the automation of interpersonal care can be developed.

### **6.5. Reconsidering the Case Studies**

All human actions can be undertaken in the modes of *labour* and *work*. By definition, automation is the process of enclosing a task from further human intervention, interaction, or mediation. As automation is developed in the direction of enclosing a task wholly in one mode, there is a simultaneous foreclosing in that act's contextual horizon that precludes engagement in the alternate mode. The tenets of each mode are not opposed to one another, and space can be created in which the ends of both modes can be achieved but in order to do this, and in order to not completely foreclose the possibility of engaging in both modes in a given task, any implementation of automation must be pursued in a deliberately open manner that is sensitive to the implications that it is having on engagement in **both** modes. The intention of automation is **not** therefore to remove all human intervention in **every** task: automated technologies can be developed in such a way that they *displace, replace, and augment/extend/enhance* human agents where appropriate. Automation is not a generalised, homogenous, or sweeping process that can be applied to different industries in exactly the same way. The varied and dynamic nature of human action requires an equally varied and dynamic approach to the automation of those actions. By applying the definitions that I have

developed and ensuring that the methodology I have demonstrated in this thesis is used to guide practical considerations, types of automation can be developed that properly reflect, respect, and interact with the two modes of *labour* and *work*.

## **7. Conclusion**

*The study of thinking machines teaches us more about the brain than we can learn by introspective methods. Western man is externalizing himself in the form of gadgets (Burroughs 1959, p.77).*

### **7.1. Summary**

Automation and the future of work is a pressing, necessary, and highly emotive question which is receiving a wide range of attention in academia and beyond. Paid employment plays a pivotal and fundamental role in contemporary life, and without great social, political, and economic change, any significant transformations to working practices could result in catastrophic upheaval and damage to citizens around the world. At the same time, increasingly sophisticated technologies offer an opportunity to redress endemic social, political, and economic issues within the world of work, and could be used to achieve a technologically mediated free and fair society. Across the literature, scholars are debating the likelihood and reality of both the dystopian and utopian eventualities but I believe that there is a fatal flaw in current discussions. Many contemporary scholars rely on intuitive and narrow conceptions of 'work' which often neglect unpaid 'reproductive labour' and focus entirely on contemporary paid employment, to make sweeping arguments regarding the future and desirability of work, and conflate the technological developments in one industry with indications of automation as a whole. I argue that more attention is needed to precisely define what is meant by the terms 'automation' and 'work'. The novel evaluative framework I have offered in this thesis is directly opposed to the narrow and reified discussions

occurring across the literature, and presents a conceptual model of automation, *labour*, and *work* that does not fall victim to the same contested uses of the terms found elsewhere in the literature. I presented three case studies of automation, each examined in the modes of *labour* and *work*, to demonstrate how these novel definitions function in practical analyses, and to demonstrate fresh approaches to automating work which become possible when premature predications of utopia and dystopia are refuted.

In order to re-approach the central issues in the literature surrounding automation and the future of work, I framed my research around three central research questions:

1. Precisely what is meant by the term 'automation'?
2. What is meant by the term 'work' as it is commonly used?
3. How might, can, and do these two terms interact with one another?

Without committing to a specific value framework in the first instance, and without focusing wholly on particular or narrow examples, I established three definitions of automation, *labour*, and *work*, established through a phenomenological reduction of the arguments currently made across the literature, and formulated as ideal types to which real-world cases can be compared. These definitions and the foundational phenomenological reduction strip back any additional contingent value judgements attached to specific cases, presenting three idealised definitions that will be relevant

to *all* cases of automation and work in practice. Consequently a clearer, more open, and more inclusive approach to automation and the future of work can take place, as evidenced by the case studies performed throughout the thesis. In order to achieve this new approach to automation and the future of work, I introduced and explored each definition before applying it to real-world cases or contemporary literature. The thesis is divided into 3 sections. Section 1 offered a response to the first central research question “Precisely what is meant by the term automation?”, beginning in Chapter 1 with an exploration of intuitive uses of the term ‘automation’, highlighting the various implicit contingent judgements made across the literature when discussing automation. In response, I then introduced the novel and ideal definition of automation as the *enclosing of a task from further human intervention, interaction, or mediation*. This definition was developed as an ideal paradigmatic example stripped of the additional common sense understandings and values that are commonly ascribed to it. I outlined this enclosure as it appears in three forms: *replacement, displacement, and extension or augmentation*, accounting for the various practical effects that automation has on real-world cases. This was couched in a broad historical context, ensuring that it aligned with real-world examples of automation throughout history, particularly those discussed in the literature. To conclude Chapter 1, I offered and responded to a set of potential Marxist and Marxian critiques, distinguishing my exploration of automation from the politically teleological claims made in the Marxist project, but retaining a space to

consider the negative implications of capitalist exploitation and alienation in the model I am developing.

Chapter 2 further explored the novel definition of automation by comparing it to arguments made in the contemporary literature. I argued that many scholars in the contemporary literature focus too narrowly on specific limited functions of automation, and do not properly consider the essential nature of the process as a whole. As a result, there is often a conflation between the results of a specific example and some notion of general effects that automation will have on society as a whole. My definition of automation is therefore intended to better account for *all* examples of automation, without conflating specific results with a general nature. I divided the literature into some of the most popular contingent functions that automation has, and critiqued the implicit narrowness of each in turn. I began by reviewing two approaches to automation that are more strictly evaluative than the others I discuss later, the historical and empirical accounts, and further couched my definition in line with these investigations. I then turned to the five contingent functions of automation that feature heavily across the literature, and included an opposing view to each:

(1) automation as a tool to save time, as presented by scholars interested in working time reduction including Nick Srnicek and Alex Williams, and the opposing view of automation causing technological unemployment, as presented by scholars including Martin Ford;

(2) automation as a tool for increasing productivity, as discussed by scholars including Aaron Benanav, and the extended or opposing accounts offered in post-scarcity economics, particularly that of Aaron Bastani;

(3) automation as a tool for redressing social issues, and the opposing account of automation as the cause of further social issues or injustice, as proposed by scholars including Virginia Eubanks;

(4) the diametrically opposed utopian and dystopian predictions of automated work, such as those of John Danaher and ‘Classical’ philosophers of technology respectively, along with a particular consideration of transhumanist and posthumanist projects;

(5) and finally, a consideration of hybrid models of automation, such as those proposed by Ajay Agrawal et al. With each account, I highlighted the various implicit value-judgements, and argued against the limited scope of each, offering suggestions for how my own definition was more conducive to effective and accessible analysis.

Following the definition of automation established in Section 1, Sections 2 and 3 responded to the second core research question “what is meant by the term ‘work’?” Following the phenomenological reduction performed in Chapter 1, the same process was applied to intuitive notions of ‘work’, revealing two distinct notions: *labour* and *work*. Section 2 began to answer the second research question by defining the mode of *labour* in a similarly stripped-back manner as automation. I defined *labour* as a mode of activity in an ideal manner, rather than a comprehensive set of actions,

one that is *primarily intended towards the biological welfare of the affected agent/s*, and in terms of its three key elements: its biological necessity; its cyclical temporal quality; and its universal presence in the human condition. Given the similarities between this notion and those offered by Hannah Arendt in her 1958 book *The Human Condition*, I clarified an intellectual debt to Arendt while also distancing my analysis from Arendtian scholarship. The definition of *labour* was then further defined in relation to its practical conditions, and I explored the ways in which *labour* is enclosed in practice, in terms of its spatial, temporal, and interpersonal conditions. To conclude Chapter 3, I considered some problematic examples of *labour*, and discussed Karl Marx's approach to labour in more depth, further refuting some potential Marxist and Marxian responses to the thesis.

In order to begin to answer the third research question "how might, can, and do these two terms [automation and *labour*] interact with one another?", Chapter 4 introduced three case studies that were applied the ideal mode of activity of *labour* defined in Chapter 3. These cases were the automation of travel through self-driving cars; the automation of manufacturing and production; and the automation of interpersonal care, including healthcare, parenting/familial care, and sex work. To begin each case study, I first outlined the ways in which each aligned with my definitions of automation and *labour* respectively, before considering the current literature discussing each case. I highlighted the reified and narrow accounts surrounding each case, and then concluded each study by

exploring additional potential conclusions that could be drawn through the application of my novel evaluative framework in practical instances, particularly in light of the various forms of universal biological necessity involved in acts of *labour*.

The final section of the thesis explored the second notion revealed in the phenomenological reduction of 'work', and concluded the responses to the second and third central research questions. Chapter 5 offered a similarly phenomenologically reduced, novel, and evaluative definition of *work* as a mode of activity, rather than a set of actions. I defined *work* as a mode of activity primarily motivated towards *the meaningful expression and engagement of enacting agents*. In a similar structure to Chapter 3, I focused on three central elements of this definition: the meaningfulness of *work*; its determinate temporal condition; and the universal capacity for expression and articulation. The definition of *work* developed here is clearly opposed to those offered in 'post-work' theories of automation, and I argued against such approaches to automation and the future of work, citing them as overly narrow and implicitly speculative. I then explored the practical conditions surrounding the ways in which *work* is enclosed in practice, citing the spatial, temporal, and articulatory conditions of enclosed cases of *work*. Some problematic instances of *work* were outlined to conclude the chapter, and I offered suggestions of how my definitions are better suited to responding to and redressing these issues that are currently featured in the literature.

To conclude Section 3 and the thesis as a whole, in Chapter 6 I completed my response to the third research question by re-examining the case studies offered in Chapter 4. However, in this chapter I presented the cases in light of the mode of *work*, and explored the ways in which automating acts must also reflect and acknowledge the meaningful ways in which human agents relate to tasks, and not to entirely foreclose all opportunities for meaningful engagement in order to entirely satisfy biological necessity. I began by restating the conclusions from Chapter 4, and then relating each case to the definition of *work*, before exploring ways in which the automation of each task might properly reflect *both* modes of activity I have defined. In doing so, I have offered a new and innovative approach to questions surrounding automation and the future of work, through the use of a novel evaluative framework that can be interjected into the contested literature.

This approach is somewhat novel when compared to contemporary approaches to automation and the future of work. Other scholars also read two distinct forms of activity into the literature, often surrounding contingent features that arise in certain formulations: paid employment as opposed to unpaid reproductive labour, or boring employment as opposed to meaningful fulfilment, for example. Moreover, distinctions between labour and work are also somewhat common elsewhere in the literature, particularly as presented by Hannah Arendt and Karl Marx. My approach to this issue is wholly novel in terms of both the methodology (the heuristic use of ideal types revealed through phenomenological reduction) and the

specific definitions of automation, *labour*, and *work*. This approach is introduced into the literature in direct opposition to the types of narrow and reified conceptions that I argue are common across contemporary discussions. The definitions developed here are intended to be practically useful in considering real-world case studies, but without succumbing to the same issues that occur across other approaches. By approaching *labour* and *work* as modes of activity, rather than as set categories or in line with contingent functions, I believe that a practical approach to automation can be developed that better reflects, acknowledges, and accounts for the various and dynamic instances of work that populate the human condition. Rather than bringing about a fully automated utopia or dystopia, in which humanity is either completely emancipated or made functionally redundant, automation presents the opportunity to redesign and restructure *labour* and *work* to better reflect our basic human needs and our desire for meaningful engagement. Without falling prey to emotive and alluring predications regarding science-fiction-esque futures, the world of work can be realistically impacted *now*, in line with our biological metabolisms and our distinctly human capacities of articulation and meaningful engagement.

## **7.2. Recommendations for Future Research**

The scope of this thesis has been relatively broad, introducing and establishing three novel definitions of automation, *labour*, and *work*, and then comparing these definitions with real-world cases. A number of areas

for further research are clear and perhaps the most pressing would be an extension of the methodology adopted in this thesis to account for other modes beyond *labour* and *work*. Three such potential modes already noted are *leisure*, *duty*, and *toil*. While I offered a limited response to these concerns as they arose, arguing that they *could* relate to my definitions of *labour* and *work* respectively (depending on the formulation and specific motivation), my approach is also wholly open to the inclusion of additional modes. By virtue of this being a heuristic method utilising ideal types, I make no scientific or material claims regarding the 'reality' of the two modes of activity offered here. The development of similar definitions of *leisure*, *duty*, and *toil* might be useful tools for further exploring the nature of work, and might have interesting implications for the future development of automation.

Moreover, additional research would be useful to further test the definitions of *labour*, *work*, and automation in relation to other cases. Due to the broad scope of the discussion in this thesis, there was limited space to explore further cases in detail: the three case studies of self-driving cars, manufacturing, and interpersonal care serve to highlight and explore some interesting and important facets of my definitions and further case studies might highlight additional interesting avenues of discussion and utility. Strong candidates for further investigation are automated hiring technologies, which test the limits of *labour* and *work* in practice, and machine-learning technologies, that might further test the limits of my definition of automation. Additionally, while the discussion of interpersonal

care went some way to applying my definitions to a more particular and problematic example, further problematic and unintuitive case studies would be useful for furthering the goals of this thesis. Consideration of autonomous weapons systems, legal decision-making technologies, and genome editing technologies would be additional examples for avenues of research.

The automation of work is a vitally important area of current research. We can neither ignore the development of automation nor trust that it will solve all of our problems. I have offered a means of approaching the automation of work through a novel evaluative framework, one that eliminates reified and narrow conceptions of both automation and 'work', but with further research, further application, and further consideration of the use of this model in other disciplines, I believe that a practically useful and conceptually rich understanding of automation and the future of work can be developed. The future of work is undoubtedly a technological one, but it must also be a distinctly human one.

## **Bibliography**

- Abildgaard, P.G. (2020) *The Secret of the 4 Day Week - How to make your business grow by working less*. Copenhagen: Frydenlund.
- Acaster, J. (2018) *Repertoire*. Netflix.
- Acemoglu, D., Restrepo, P. (2018) 'Low-Skill and High-Skill Automation', *Journal of Human Capital*, 12(2).
- Adler, P. (1988) 'Automation, Skill and the Future of Capitalism', *Berkeley Journal of Sociology*, 33, pp.1–36.
- Agrawal, A., Gans, J., Goldfarb, A. (2018) *Prediction Machines: The Simple Economics of Artificial Intelligence*. Boston: Harvard University Press.
- Aguilar-Millan, S., Feeney, A., Oberg, A., Rudd, E. (2010) 'The Post-Scarcity World of 2050–2075', *The Futurist*, 44(1).
- Ahmed, H.M. (2020) 'Role of verbal and non-verbal communication of health care providers in general satisfaction with birth care: a cross-sectional study in government health settings of Erbil City, Iraq', *Reproductive Health*, 17(35).
- Alexander, S. (2020) 'Post-capitalism by design not disaster', *The Ecological Citizen*, 3(B), pp.13–21.
- Allwood, J. (1977) 'A Critical Look at Speech Act Theory', in Dahl, Ö. (ed.) *Logic, Pragmatics and Grammar*. Göteborg: University of Göteborg Press, pp.53–99.
- Alnajjar, F., Cappuccio, M., Renawi, A., Mubin, O., Loo, C.K. (2020) 'Personalized Robot Interventions for Autistic Children: An Automated Methodology for Attention Assessment', *International Journal of Social Robotics*.
- Altenried, M. (2022) *The Digital Factory: The Human Labor of Automation*. Chicago: University of Chicago Press.
- Alter, A. (2017) *Irresistible: The Rise of Addictive Technology and the Business of Keeping Us Hooked*. London: Penguin Press.
- d'Ancona, M. (2017) *Post-Truth: The New War on Truth and How to Fight Back*. London: Ebury Press.
- Andrade, N.N. Gomes de, Pawson, D., Muriello, D., Donahue, L., Guadagno, J. (2018) Ethics and Artificial Intelligence: Suicide Prevention on Facebook. *Philosophy & Technology* 31: 669–684.
- Arendt, H. (1951) *The Origins of Totalitarianism*. 2017 edn. London: Penguin.

- Arendt, H. (1958) *The Human Condition*. 1998 edn. London: University of Chicago Press.
- Arendt, H. (1963) 'The Conquest of Space and the Stature of Man', in *Between Past and Future*. 2006 edn. New York: Penguin Books.
- Arendt, H. (1970) *On Violence*. New York: Schocken Books.
- Arendt, H. (1993) *The Promise of Politics*. New York: Harvest Books.
- Aristophanes (411) *Lysistrata and Other Plays*. 2003 edn. Translated by A. Sommerstein. London: Penguin Classics.
- Aristotle (335) *Rhetoric*. 1926 edn. Translated by J.H. Freese. London: Harvard University Press.
- Aristotle (340) *The Nicomachean Ethics*. 2004 edn. Translated by W.D. Ross. London: Penguin Classics.
- Armstrong, L. (2019) 'Stigma, decriminalisation, and violence against street-based sex workers: Changing the narrative', *Sexualities*, 22(7), pp.1288–1308.
- Arnold, D., Arntz, M., Gregory, T., Steffes, S., Zierahn, U. (2018) 'No need for automation angst, but automation policies', in Neufeind, M., O'Reilly, J., and Ranft, F. (eds.) *Work in the Digital Age: Challenges of the Fourth Industrial Revolution*. London: Rowman & Littlefield.
- Aronowitz, S., Cutler, J. (eds.) (1998) *Post-Work*. New York: Routledge.
- Arrowsmith, J. (2002) 'The Struggle over Working Time in Nineteenth- and Twentieth-Century Britain', *Historical Studies in Industrial Relations*, 13, pp.83–117.
- Ashton, T.S. (1948) *The Industrial Revolution, 1760-1830*. 1997 edn. Oxford: Oxford University Press.
- Asimov, I. (1967) *I, Robot*. 2013 edn. London: Harper Voyager.
- Asimov, I. (1990) *Robot Visions*. London: Penguin.
- Aspalter, C. (2021) 'Back to Origins: The ideal-type methodology in social sciences as developed by Max Weber', in Aspalter, C. (ed.) *Ideal Types in Comparative Social Policy*. London: Routledge.
- Attfield, R. (2001) 'Meaningful Work and Full Employment', *Philosophy of Management*, 1(1), pp.41–48.

- Aubrey, T. (2018) 'Why adaptive technical skills systems are needed to capitalise on the technological revolution: Challenges for the UK', in Neufeind, M., O'Reilly, J., Ranft, F. (eds.) *Work in the Digital Age: Challenges of the Fourth Industrial Revolution*. London: Rowman & Littlefield.
- Augé, M. (1995) *Non-places: Introduction to Supermodernity*. London: Verso Books.
- Austin, J.L. (1955) *How To Do Things With Words*. 2018 edn. Edited by J.O. Urmson. London: Martino Fine Books.
- Austin, M.W. (2014) 'Is Humility a Virtue in the Context of Sport?' *Journal of Applied Philosophy*, 31(2), pp.203–214.
- Autor, D. (2015) 'Why Are There Still So Many Jobs? The History and Future of Workplace Automation', *Journal of Economic Perspectives*, 29(3), pp.3–30.
- Au-Yong-Oliveira, M., Canastro, D., Oliveira, J., Tomás, J., Amorim, S., Moreira, F. (2019) 'The Role of AI and Automation on the Future of Jobs and the Opportunity to Change Society', *New Knowledge in Information Systems and Technologies*, pp.348–357.
- Bagrit, L. (1964) *The Age of Automation*. London: Pelican Books.
- Bailey, C., Madden, A., Alfes, K., Shantz, A., Soane, E. (2017) 'The mismanaged soul: Existential labor and the erosion of meaningful work', *Human Resource Management Review*, 27(3), pp.416–430.
- Bainbridge, L. (1983) 'Ironies of Automation', *Automatica*, 19(6), pp.775–779.
- Balakrishnan, R. (ed.) (2002) *The Hidden Assembly Line: Gender Dynamics of Subcontracted Work in a Global Economy*. Bloomfield: Kumarian Press.
- Barnes, A. (2020) *The 4 Day Week: How the Flexible Work Revolution Can Increase Productivity, Profitability and Well-being, and Create a Sustainable Future*. London: Piaktus.
- Barnes, A., Jones, S. (2020) *The 4 Day Week: How the Flexible Work Revolution Can Increase Productivity, Profitability and Well-being, and Create a Sustainable Future*. London: Piatkus.
- Barnes, J. (ed.) (2016) *Environmental Futures*. London: Wiley-Blackwell (Journal of the Royal Anthropological Institute).
- Bashford, A. (2010) 'Epilogue: where did eugenics go?' in Bashford, A., Levine, P. (eds.) *The Oxford Handbook of the History of Eugenics*. Oxford: Oxford University Press.

- Bastani, A. (2019) *Fully Automated Luxury Communism: A Manifesto*. New York: Verso Books.
- Batchelor, T., Hooton, C. (2017) 'Pepsi advert with Kendall Jenner pulled after huge backlash', *The Independent*, 5 May. Available at: <https://www.independent.co.uk/arts-entertainment/tv/news/pepsi-advert-pulled-kendall-jenner-protest-video-cancelled-removed-a7668986.html> (Accessed: 27 September 2021).
- BBC News (2020) 'Low-paid workers face pandemic "double whammy"', *BBC News*, 15 December. Available at: <https://www.bbc.co.uk/news/business-55310850#comments> (Accessed: 03 January 2022).
- Beckman, K. (2010) *Crash: Cinema and the Politics of Speed and Stasis*. Durham: Duke University Press.
- Beller, J. (2018) *The Message is Murder: Substrates of Computational Capital*. London: Pluto Press.
- Benanav, A. (2020) *Automation and the Future of Work*. New York: Verso Books.
- Beneria, L. (1999) 'The enduring debate over unpaid labour', *International Labour Review*, 138(3).
- Bennett, S. (1979) *A History of Control Engineering: 1800-1930*. London: Peter Peregrinus Ltd.
- Bennett, S. (1993) *A History of Control Engineering: 1930-1955*. London: Peter Peregrinus Ltd.
- Berg, H. (2021) 'Reading Sex Work: An Introduction', *The South Atlantic Quarterly*, 120(3), pp. 485–492.
- Bernet, R. (2016) 'The phenomenological reduction: from natural life to philosophical thought', *Metodo*, 4(2), pp.312–333.
- Bernhard, P. (2017) 'Blueprints of Totalitarianism: How Racist Policies in Fascist Italy Inspired and Informed Nazi Germany', *Fascism*, 6(2), pp.127–162.
- Bertolaso, M., Rocchi, M. (2020) 'Specifically human: Human work and care in the age of machines', *Business Ethics*.
- Bessen, J. (2016) 'The Automation Paradox', *The Atlantic*, 19 January. Available at: <https://www.theatlantic.com/business/archive/2016/01/automation-paradox/424437/> (Accessed: 03 January 2022).

- Bethel, B.J. (2017) 'It's in the Details: On the Authenticity of Pixar's "Cars" Franchise', *Roger Ebert*, 23 June. Available at: <https://www.rogerebert.com/features/its-in-the-details-on-the-authenticity-of-pixars-cars-franchise> (Accessed: 03 November 2021).
- Bhargava, V., Kim, T.W. (2017) 'Autonomous Vehicles and Moral Uncertainty', in Lin, P., Abney, K., Jenkins, R. (eds.) *Robot Ethics 2.0: From Autonomous Cars to Artificial Intelligence*. Oxford: Oxford University Press.
- Bieler, A., Morton, A.D. (2021) 'Is capitalism structurally indifferent to gender?: Routes to a value theory of reproductive labour', *Environment and Planning A: Economy and Space*, 53(7), pp.1749–1769.
- Bieler, A., Salyga, J. (2020) 'Baltic labour in the crucible of capitalist exploitation: Reassessing "post-communist" transformation', *The Economic and Labour Relations Review*, 31(2), pp.191–210.
- Billings, C.E., Graeber, C. (1989) *Human-Centered Automation: Development of a Philosophy*. Mountain View: NASA Ames Research Centre.
- Binfield, K. (ed.) (2015) *Writings of the Luddites*. Baltimore: Johns Hopkins University Press.
- Biron, M., van Veldhoven, M. (2012) 'Emotional labour in service work: Psychological flexibility and emotion regulation', *Human Relations*, 65(10), pp.1259–1282.
- Blake, R. (2019) 'Small Factories Embrace Automation – Because They Can't Find Enough People', *Forbes*, 26 November. Available at: <https://www.forbes.com/sites/richblake1/2019/11/26/small-factories-embrace-automation--because-they-cant-find-enough-people/?sh=3e009c30352a> (Accessed: 03 April 2021).
- Blanchette, A. (2019) 'Living Waste and the Labor of Toxic Health on American Factory Farms', *Medical Anthropology Quarterly*, 33(1), pp.80–100.
- Blanchflower, D.G. (2019) *Not Working: Where Have All the Good Jobs Gone?* Princeton: Princeton University Press.
- Bloodworth, J. (2019) *Hired: Six Months Undercover in Low-Wage Britain*. London: Atlantic Books.

- Boffey, D. (2022) 'Belgium to give workers right to request four-day week', *The Guardian*, 15 February. Available at:  
<https://www.theguardian.com/law/2022/feb/15/belgium-to-give-workers-right-to-request-four-day-week> (Accessed: 15 February 2022).
- Bonifati, G. (2019) 'Is automation beneficial for society as a whole?' in *Economic Policy, Crisis and Innovation*. London: Routledge.
- Bonnefon, J-F., Shariff, A., Rawhwan, I. (2015) 'Autonomous Vehicles Need Experimental Ethics: Are We Ready for Utilitarian Cars?' *Science and Engineering Ethics*. Available at:  
[https://www.researchgate.net/publication/282843902\\_Autonomous\\_Vehicles\\_Need\\_Experimental\\_Ethics\\_Are\\_We\\_Ready\\_for\\_Utilitarian\\_Cars](https://www.researchgate.net/publication/282843902_Autonomous_Vehicles_Need_Experimental_Ethics_Are_We_Ready_for_Utilitarian_Cars) (Accessed: 14 October 2020)
- Bookchin, M. (1971) *Post-Scarcity Anarchism*. 2004 edn. Oakland: AK Press.
- Borenstein, J., Herkert, J., Miller, K. (2019) 'Self-Driving Cars and Engineering Ethics: The Need for a System Level Analysis', *Science and Engineering Ethics*, 25(1), pp.383–398. <https://doi.org/10.1007/s11948-017-0006-0>.
- Borgmann, A. (2010) 'Focal things and practices', in Hanks, C. (ed.) *Technology and Values: Essential Readings*. London: Wiley-Blackwell.
- Boris, E. (1994) *Home to Work: Motherhood and the politics of industrial homework in the United States*. Cambridge: Cambridge University Press.
- Bostrom, N. (2003) 'The Transhumanist FAQ: A General Introduction', *World Transhumanist Association*. 2.1. Available at:  
<https://nickbostrom.com/views/transhumanist.pdf> (Accessed: 13 April 2021).
- Bostrom, N. (2005) 'A History of Transhumanist Thought', *Journal of Evolution and Technology*, 14(1).
- Bouwer, J., van Leeuwen, M. (2017) *Philosophy of Leisure: Foundations of the good life*. London: Routledge.
- Bowie, N.E. (2019) 'Dignity and Meaningful Work', in Yeoman, R., Bailey, C., Madden, A., Thompson, M. (eds.) *The Oxford Handbook of Meaningful Work*. Oxford: Oxford University Press.
- Boyer, G.R. (1998) 'The Historical Background of the Communist Manifesto', *Journal of Economic Perspectives*, 12(4), pp. 151–174.

- Braidotti, R. (2019) 'Transversal Posthumanities', *Philosophy Today*, 63(4), pp.1181–1195.
- Breen, K. (2019) 'Meaningful Work and Freedom: Self-realization, Autonomy, and Non-domination in Work', in Yeoman, R., Bailey, C., Madden, A., Thompson, M. (eds.) *The Oxford Handbook of Meaningful Work*. Oxford: Oxford University Press.
- Breen, K., Deranty, J-P. (2021) 'Whither work? The politics and ethics of contemporary work', in Breen, K., Deranty, J-P. (eds.) *The Politics and Ethics of Contemporary Work*. London: Routledge.
- Bregman, R. (2016) *Utopia for Realists: The Case for a Universal Basic Income, Open Borders, and a 15-Hour Workweek*. Amsterdam: De Correspondent.
- Bridle, J. (2019) *New Dark Age: Technology and the End of the Future*. New York: Verso Books.
- Brindley, P.G., Reynolds, S.F. (2011) 'Improving verbal communication in critical care medicine', *Journal of Critical Care*, 26(2), pp.155–159.
- Brynjolfsson, E., McAfee, A. (2014) *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*. New York: W. W. Norton & Co.
- Burns, S. (1997) *Daybreak of Freedom: The Montgomery Bus Boycott*. Chapel Hill: University of North Carolina Press.
- Burroughs, W.S. (1959) *Naked Lunch*. 2010 edn. London: Penguin Classics.
- Byatt, J. (2012) 'Being Dead? Trauma and the Liminal Narrative in J. G. Ballard's Crash and Tom McCarthy's Remainder', *Forum for Modern Language Studies*, 48(3), pp.45–259.
- Byron, C., Brake, M. (2019) 'Fifteen Million Merits and Fighting Capitalism: How Can We Resist?' in Johnson, D.K. (ed.) *Black Mirror and Philosophy: Dark Reflections*. London: Wiley-Blackwell.
- Bytwerk, R.L. (2005) 'The Argument for Genocide in Nazi Propaganda', *Quarterly Journal of Speech*, 91(1), pp.37–62.
- Cadwalladr, C. (2018) 'Revealed: 50 million Facebook profiles harvested for Cambridge Analytica in major data breach', *The Guardian*, 17 March. Available at: <https://www.theguardian.com/news/2018/mar/17/cambridge-analytica-facebook-influence-us-election> (Accessed: 23 June 2020).

- Cahnman, W.J. (1965) 'Ideal Type Theory: Max Weber's Concept and Some of Its Derivations', *Sociological Quarterly*, 6(3), pp.267–280.
- Campbell-Kelly, M., Aspray, W., Ensmenger, N., Yost, J.R. (2014) *Computer: A History of the Information Machine*. 3rd edn. London: Routledge.
- Canovan, M. (2008) *Hannah Arendt: A Reinterpretation of Her Political Thought*. Cambridge: Cambridge University Press.
- Cant, C. (2019) *Riding for Deliveroo: Resistance in the New Economy*. Cambridge: Polity Press.
- Capper, J.L., Cady, R.A., Bauman, D.E. (2009) 'The environmental impact of dairy production: 1944 compared with 2007', *Journal of Animal Science*, 87(6), pp.2160–2167.
- Carbonero, F., Ekkehard, E., Weber, E. (2020) 'Robots Worldwide: The Impact of Automation on Employment and Trade', *Institute for Employment Research*, IAB Discussion Paper.
- Carey, K. (2016) *The End of College: Creating the Future of Learning and the University of Everywhere*. London: Riverhead Books.
- Carlisle, V. (2021) "'Sex Work Is Star Shaped": Antiwork Politics and the Value of Embodied Knowledge', *The South Atlantic Quarterly*, 120(3), pp.573–590.
- Carlsson, B. (1995) *Technological Systems and Economic Performance: The Case of Factory Automation*. New York: Kluwer Academic Publishers.
- Carr, N. (2014) *The Glass Cage*. New York: W. W. Norton & Co.
- Carr, N. (2016) *Utopia is Creepy: And Other Provocations*. London: W. W. Norton & Co.
- Castells, M. (1996) *The Rise of the Network Society*. Oxford: Blackwell Publishers (The Information Age: Economy, Society and Culture, 1).
- Cave, S., Dihal, K., Dillon, S. (2020) *AI Narratives: A History of Imaginative Thinking about Intelligent Machines*. Oxford: Oxford University Press.
- Cellan-Jones, R. (2019) 'Robots "to replace up to 20 million factory jobs" by 2030', *BBC News*, 26 June. Available at: <https://www.bbc.co.uk/news/business-48760799> (Accessed: 28 June 2019).
- Chambers, C., Ryder, E. (2009) *Compassion and Caring in Nursing*. London: Routledge.
- Chang, C-H., Sam, A.G. (2015) 'Corporate environmentalism and environmental innovation', *Journal of Environmental Management*, 153, pp.84–92.

- Chaplin, C. (1936) *Modern Times* [film.] United Artists.
- Chaplin, C. (1940) *The Great Dictator* [film.] United Artists.
- Chateauvert, M. (2013) *Sex Workers Unite: A History of the Movement from Stonewall to SlutWalk*. Boston: Beacon Press.
- Chen, M. (2020) 'A Tale of Two Deficits: Causality and Care in Medical AI', *Philosophy & Technology*. <https://doi.org/10.1007/s13347-019-00359-6>.
- Chessell, D. (2018) 'The Jobless Economy in a Post-Work Society: How Automation will Transform the Labour Market', *Psychosociological Issues in Human Resource Management*, 6(2), pp.74–79.
- Chiodo, S. (2021) 'Human autonomy, technological automation (and reverse)', *AI & Society*, 37, pp.39-48.
- Chitnis, P.L. (2021) 'Changing Trends of Advertisements', *International Journal of Advance Study and Research Work*, 4(3).
- Coeckelbergh, M. (2015) 'Care robots and the future of ICT-mediated elderly care: a response to doom scenarios', *AI & Society*, 31, pp.455-462.
- Coeckelbergh, M. (2016) 'Responsibility and the Moral Phenomenology of Using Self-Driving Cars', *Applied Artificial Intelligence*, 30(8), pp.748–757.
- Coelingh, E., Nilsson, J. (2018) *Driving Tests for Self-Driving Cars*. IEEE. Available at: [https://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=8302386&casa\\_token=WDQ8NH3r7CcAAAAA:G4T76OHB7VomEO2DgX3-oSYv4MYy8UDWLttuhaOX42\\_9h\\_neY0TXZywoLRURokGThntvm\\_t5&tag=1](https://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=8302386&casa_token=WDQ8NH3r7CcAAAAA:G4T76OHB7VomEO2DgX3-oSYv4MYy8UDWLttuhaOX42_9h_neY0TXZywoLRURokGThntvm_t5&tag=1) (Accessed: 21 January 2022).
- Cole, H.L., Ohanian, L.E. (2002) 'The Great U.K. Depression: A Puzzle and Possible Resolution', *Review of Economic Dynamics*, 5, pp.19–44.
- Collier, P. (2019) *The Future of Capitalism: Facing the New Anxieties*. London: Penguin Publishing.
- Collinson, P. (2019) 'Automation threatens 1.5 million workers in Britain, says ONS', *The Guardian*, 25 March. Available at: <https://www.theguardian.com/money/2019/mar/25/automation-threatens-15-million-workers-britain-says-ons> (Accessed: 03 April 2021).
- Condurat, M., Nicuță, A.M., Andrei, R. (2017) 'Environmental Impact of Road Transport Traffic: A Case Study for County of Iași Road Network', *Procedia Engineering*, 181, pp.123–130.

- Conger, K. (2020) 'Facebook Starts Planning for Permanent Remote Workers', *New York Times*, 21 May. Available at: <https://www.nytimes.com/2020/05/21/technology/facebook-remote-work-coronavirus.html> (Accessed: 07 June 2020).
- Cooper, L., Holderness, K., Sorensen, T., Wood, D.A (2021) 'Perceptions of Robotic Process Automation in Big 4 Public Accounting Firms: Do Firm Leaders and Lower-Level Employees Agree?' *SSRN*. Available at: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3445005](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3445005) (Accessed: 01 July 2021).
- Cotgrove, S. (1972) 'Alienation and Automation', *The British Journal of Sociology*, 23(4), pp.437–451.
- Crary, J. (2014) *24/7: Late Capitalism and the Ends of Sleep*. London: Verso Books.
- Crouch, C. (2019) *Will the Gig Economy Prevail?* Cambridge: Polity Press.
- Cumming, E., Kaplan, W. (1991) *The Arts and Crafts Movement*. London: Thames & Hudson Ltd.
- Cummings, A. (2017) 'Art time, Life Time: Tehching Hsieh', *Tate Research Centre*. Available at: <https://www.tate.org.uk/research/research-centres/tate-research-centre-asia/event-report-tehching-hsieh> (Accessed: 31 January 2020).
- Dahl, R. (1964) *Charlie and the Chocolate Factory*. 2013 edn. London: Puffin.
- Daily, M., Medasani, S., Behringer, R., Trivedi, M. (2017) 'Self-Driving Cars', *Computer*, 50(12), pp.19–23.
- Danaher, J. (2017a) 'Building a Postwork Utopia: Technological Unemployment, Life Extension and the Future of Human Flourishing', in LaGrandeur, K., Hughes, J.J. (eds.) London: Palgrave Macmillan.
- Danaher, J. (2017b) 'Will life be worth living in a world without work? Technological Unemployment and the Meaning of Life', *Science and Engineering Ethics*, 23, pp.41–64.
- Danaher, J. (2019) *Automation and Utopia: Human Flourishing in a World Without Work*. Cambridge: Harvard University Press.
- Danaher, J., McArthur, N. (eds.) (2017) *Robot Sex: Social and Ethical Implications*. Cambridge: MIT Press.
- Danaher, J., Nyholm, S. (2021) 'Automation, work and the achievement gap', *AI and Ethics*, 1, pp.227–237.

- Dasgupta, S. (2013) 'Poverty as a Contextual Factor Affecting Sexual Health Behavior Among Female Sex Workers in India', *Qualitative Health Research*, 23(6), pp.825–833.
- Daugherty, P., Wilson, J. (2018) *Human + Machine: Reimagining Work in the Age of AI*. Boston: Harvard University Press.
- Davenport, T., Kalakota, R. (2019) 'The potential for artificial intelligence in healthcare', *Future Healthcare Journal*, 6(2), pp.94–98.
- Dean, J. (2012) *The Communist Horizon*. New York: Verso Books.
- DeBord, M. (2017) 'Tesla's future is completely inhuman — and we shouldn't be surprised', *Business Insider*, 20 May. Available at: <https://www.businessinsider.com/tesla-completely-inhuman-automated-factory-2017-5?r=US&IR=T> (Accessed: 22 March 2021).
- Del Ray, J. (2019) 'How robots are transforming Amazon warehouse jobs — for better and worse', *Vox*, 12 November. Available at: <https://www.vox.com/recode/2019/12/11/20982652/robots-amazon-warehouse-jobs-automation> (Accessed: 03 December 2019).
- Deranty, J-P. (2021) 'Post-work society as an oxymoron: Why we cannot and should not wish work away', *European Journal of Social Theory*. <https://doi.org/10.1177/13684310211012169>.
- Descartes, R. (1641) *Meditations and Other Metaphysical Writings*. 2003 edn. Translated by D.M. Clarke. London: Penguin Books.
- Dick, D.G. (2020) 'What Money Is and Ought To Be', *Journal of Social Ontology*, 6(2), pp.293–313.
- Dickens, C. (1859) *A Tale of Two Cities*. 1999 edn. London: Wordsworth Editions.
- Diebold, J. (1959) 'Automation Needs a Human Policy', *Challenge*, 7(8).
- Diethel, C. (2003) *Nietzsche's Sister and the Will to Power: A Biography of Elisabeth Forster-Nietzsche*. Champaign: University of Illinois Press.
- Dietz, M.G. (2000) 'Arendt and the Holocaust', in Villa, D. (ed.) *The Cambridge Companion to Hannah Arendt*. Cambridge: Cambridge University Press.
- Dinerstein, A.C., Pitts, F.H. (2018) 'From Post-Work to Post-Capitalism? Discussing the Basic Income and Struggles for Alternative Forms of Social Reproduction', *Journal of Labor and Society*, 21(4), pp.471–491.

- Diprose, R., Ziarek, E.P. (2018) *Arendt, Natality and Biopolitics: Toward Democratic Plurality and Reproductive Justice*. Edinburgh: Edinburgh University Press.
- Donà, G. (2019) *The Marginalised in Genocide Narratives*. London: Routledge.
- Dowie, J.A. (1975) '1919-20 is in Need of Attention', *The Economic History Review*, 28(3), pp.429–450.
- Driver, C. (1946) *Tory Radical: The Life of Richard Oastler*. New York: Oxford University Press.
- D'Souza, J. (2015) 'Greed: Crises, Causes, and Solutions', *International Journal of Humanities and Social Science*, 5(7), pp.1-6.
- Duerden, M.D., Courtright, S.H., Widmer, M.A. (2018) 'Why People Play at Work: A Theoretical Examination of Leisure-at-Work', *Leisure Sciences: An Interdisciplinary Journal*, 40(6), pp.634–648.
- Duffy, B.E. (2015) 'The romance of work: Gender and aspirational labour in the digital culture industries', *International Journal of Cultural Studies*, pp.1–17.
- Dvorsky, G., Hughes, J.J. (2008) 'Postgenderism: Beyond the Gender Binary', *Institute for Ethics and Emerging Technologies*, (3).
- Dyer, J. (2021) 'Georgian Washerwomen: tales of the tub from the long eighteenth century', *Continuity and Change*, 36(1).
- Edensor, T. (2000) 'Walking in the British Countryside: Reflexivity, Embodied Practices and Ways to Escape', *Body & Society*, 6(3–4), pp.81–106.
- Egiyi, M.A., Ofoegbu, G.N. (2020) 'Cryptocurrency and Climate Change: An Overview', *International Journal of Mechanical Engineering and Technology*, 11(3), pp.15–22.
- Ehrenreich, B., Hochschild, A.R. (eds.) (2004) *Global Women: Nannies, Maids, and Sex Workers in the New Economy*. New York: Henry Holt & Company.
- EIA (2021) *Use of energy explained: Energy use in industry*. US Energy Information Administration. Available at: <https://www.eia.gov/energyexplained/use-of-energy/industry.php> (Accessed: 23 January 2022).
- Elder, A. (2017) 'Robot Friends for Autistic Children', in Lin, P., Abney, K., Jenkins, R. (eds.) *Robot Ethics 2.0: From Autonomous Cars to Artificial Intelligence*. Oxford: Oxford University Press.

- Elliott, R., Wright, L. (2001) 'Verbal communication: what do critical care nurses say to their unconscious or sedated patients?' *Journal of Advanced Nursing*, 29(6), pp.1412–1420.
- Ellul, J. (1954) *The Technological Society*. New York: Vintage Books.
- Engels, F. (1876) *The Part Played by Labour in the Transition from Ape to Man*. 1950 edn. New York: International Publishers.
- Engels, F. (1880) 'Socialism: Utopian and Scientific', in *Marx and Engels: Selected Works*. 1970 edn. Moscow: Progress Publishers.
- Epting, S. (2019a) 'Automated Vehicles and Transportation Justice', *Philosophy & Technology*, 32(3), pp.389–403.
- Epting, S. (2019b) 'Transportation Planning for Automated Vehicles—Or Automated Vehicles for Transportation Planning?' *Essays in Philosophy*, 20(2).
- Erdoğan, G. (2019) 'Land selection criteria for lights out factory districts during the industry 4.0 process', *Journal of Urban Management*, 8(3), pp.377–385.
- Eskin, B. (2010) 'The Man on the Other Side of the Lunch Counter', *The New Yorker*, 5 May. Available at: <https://www.newyorker.com/culture/photo-booth/the-man-on-the-other-side-of-the-lunch-counter> (Accessed: 31 January 2022).
- Estlund, C. (2021) *Automation Anxiety: Why and How to Save Work*. Oxford: Oxford University Press.
- Eubanks, V. (2019) *Automating Inequality: How High-Tech Tools Profile, Police, and Punish the Poor*. New York: Picador.
- Evangelou, A. (2017) *Philosophizing Madness from Nietzsche to Derrida*. Berlin: Springer.
- Fairtrade International (2021) *The Future is Fair*. Germany: Fairtrade International, pp.2–26. Available at: <https://files.fairtrade.net/publications/Fairtrade-International-Annual-Report-2020-2021.pdf> (Accessed: 12 June 2021).
- Fan, J.S. (2019) 'Woke Capital: The Role of Corporations in Social Movements', *Harvard Business Law Review*, 9(441).
- Fazi, M.B. (2019) 'Can a machine think (anything new)? Automation beyond simulation', *AI & Society*, 34, pp.813–824.
- Federico, G. (2005) *Feeding the World: An Economic History of Agriculture, 1800-2000*. Princeton: Princeton University Press.

- Feenberg, A. (1993) *Critical Theory of Technology*. Oxford: Oxford University Press.
- Ferguson, A. (1991) *Sexual Democracy: Women, Oppression, and Revolution*. Oxford: Westview Press.
- Ferguson, A., Folbre, N. (1981) 'The Unhappy Marriage of Capitalism and Patriarchy', *Sargent 1981*, pp.313–338.
- Ferguson, S. (2019) *Women and Work: Feminism, Labour, and Social Reproduction*. New York: Pluto Press.
- Foehn, P., Brescianini, D., Kaufmann, E., Cieslewski, T., Gehrig, M., Muglikar, M., Scaramuzza, D. (2021) 'AlphaPilot: autonomous drone racing', *Autonomous Robots*, 45(7).
- Folbre, N. (1982) 'Exploitation Comes Home: A Critique of the Marxian Theory of Family Labor', *Cambridge Journal of Economics*, 6(4), pp.317–329.
- Folbre, N. (1994) *Who Pays for the Kids? Gender and the Structures of Constraint*. London: Routledge.
- Foot, P. (1978) *Virtues and Vices: and other essays in moral philosophy*. 2<sup>nd</sup> edn. Oxford: Oxford University Press.
- Ford, M. (2009) *The Lights in the Tunnel: Automation, Accelerating Technology and the Economy of the Future*. New York: Acculant Publishing.
- Ford, M. (2015) *The Rise of the Robots: Technology and the Threat of a Jobless Future*. London: Oneworld Publications.
- Ford, M. (2021) *Rule of the Robots: How Artificial Intelligence Will Transform Everything*. New York: Basic Books.
- Foucault, M. (1977) *Discipline and Punish*. London: Allen Lane.
- Frank, M., Roehrig, P., Pring, B. (2017) *What To Do When Machines Do Everything: How to Get Ahead in a World of AI, Algorithms, Bots, and Big Data*. Hoboken: John Wiley & Sons, Inc.
- Frase, P. (2016) *Four Futures: Life After Capitalism*. New York: Verso Books.
- Fraser, D. (2021) 'Scotland to trial a four-day week', *BBC News*, 1 September. Available at: <https://www.bbc.co.uk/news/uk-scotland-scotland-business-58403087> (Accessed: 03 September 2021).
- Fraser, S. (2022) 'It's Time to Take Woke Capital Seriously', *Dissent*, 69(1), pp.107–114.
- Frayne, D. (2015) *The Refusal of Work: The Theory and Practice of Resistance to Work*. London: Zed Books.

- FreshPrint. (2016) 'Elon Musk and SpaceX want you to design the tube transportation system from Futurama', *FreshPrint*, 20 November. Available at: <http://www.freshprintmagazine.com/elon-musk-spacex-want-design-tube-transportation-system-futurama/> (Accessed: 03 November 2021).
- Frey, C.B. (2019) *The Technology Trap: Capital, Labor, and Power in the Age of Automation*. Princeton: Princeton University Press.
- Friedmann, G. (1992) *The Anatomy of Work: Labour, leisure, and the Implications of Automation*. London: Transaction Publishers.
- Fuchs, C. (2014) *Digital Labour and Karl Marx*. New York: Routledge.
- Fuchs, C. (2020) *Communication and Capitalism: A Critical Theory*. London: University of Westminster Press (Critical, Digital, and Social Media Studies).
- Fuchs, C., Sevignani, S. (2013) 'What is Digital Labour? What is Digital Work? What's their Difference? And why do these Questions Matter for Understanding Social Media?' *Triple C*, 11(2), pp.237–293.
- Fukuyama, F. (2003) *Our Posthuman Future: Consequences of the Biotechnology Revolution*. London: Profile Books.
- Fukuyama, F. (2011) *The Origins of Political Order: From Prehuman Times to the French Revolution*. London: Profile Books.
- Fukuyama, F. (2014) *Political Order and Political Decay: From the Industrial Revolution to the Globalisation of Democracy*. London: Profile Books.
- Fuller, S., Lipinska, V. (2014) *The Proactionary Imperative: A Foundation to Transhumanism*. London: Palgrave Macmillan.
- Galarza, M. (2016) 'How To Save Time And Money Through Automation', *Forbes*, 17 November. Available at: <https://www.forbes.com/sites/forbestechcouncil/2016/11/17/how-to-save-time-and-money-through-automation/?sh=8da3d4658e80> (Accessed: 01 September 2021).
- Galloway, L. (2017) 'Living in: Hồ Chí Minh City', *BBC Travel*, 27 March. Available at: <https://www.bbc.com/travel/article/20170317-living-in-ho-ch-minh-city> (Accessed: 23 July 2019).

- Garling, T., Schuitema, G. (2007) 'Travel Demand Management Targeting Reduced Private Car Use: Effectiveness, Public Acceptability and Political Feasibility', *Journal of Social Issues*, 63(1), pp.139–153.
- Gaskell, A. (2020) 'Automation, COVID, And The Future Of Work', *Forbes*, 16 October. Available at: <https://www.forbes.com/sites/adigaskell/2020/10/16/automation-covid-and-the-future-of-work/?sh=7ae7214e5e10> (Accessed: 31 August 2021).
- Gayozzo, P. (2018) 'Extrapolitical Theory and Postpoliticism', *Institute for the Development of Extrapolitical Proposals*. DOI:10.13140/RG.2.2.20166.32321.
- Geisslinger, M., Poszler, F., Betz, J., Lütge, C., Lienkamp, M. (2021) 'Autonomous Driving Ethics: from Trolley Problem to Ethics of Risk', *Philosophy & Technology*. <https://doi.org/10.1007/s13347-021-00449-4>.
- George, H. (1879) *Progress and Poverty*. 2009 edn. Cambridge: Cambridge University Press.
- Gertz, N. (2018) *Nihilism of Technology*. London: Rowman & Littlefield.
- Ghimire, R., Skinner, J., Carnathan, M. (2020) 'Who perceived automation as a threat to their jobs in metro Atlanta: Results from the 2019 Metro Atlanta Speaks survey', *Technologi in Society*, 63.
- Ghitis, F. (2012) 'A nation's sex strike for democracy', *CNN*. Available at: <https://edition.cnn.com/2012/08/29/opinion/ghitis-sex-strikes/index.html> (Accessed: 12 July 2021).
- Ghosh, P. (2020) 'Sex robots may cause psychological damage', *BBC News*. Available at: <https://www.bbc.co.uk/news/science-environment-51330261> (Accessed: 12 July 2021).
- Gibson Robinson, J.A. (1987) *The Montgomery Bus Boycott and the Women Who Started It: The Memoir of Jo Ann Gibson Robinson*. Edited by D.J. Garrow. Knoxville: University of Tennessee Press.
- Giddens, A. (1996) 'Affluence, Poverty and the Idea of a Post Scarcity Society', *Development and Change*, 27(2), pp.365–377.
- Giles-Corti, B., Vernez-Moudon, A., Reis, R., Turrell, G., Dannenberg, A.L., Badland, H., Foster, S., Lowe, M., Sallis, J.F., Stevenson, M., Owen, N. (2016) 'City planning and population health: a global challenge', *The Lancet*, 388(10062), pp.2912–2924.

- Gilmore, O. (2019) *A 4-day week for Ireland?: A report on the feasibility of a four-day working week in Ireland*. Dublin: Fórsa Trade Union.
- Goddard, D. (1973) 'Max Weber and the Objectivity of Social Science', *History and Theory*, 12(1), pp.1–22.
- Goldberg, R. (1931) *Professor Butts and the Self-Operating Napkin* [Cartoon]. Available at: <https://www.rubegoldberg.com/artwork/self-operating-napkin/> (Accessed: 14 January 2021).
- Golden, L. (2009) 'A Brief History of Long Work Time and the Contemporary Sources of Overwork', *Journal of Business Ethics*, 84, pp.217–227.
- Golden, L. (2011) *The effects of working time on productivity and firm performance: a research synthesis paper*. 33. Geneva: International Labour Office.
- Goodkind, A.L., Jones, B.A., Berrens, R.P. (2020) 'Cryptodamages: Monetary value estimates of the air pollution and human health impacts of cryptocurrency mining', *Energy Research & Social Science*, 59.
- Gourevitch, A. (2013) 'Labor Republicanism and the Transformation of Work', *Political Theory*, 41(4), pp.591–617.
- Graeber, D. (2018) *Bullshit Jobs: A Theory*. New York: Simon & Schuster.
- Graeber, D., Wengrow, D. (2021) *The Dawn of Everything: A New History of Humanity*. London: Allen Lane.
- Graham-Harrison, E., Lindeman, T. (2022) 'Freedom convoys: legitimate Covid protest or vehicle for darker beliefs?' *The Guardian*, 13 February. Available at: <https://www.theguardian.com/world/2022/feb/13/freedom-convoys-legitimate-covid-protest-or-vehicle-for-darker-beliefs> (Accessed: 18 February 2022).
- de Grey, A., Rae, M. (2007) *Ending Aging: The Rejuvenation Breakthroughs That Could Reverse Human Aging in Our Lifetime*. New York: St. Martin's Griffin Press.
- GreyB (2021) 'Top 30 Self Driving Technology and Car Companies', 25 May. Available at: <https://www.greyb.com/autonomous-vehicle-companies/> (Accessed: 12 August 2021).
- Gries, T., Naudé, W. (2018) 'Artificial Intelligence, Jobs, Inequality and Productivity: Does Aggregate Demand Matter?' *Institute of Labour Economics*, Discussion Paper Series (12005).

- Griffin, E. (2010) *A Short History of the British Industrial Revolution*. 2018 edn. London: Red Globe Press.
- Griffin, E. (2014) *Liberty's Dawn: A People's History of the Industrial Revolution*. New Haven: Yale University Press.
- Groes, S. (2012) 'The Texture of Modernity in J. G. Ballard's *Crash*, *Concrete Island* and *High-Rise*', in Baxter, J., Wymer, R. (eds.) *J. G. Ballard: Visions and Revisions*. London: Palgrave Macmillan.
- van Grunsven, J., van Wynsberghe, A. (2019) 'A Semblance of Aliveness: How the Peculiar Embodiment of Sex Robots Will Matter', *Techné: Research in Philosophy and Technology*, 23(3), pp.290–317.
- Guarnieri, M. (2010) 'The Roots of Automation Before Mechatronics', *IEEE Industrial Electronics Magazine*, 4(2), pp.42–43.
- Gunther, M. (2005) 'Can Factory Monitoring Ever Really Work?' *Business Ethics*, 19(3), p.12.
- Guo, J. (2017) 'This is why the US isn't ready for automation', *World Economic Forum*, 7 April. Available at: <https://www.weforum.org/agenda/2017/04/why-the-us-isnt-ready-for-the-arrival-of-the-robots/> (Accessed: 03 April 2019).
- Gurney, J.K. (2017) 'Imputing Driverhood', in Lin, P., Abney, K., Jenkins, R. (eds.) *Robot Ethics 2.0: From Autonomous Cars to Artificial Intelligence*. Oxford: Oxford University Press.
- Gurumurthy, A., Chami, N., Bharthur, D. (2021) *Platform labour in search of value: A study of workers' organizing practices and business models in the digital economy*. Geneva: ILO.
- Hadadi, R. (2020) "'It's Not Your Fault": On Hanging Out and Healing in Good Will Hunting', *Roger Ebert*, 25 May. Available at: <https://www.rogerebert.com/features/its-not-your-fault-on-hanging-out-and-healing-in-good-will-hunting> (Accessed: 03 November 2020).
- Hall, D., Williams, C. (2014) *Big Hero 6*. [film.] Walt Disney Motion Pictures.
- Hall, E.J. (1993) 'Smiling, Deferring, and Flirting: Doing Gender by Giving "Good Service"', *Work and Occupations*, 20(4), pp.452–471. <https://doi.org/10.1177/0730888493020004003>.
- Hancock, P.A. (2014) 'Automation: how much is too much?' *Ergonomics*, 57(3), pp.449–454.

- Harding, N. (2019) 'Identity and Meaningful/Meaningless Work', in Yeoman, R., Bailey, C., Madden, A., Thompson, M. (eds.) *The Oxford Handbook of Meaningful Work*. Oxford: Oxford University Press.
- Hardy, K., Barbagallo, C. (2021) 'Hustling the Platform: Capitalist Experiments and Resistance in the Digital Sex Industry', *The South Atlantic Quarterly*, 120(3), pp.534–551.
- Harrison, P. (1992) 'Descartes on Animals', *The Philosophical Quarterly*, 42(16), pp.219–227.
- Hartley, G. (2018) *Fed Up: Emotional Labor, Women, and the Way Forward*. New York: HarperOne.
- al-Hassan, A.Y., Hill, D.R. (1986) *Islamic Technology: An Illustrated History*. Cambridge: Cambridge University Press.
- Hatton, E. (2020) *Coerced: Work Under Threat of Punishment*. Berkeley: University of California Press.
- Hatton, E. (2021) *Labor and Punishment: Work in and out of prison*. Berkeley: University of California Press.
- Häyry, M. (2020) 'Employing Lethal Autonomous Weapon Systems: Ethical Issues in the Use of Artificial Intelligence in Military Leadership', *International Journal of Applied Philosophy*, 34(2), pp.173–181.
- Heidegger, M. (1954) 'The Question Concerning Technology', in Lovitt, W. (trans.) *The Question Concerning Technology and Other Essays*. 1977 edn. New York: Harper and Row.
- Hekman, S.J. (1983) 'Weber's Ideal Type: A Contemporary Reassessment', *Polity*, 16(1).
- Hennessey, T. (2014) *Hunger Strike: Margaret Thatcher's Battle with the IRA, 1980-1981*. Dublin: Irish Academic Press.
- Hermann, C. (2015) *Capitalism and the Political Economy of Work Time*. New York: Routledge.
- Hester, H., Srnicek, N. (2023) *After Work: The Politics of Free Time*. New York: Verso Books.
- Hildebrand, J.M. (2019) 'On Self-Driving Cars as a Technological Sublime', *Techné: Research in Philosophy and Technology*, 23(2), pp.153–173.  
<https://doi.org/DOI: 10.5840/techne2019722100>.

- Hildebrand, J.M., Sheller, M. (2018) 'Media Ecologies of Autonomous  
Automobility: Gendered and Racial Dimensions of Future Concept Cars',  
*Transfers: Interdisciplinary Journal of Mobility Studies*, 8(1), pp.64–85.  
<https://doi.org/10.3167/TRANS.2018.080106>.
- Hobsbawm, E. (1962) *The Age of Revolution: Europe 1789-1848*. London:  
Weidenfeld & Nicolson.
- Hobsbawm, E. (1968) *Industry and Empire: The Birth of the Industrial Revolution*.  
1999 edn. New York: The New Press.
- Hobsbawm, E. (1975) *The Age of Capital, 1848-1875*. London: Weidenfeld &  
Nicolson.
- Hochschild, A.R. (1983) *The Managed Heart: Commercialization of Human Feeling*.  
2012 edn. London: University of California Press.
- Hockney, D. (1980) *Mulholland Drive: The Road to the Studio* [Acrylic on canvas].
- Hoffman, M.F. (2007) 'Ora et Labora (Prayer and Work): Spirituality,  
Communication and Organizing in Religious Communities', *Journal of  
Communication and Religion*, 30(2), pp.187–212.
- Hofmeister, H. (2019) 'Work Through a Gender Lens: More Work and More  
Sources of Meaningfulness', in Yeoman, R., Bailey, C., Madden, A.,  
Thompson, M. (eds.) *The Oxford Handbook of Meaningful Work*. Oxford:  
Oxford University Press.
- Holmstrom, N. (1977) 'Exploitation', *Canadian Journal of Philosophy*, 7(2), pp.353–  
369.
- Homer (762) *The Iliad*. 1924 edn. Translated by A.T. Murray. London: William  
Heinemann Ltd.
- van Hoorn, A.(2021) 'Automatability of Work and Preferences for Redistribution',  
*Oxford Bulletin of Economics and Statistics*. [https://doi.org/doi:  
10.1111/obes.12460](https://doi.org/doi:10.1111/obes.12460).
- Hoorn, J.F., Winter, S.D. (2018) 'Here Comes the Bad News: Doctor Robot Taking  
Over', *International Journal of Social Robotics*, 10, pp.519–535.  
<https://doi.org/10.1007/s12369-017-0455-2>.
- Horgan, A. (2021) *Lost in Work: Escaping Capitalism*. London: Pluto Press.

- Howarth, D. (2021) 'Tiny home village by Lehrer Architects provides temporary shelter for LA's homeless', *dezeen*, 9 November. Available at: <https://www.dezeen.com/2021/11/09/whitsett-west-tiny-home-village-los-angeles-lehrer-architects/> (Accessed: 12 December 2021).
- Hughes, C., Southern, A. (2019) 'The world of work and the crisis of capitalism: Marx and the Fourth Industrial Revolution', *Journal of Classical Sociology*, 19(1), pp.59–71.
- Huizinga, J. (1938) *Homo Ludens: A Study of the Play-Element in Culture*. 2016 edn. California: Angelica Press.
- Humanity+. (2021) *Humanity+ Homepage*. Available at: <https://humanityplus.org/about/> (Accessed: 13 April 2021).
- Hunnicut, B. (1990) *Work without End: Abandoning Shorter Hours for the Right to Work*. Philadelphia: Temple University Press.
- Husain, A. (2018) *The Sentient Machine: The Coming Age of Artificial Intelligence*. New York: Scribner.
- Husserl, E. (1913) *Ideas Pertaining to a Pure Phenomenology and to a Phenomenological Philosophy. First Book: General Introduction to a Pure Phenomenology*. 1983 edn. Translated by F. Kersten. The Hague: Martinus Nijhoff Publishers.
- Hutchins, B. L., Harrison, A. (1911) *A History of Factory Legislation*. London: P. S. King & Son.
- Huxley, J. (1957) *New Bottles for New Wine*. London: Chatto & Windus.
- Ihde, D. (2001) *Bodies in Technology*. Minneapolis: University of Minnesota Press.
- Ihde, D. (2021) 'From Heideggerian Industrial Gigantism to Nanoscale Technologies', *Foundations of Science*, 27, pp.245-257.
- Inagaki, T. (2003) 'Automation and the cost of authority', *International Journal of Industrial Ergonomics*, 31(3), pp.169–174.
- Irigaray, L. (1993) *An Ethics of Sexual Difference*. Ithaca: Cornell University Press.
- Ishii-Kuntz, M. (1990) 'Social Interaction and Psychological Well-Being: Comparison across Stages of Adulthood', *The International Journal of Aging and Human Development*, 30(1), pp.15–36.
- Jacobs, J. (1961) *The Death and Life of Great American Cities*. 1993 edn. New York: Vintage Books.

- Jaffe, S. (2021) *Work Won't Love You Back: How Devotion to Our Jobs Keeps Us Exploited, Exhausted, and Alone*. New York: Bold Type Books.
- Jenkins, M., Pasternak, K., West, R. (2016) *Performance at the Limit: Business Lessons from Formula 1 Motor Racing*. Cambridge: Cambridge University Press.
- Jin, H. (2021) 'A life and death question for regulators: Is Tesla's Autopilot safe?' *Reuters*, 21 September. Available at: <https://www.reuters.com/business/autos-transportation/life-death-question-regulators-is-teslas-autopilot-safe-2021-09-21/> (Accessed: 03 January 2022).
- Jones, J.A. (2020a) 'Campaigns around working time have always been about freedom', *Autonomy*, 12 August. Available at: <https://autonomy.work/portfolio/workingtimerepublicanism/> (Accessed: 01 May 2021).
- Jones, J.A. (2020b) 'Sudden Drops and Deceptive Plateaus: Looking at Interwar Working Time Reduction Campaigns', *Autonomy*, 12 October. Available at: <https://autonomy.work/portfolio/interwarwtr/> (Accessed: 01 May 2021).
- Jones, J.A. (2020c) 'What Can 19th Century Labour Activists Teach Us About Transforming Work after Covid?' *Autonomy*, 19 June. Available at: <https://autonomy.work/portfolio/19thcenturyworkingtime/> (Accessed: 01 May 2021).
- Jones, J.A., Winder, J. (2021) 'Work and Play During Covid-19', *Brief Encounters*, 1(5), pp.1–16. <https://doi.org/10.24134/be.v5i1.249>.
- Jones, P. (2021) *Work Without the Worker: Labour in the Age of Platform Capitalism*. New York: Verso Books.
- Jones, R. (2019) 'Concerning the Apperception of Robot-Assisted Childcare', *Philosophy & Technology*, 32, pp.445-456.
- Joseph Rowntree Foundation. (2021) *UK Poverty 2020/21*. York: Joseph Rowntree Foundation. Available at: <https://www.jrf.org.uk/report/uk-poverty-2020-21> (Accessed 14 October 2021).
- Käckenhoff, T., Inverardi, M. (2021) 'A raise or a four-day week; biggest German union seals new deal', *Reuters*, 30 March. Available at: <https://www.reuters.com/article/us-germany-wages-idUSKBN2BM1PY> (Accessed: 12 May 2021).

- Kahn, L. (2017) 'Military Robots and the Likelihood of Armed Combat', in Lin, P., Abney, K., Jenkins, R. (eds.) *Robot Ethics 2.0: From Autonomous Cars to Artificial Intelligence*. Oxford: Oxford University Press.
- Kara, S. (2017) *Modern Slavery: A Global Perspective*. New York: Columbia University Press.
- Kari, P. (2020) 'Twitter announces employees will be allowed to work from home "forever"', *The Guardian*, 12 May. Available at: <https://www.theguardian.com/technology/2020/may/12/twitter-coronavirus-covid19-work-from-home> (Accessed: 07 June 2020).
- Kasparov, G. (2017) 'Don't fear intelligent machines. Work with them'. *TED2017*, Vancouver. Available at: [https://www.ted.com/talks/garry\\_kasparov\\_don\\_t\\_fear\\_intelligent\\_machines\\_work\\_with\\_them](https://www.ted.com/talks/garry_kasparov_don_t_fear_intelligent_machines_work_with_them) (Accessed: 16 December 2021).
- Kassam, A. (2021) 'Spain to launch trial of four-day working week', *The Guardian*, 15 March. Available at: <https://www.theguardian.com/world/2021/mar/15/spain-to-launch-trial-of-four-day-working-week> (Accessed: 03 September 2021).
- Kay, R. (2020) 'Automation and Working Time in the UK', in Skidelsky, R., Craig, N. (eds.) *Work in the Future: The Automation Revolution*. London: Palgrave Macmillan.
- Kenway, E. (2021) *The Truth About Modern Slavery*. New York: Pluto Press.
- Kenworthy, J.R. (2007) 'Urban Planning and Transport Paradigm Shifts for Cities of the Post-Petroleum Age', *Journal of Urban Technology*, 14(2), pp.47–70.
- Kenworthy, J.R. (2017) 'Is Automobile Dependence in Emerging Cities an Irresistible Force? Perspectives from São Paulo, Taipei, Prague, Mumbai, Shanghai, Beijing, and Guangzhou', *Sustainability*, 9(11).
- Keohane, J. (2015) 'In praise of meaningless work', *The New Statesman*, 4 March. Available at: <https://www.newstatesman.com/economics/2015/03/praise-meaningless-work> (Accessed: 07 June 2020).
- Kessler, S. (2019) *Gigged: The Gig Economy, the End of the Job, and the Future of Work*. New York: Random House.
- Keynes, J.M. (1931) 'Economic Possibilities for our Grandchildren', in *Essays in Persuasion*. New York: W. W. Norton & Co.

- Khan, S. Zaman, A.U. (2018) 'Future cities: Conceptualizing the future based on a critical examination of existing notions of cities', *Cities*, 72(B), pp.217–225.
- Kierkegaard, S. (1846) *The Present Age: On the Death of Rebellion*. 2010 edn. London: Harper Perennial Modern Classics.
- Kipfer, S. (2019) 'What colour is your vest? Reflections on the yellow vest movement in France', *Studies in Political Economy*, 100(3), pp.209–231.
- Klarica, A.J. (2001) 'Performance in motor sports', *British Journal of Sports Medicine*, 35(5). <http://dx.doi.org/10.1136/bjism.35.5.290>.
- Klawiter, M. (1990) 'Using Arendt and Heidegger to Consider Feminist Thinking on Women and Reproductive/ Infertility Technologies', *Hypatia*, 5(3).
- Koch, T. (2010) 'Enhancing Who? Enhancing What? Ethics, Bioethics, and Transhumanism', *Journal of Medicine and Philosophy*, 35, pp.685–699.
- Kohn, C., Brodin, M.H. (2008) 'Centralised distribution systems and the environment: how increased transport work can decrease the environmental impact of logistics', *International Journal of Logistics: Research and Applications*, 11(3), pp.229–245.
- Korczynski, M. (2003) 'Communities of Coping: Collective Emotional Labour in Service Work', *Organization*, 10(1), pp.55–79.
- Korinek, A., Stiglitz, J. (2021) 'Covid-19 driven advances in automation and artificial intelligence risk exacerbating economic inequality', *BMJ*. <https://doi.org/10.1136/bmj.n367>.
- Korpela, K., Kinnunen, U. (2010) 'How Is Leisure Time Interacting with Nature Related to the Need for Recovery from Work Demands? Testing Multiple Mediators', *Leisure Sciences: An Interdisciplinary Journal*, 33(1), pp.1–14.
- Kosrow, L., Hinchliffe, L. (2014) "'Happiness Is... Library Automation": The Rhetoric of Early Library Automation and the Future of Discovery and Academic Libraries', *Proceedings of the Charleston Library Conference*.
- Kost, D. (2020) 'You're Right! You Are Working Longer and Attending More Meetings', *Harvard Business School Working Knowledge*. Available at: <https://hbswk.hbs.edu/item/you-re-right-you-are-working-longer-and-attending-more-meetings> (Accessed: 03 February 2022).
- Kotis, K. (2021) 'Artificial General Intelligence and Creative Economy', *Academia Letters*, (260).

- Kouppanou, A. (2015) 'Bernard Stiegler's Philosophy of Technology: Invention, decision, and education in times of digitization', *Educational Philosophy and Theory*, 47(10), pp.1110–1123.
- Kranak, J. (2020) 'Will Autonomous Vehicles Eliminate a Right to Drive?' *International Journal of Applied Philosophy*, 34(1), pp.43–55.
- Krauthammer, C. (1997) 'Be Afraid', *Washington Examiner*, 26 May. Available at: <https://www.washingtonexaminer.com/weekly-standard/be-afraid-9802> (Accessed: 14 February 2022).
- Kremer, M., Went, R. (2018) 'Mastering the digital transformation: An inclusive robotisation agenda', in Neufeind, M., O'Reilly, J., Ranft, F. (eds.) *Work in the Digital Age: Challenges of the Fourth Industrial Revolution*. London: Rowman & Littlefield.
- Krüger, J., Lien, T.K., Verl, A. (2009) 'Cooperation of human and machines in assembly lines', *CIRP Annals*, 58(2), pp.628–646.
- Kurzweil, R. (2005) *The Singularity is Near*. New York: Viking.
- Laderman, D. (2002) *Driving Visions: Exploring the Road Movie*. Austin: University of Texas Press.
- Laitinen, A., Niemelä, M., Pirhonen, J. (2019) 'Demands of Dignity in Robotic Care: Recognizing Vulnerability, Agency, and Subjectivity in Robot-based, Robot-assisted, and Teleoperated Elderly Care', *Techné: Research in Philosophy and Technology*, 23(3), pp.366–401.  
<https://doi.org/10.5840/techne20191127108>.
- Lancaster, K. (2019) 'The Robotic Touch: Why There is No Good Reason to Prefer Human Nurses to Carebots', *Philosophy in the Contemporary World*, 25(2).
- Landels, J.G. (2000) *Engineering in the Ancient World*. Berkeley: University of California Press.
- Langhamer, C. (2000) *Women's Leisure in England, 1920-1960*. Manchester: University of Manchester Press.
- Larsson, A., Teigland, R. (2020) *The digital transformation of labor: Automation, the gig economy and welfare*. London: Routledge.
- Laurie, H. (2010) *John Henry* [CD]. Los Angeles: Warner Records.
- Lawlor, R. (2021) 'The Ethics of Automated Vehicles: Why Self-driving Cars Should not Swerve in Dilemma Cases', *Res Publica*, 27(4).

- Lee, N. (2018) 'Total Automation: The Possibility of Lights-Out Manufacturing in the Near Future', *Missouri S&T's Peer to Peer*, 2(1).
- Lewis, S. (2019) *Full Surrogacy Now: Feminism Against Family*. London: Verso Books.
- Li, J., Zhao, X., Ju, W., Malle, B. (2016) 'From Trolley to Autonomous Vehicle: Perceptions of Responsibility and Moral Norms in Traffic Accidents with Self-Driving Cars', *Proceedings of Society of Automotive Engineers World Congress 2016*.
- van der Linden, H. (2016) 'Arguments against Drone Warfare with a Focus on the Immorality of Remote Control Killing and "Deadly Surveillance"', *Radical Philosophy Review*, 19(2), pp.331–358.
- Lindman, M. (2015) *Work and Non-Work: On Work and Meaning*. Turku: Åbo Akademi University Press.
- Lipman, J. (2021) 'The Pandemic Revealed How Much We Hate Our Jobs. Now We Have a Chance to Reinvent Work', *Time*, 27 May. Available at: <https://time.com/6051955/work-after-covid-19/> (Accessed: 31 January 2022).
- Lips-Wiersma, M. (2019) 'Does Corporate Social Responsibility Enhance Meaningful Work?: A Multi-perspective Theoretical Framework', in Yeoman, R., Bailey, C., Madden, A., Thompson, M. (eds.) *The Oxford Handbook of Meaningful Work*. Oxford: Oxford University Press.
- Livingstone, D. (2015) *Transhumanism: The History of a Dangerous Idea*. Not identified: Sabilillah Publications.
- Lohmann, H., Marx, I. (eds.) (2018) *Handbook on In-Work Poverty*. Cheltenham: Edward Elgar Publishing.
- López-Cajún, C., Ceccarelli, M. (2016) *Explorations in the History of Machines and Mechanisms: Proceedings of the Fifth IFToMM Symposium on the History of Machines and Mechanisms*. Berlin: Springer.
- Lowery, W. (2017) *They Can't Kill Us All: The Story of Black Lives Matter*. London: Penguin.
- Lowrey, A. (2018) *Give People Money: How a Universal Basic Income Would End Poverty, Revolutionize Work, and Remake the World*. London: Penguin Books.
- Lu, Y. (ed.) (2015) *A History of Chinese Science and Technology*. Berlin: Springer.

- Luo, J., Han, H., Jia, F., Dong, H. (2020) 'Agricultural Co-operatives in the western world: A bibliometric analysis', *Journal of Cleaner Production*, 273.
- Luxton, M. (1997) 'The UN, women, and household labour: Measuring and valuing unpaid work', *Women's Studies International Forum*, 20(3), pp.431–439.
- Lyn, E. (2011) *Fifteen Million Merits*. Channel 4 Television.
- MacIntyre, A. (1981) *After Virtue*. 2013 edn. London: Bloomsbury Publishing.
- McAfee, A., Brynjolfsson, E. (2011) *Race Against the Machine: How the Digital Revolution is Accelerating Innovation, Driving Productivity, and Irreversibly Transforming Employment and the Economy*. New York: Digital Frontier Press.
- McBride, S. (2021) 'Why 2021 Will Be The Year Self-Driving Cars Go Mainstream', *Forbes*, 1 June. Available at: <https://www.forbes.com/sites/stephenmcbride1/2021/01/06/why-2021-will-be-the-year-self-driving-cars-go-mainstream/?sh=4f565694e247> (Accessed: 20 January 2022).
- McClanahan, A., Settell, J-D. (2021) 'Service Work, Sex Work, and the "Prostitute Imaginary"', *The South Atlantic Quarterly*, 120(3), pp.493–514.
- McGaughey, E. (2021) 'Will Robots Automate Your Job Away? Full Employment, Basic Income, and Economic Democracy', *Industrial Law Journal*. <https://doi.org/10.1093/indlaw/dwab010>.
- McIntyre, L. (2018) *Post-Truth*. Cambridge: MIT Press.
- Majumder, S., Aghayi, E., Noferesti, M., Memarzadeh-Tehran, H., Mondal, T., Pang, Z., Jamal Deen, M. (2017) 'Smart Homes for Elderly Healthcare—Recent Advances and Research Challenges', *Sensors*, 17(2496), pp.1–32.
- Marcuse, H. (1964) *One-Dimensional Man: Studies in the Ideology of Advanced Industrial Society*. New York: Routledge Classics.
- Martin, J. (2021) *Homeworking hours, rewards and opportunities in the UK: 2011 to 2020*. ONS [Office for National Statistics]. Available at: <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/homeworkinghoursrewardsandopportunitiesinthek2011to2020/2021-04-19> (Accessed: 03 February 2022).
- Marx, K. (1845) *The German Ideology*. 1976 edn. Surrey: Staples Printing Group.
- Marx, K. (1846) *The German Ideology*. 1998 edn. New York: Prometheus Books.
- Marx, K. (1847) *Wage-Labour and Capital*. 1975 edn. London: Intl Pub Co Inc.

- Marx, K. (1858) 'The Fragment on Machines', in *Grundrisse*. 1993 edn. London: Penguin Books.
- Marx, K. (1867) *Capital: Volume 1*. 2004 edn. London: Penguin.
- Mason, P. (2016) *Postcapitalism: A Guide to Our Future*. London: Penguin Books.
- Mason, P. (2020) *Clear Bright Future: A Radical Defence of the Human Being*. London: Penguin Books.
- Mason, P. (2021) 'Why Marx Is More Relevant Than Ever in the Age of Automation', in Anderson, K.B., Durkin, K., Brown, H.A. (eds.) *Raya Dunayevskaya's Intersectional Marxism*. London: Palgrave Macmillan (Marx, Engels, and Marxisms).
- Mauss, M. (1925) *The Gift: The Form and Reason for Exchange in Archaic Societies*. 2011 edn. London: Routledge.
- Mayr, O. (1986) *Authority, Liberty, & Automatic Machinery in Early Modern Europe*. Baltimore: Johns Hopkins University Press.
- Meacham, D., Studley, M. (2017) 'Could a Robot Care? It's All in the Movement', in Lin, P., Abney, K., Jenkins, R. (eds.) *Robot Ethics 2.0: From Autonomous Cars to Artificial Intelligence*. Oxford: Oxford University Press.
- van Meel, J., Vos, P. (2001) 'Funky offices: Reflections on office design in the "new economy"', *Journal of Corporate Real Estate*, 3(4), pp.322–334.
- Mei, T. (2009) *Heidegger, Work, and Being*. London: Continuum Books.
- Mei, T. (2019) 'Work and the Meaning of Being', in Yeoman, R., Bailey, C., Madden, A., Thompson, M. (eds.) *The Oxford Handbook of Meaningful Work*. Oxford: Oxford University Press.
- Mercurio, Z.A. (2020) 'The Lived Experience of Meaningful and Meaningless Work in a Stigmatized Occupation', *Academy of Management Proceedings*, 2020(1).
- Metz, C. (2021a) 'Tesla Sells "Full Self-Driving," but What Is It Really?' *New York Times*, 20 August. Available at: <https://www.nytimes.com/2021/08/20/technology/tesla-full-self-driving-fsd.html?searchResultPosition=2> (Accessed: 31 August 2021).
- Metz, C. (2021b) 'The Costly Pursuit of Self-Driving Cars Continues On. And On. And On.', *New York Times*, 24 May. Available at: <https://www.nytimes.com/2021/05/24/technology/self-driving-cars-wait.html> (Accessed: 20 January 2022).

- Metz, C., Boudette, N.E. (2021) 'Inside Tesla as Elon Musk Pushed an Unflinching Vision for Self-Driving Cars', *New York Times*, 6 December. Available at: <https://www.nytimes.com/2021/12/06/technology/tesla-autopilot-elon-musk.html> (Accessed: 04 February 2022).
- Miller, E. (2015) 'Anticapitalism or Postcapitalism? Both!' *Rethinking Marxism*, 27(3), pp.364–367.
- Miller, J. (2017) 'Ethics Settings for Autonomous Vehicles', in Lin, P., Abney, K., Jenkins, R. (eds.) *Robot Ethics 2.0: From Autonomous Cars to Artificial Intelligence*. Oxford: Oxford University Press.
- Mills, S. (2007) *Turning Away from Technology: A New Vision for the 21st Century*. Gabriola Island: New Catalyst Books.
- Mladenovic, M., McPherson, T. (2016) 'Engineering Social Justice into Traffic Control for Self-Driving Vehicles?' *Science and Engineering Ethics*, 22(4), pp.1131–1149.
- Monahan, M. (2002) 'The Ethics of Socially Responsible Investing', *Business & Professional Ethics Journal*, 24(3), pp.27–46.
- Monroe, J. (2005) 'Women in Street Prostitution: The Result of Poverty and the Brunt of Inequity', *Journal of Poverty*, 9(3), pp.69–88.
- Montinari, M. (1997) *'The Will to Power' Does Not Exist*. Translated by P. Farazzi. Paris: Éditions de l'Éclat.
- Moody, K. (2017) *On New Terrain: How Capital is Reshaping the Battleground of Class War*. Chicago: Haymarket Books.
- More, C. (2000) *Understanding the Industrial Revolution*. London: Routledge.
- More, M. (2013) 'The Philosophy of Transhumanism', in *The Transhumanist Reader: Classical and Contemporary Essays on the Science, Technology, and Philosophy of the Human Future*. London: Wiley-Blackwell, pp.3–17.
- More, M., Vita-More, N. (eds.) (2013) *The Transhumanist Reader: Classical and Contemporary Essays on the Science, Technology, and Philosophy of the Human Future*. London: John Wiley & Sons, Inc.
- Morgan, G., Pariece, N. (2017) *The Creativity Hoax: Precarious Work in the Gig Economy*. London: Anthem Press.
- Mueller, G. (2021) *Breaking Things at Work: The Luddites Are Right About Why You Hate Your Job*. New York: Verso Books.

- Mulas-Granados, C., Varghese, R., Boranova, V., de Chalendar, A., Wallenstein, J. (2019) 'Automation, Skills and the Future of Work: What do Workers Think?' *IMF Working Papers*.
- Mulcahy, D. (2018) *Gig Economy*. London: AMACOM.
- Mullin, A. (2005) *Reconceiving Pregnancy and Childcare: Ethics, Experience, and Reproductive Labor*. Cambridge: Cambridge University Press.
- Mulvenna, M., Bond, R., Delaney, J., Mustansir Dawoodbhoy, F., Boger, J., Potts, C., Turkington, R. (2021) 'Ethical Issues in Democratizing Digital Phenotypes and Machine Learning in the Next Generation of Digital Health Technologies', *Philosophy & Technology*, 34(1).  
DOI:10.1007/s13347-021-00445-8
- Mumford, L. (1964) 'Authoritarian and Democratic Technics', *Technology and Culture*, 5(1).
- Murtagh, N., Gatersleben, B., Cowen, L., Uzzell, D. (2015) 'Does perception of automation undermine pro-environmental behaviour? Findings from three everyday settings', *Journal of Environmental Psychology*, 42, pp.139–148.
- Naydler, J. (2018) *Shadow of the Machine: The Prehistory of the Computer and the Evolution of Consciousness*. Forest Row: Temple Lodge.
- Nayeri, K. (2018) 'Capitalism, Automation, and Socialism: Karl Marx on the Labor Process', *Our Place in the World: A Journal of Ecosocialism*, (2942).
- Naylor, C., Das, P., Ross, S., Honeyman, M., Thompson, J., Gilbert, H. (2016) *Bringing together physical and mental health: A new frontier for integrated care*. London: The King's Fund.
- Nees, M.A. (2019) 'Safer than the average human driver (who is less safe than me)? Examining a popular safety benchmark for self-driving cars', *Journal of Safety Research*, 69, pp.61–68.
- Neilsen, B., Rossiter, N. (2019) 'Theses on Automation and Labour', in Bigo, D., Isin, E., Ruppert, E. (eds.) *Data Politics: Worlds, Subjects, Rights*. London: Routledge.
- Nielsen, T.A.S., Haustein, S. (2018) 'On sceptics and enthusiasts: What are the expectations towards self-driving cars?' *Transport Policy*, 66, pp.49–55.

- Nieswandt, K. (2021) 'Automation, basic income, and merit', in Breen, K., Deranty, J.-P. (eds.) *The Politics and Ethics of Contemporary Work*. London: Routledge.
- Nietzsche, F. (1881) *Daybreak: Thoughts on the Prejudices of Morality*. 1997 edn. Edited by M. Clark and B. Leiter. Cambridge: Cambridge University Press (Cambridge Texts in the History of Philosophy).
- Niklas, F., Cohrssen, C., Tayler, C. (2016) 'The Sooner, the Better: Early Reading to Children', *SAGE Open*, 6(4).
- Noble, D. (1984) *Forces of Production: A Social History of Industrial Automation*. Piscataway: Transaction Publishers.
- Noble, S.U. (2018) *Algorithms of Oppression: How Search Engines Reinforce Racism*. New York: NYU Press.
- Nof, S.Y. (2009) *Automation: What It Means to Us Around the World*, pp.13–52. DOI: 10.1007/978-3-540-78831-7\_3.
- Norton, A. (2017) 'Automation and inequality: The changing world of work in the global South', *International Institute for Environment and Development*, pp. 4–30.
- Nunes, T., Bryant, P. (eds.) (2004) *Handbook of Children's Literacy*. Berlin: Springer.
- Nyholm, S. (2018) 'The ethics of crashes with self-driving cars: A roadmap, II', *Philosophy Compass*, 13.
- Nyholm, S., Frank, L.E. (2019) 'It Loves Me, It Loves Me Not: Is It Morally Problematic to Design Sex Robots that Appear to Love Their Owners', *Techné: Research in Philosophy and Technology*, 23(3), pp.402–424.
- Nyholm, S., Smids, J. (2016) 'The Ethics of Accident-Algorithms for Self-Driving Cars: an Applied Trolley Problem?' *Ethical Theory and Moral Practice*, 19, pp.1275–1289.
- Oakley, A. (1976) *Woman's Work: The Housewife, Past and Present*. New York: Random House.
- O'Brien, J. (1885) *The Rise, Progress, and Phases of Human Slavery*. London: W. Reeves.
- O'Brien, W. (1996) 'Meaning and Mattering', *The Southern Journal of Philosophy*, 34(3), pp.339–360.

- de Oca, J.M., Mason, S., Ahn, S. (2020) 'Consuming for the Greater Good: "Woke" Commercials in Sports Media', *Communication & Sport*, pp.1–23.
- Oh, S-Y., Park, Y., Bowles, S. (2012) 'Veblen effects, political representation, and the reduction in working time over the 20th century', *Journal of Economic Behaviour & Organisation*, 83, pp.218–242.
- O'Neil, C. (2017) *Weapons of Math Destruction*. London: Penguin.
- Onetto, M. (2014) 'When Toyota met e-commerce: Lean at Amazon', *McKinsey Quarterly*. Available at: <https://www.mckinsey.com/business-functions/operations/our-insights/when-toyota-met-e-commerce-lean-at-amazon> (Accessed: 04 September 2021).
- ONS [Office for National Statistics] (2021) *Earnings and working hours*. Available at: <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours> (Accessed: 03 April 2021).
- Oseland, N. (2009) 'The impact of psychological needs on office design', *Journal of Corporate Real Estate*, 11(4), pp.244–254.
- Overs, C. (2014) *Sex Workers, Empowerment and Poverty Alleviation in Ethiopia*. Brighton: Institute of Development Studies.
- Owen, R. (1813) *A New View of Society and Other Writings*. 1991 edn. Edited by G. Claeys. London: Penguin Classics.
- Owsianik, J. (2021) 'State of the Sexbot Market: The World's Best Sex Robot and AI Sex Doll Companies', *Future Of Sex*. Available at: <https://futureofsex.net/robots/state-of-the-sexbot-market-the-worlds-best-sex-robot-and-ai-love-doll-companies/> (Accessed: 08 August 2021).
- Pandey, A., Manocha, S., Saini, P. (2020) 'A Study On An Automobile Revolution And Future Of Electric Cars In India', *International Journal of Management*, 11(3), pp.107–113.
- Parasuraman, R. (1997) 'Humans and Automation: Use, Misuse, Disuse, Abuse', *Human Factors*, 39(2), pp.230–253.
- Parasuraman, R. (2000) 'Designing automation for human use: empirical studies and quantitative models', *Ergonomics*, 43(7), pp.931–951.
- Paredes, D., Fleming-Muñoz, D. (2021) 'Automation and robotics in mining: Jobs, income and inequality implications', *The Extractive Industries and Society*, 8(1), pp.189–193.

- Parks, J.A. (2010) 'Lifting the Burden of Women's Care Work: Should Robots Replace the "Human Touch"?' *Hypatia*, 25(1), pp.100–121.
- Partington, R. (2020) 'More than half of UK's furloughed jobs at risk of automation – report', *The Guardian*, 15 December. Available at: <https://www.theguardian.com/business/2020/dec/15/more-than-half-of-uk-furloughed-jobs-at-risk-of-automation-report> (Accessed: 03 January 2022).
- Passerin d'Entreves, M. (1993) *The Political Philosophy of Hannah Arendt*. London: Routledge.
- Paton, H.J. (1947) *The Categorical Imperative: A Study in Kant's Moral Philosophy*. Philadelphia: University of Pennsylvania Press.
- Patrick, R. (2012) 'Work as the primary "duty" of the responsible citizen: a critique of this work-centric approach', *People, Place & Policy Online*, 6(1), pp.5–15.
- Paul, D.B. (2014) 'What Was Wrong with Eugenics? Conflicting Narratives and Disputed Interpretations', *Science and Education*, 23, pp.259–271.
- Pavlish, C.L., Hunt, R.J., Sato, H-W., Brown-Saltzman, K. (2019) 'Finding Meaning in the Work of Caring', in Yeoman, R., Bailey, C., Madden, A., Thompson, M. (eds.) *The Oxford Handbook of Meaningful Work*. Oxford: Oxford University Press.
- Pearce, D. (1995) *The Hedonistic Imperative*. Available at: <https://www.hedweb.com/hedethic/tabconhi.htm> (Accessed: 13 April 2021).
- Perlow, L.A. (1997) *Finding Time*. Ithaca: Cornell University Press.
- Peters, M.A. (2017) 'Technological unemployment: Educating for the fourth industrial revolution', *Educational Philosophy and Theory*, 49(1).
- Petropoulos, G. (2018) 'The impact of artificial intelligence on employment', in Neufeind, M., O'Reilly, J., Ranft, F. (eds.) *Work in the Digital Age: Challenges of the Fourth Industrial Revolution*. London: Rowman & Littlefield.
- Pieper, J. (2009) *Leisure: The Basis of Culture*. San Francisco: Ignatius Press.
- Piketty, T. (2014) *Capital in the Twenty-First Century*. Translated by A. Goldhammer. Cambridge: Harvard University Press.

- Pilsch, A. (2017) *Transhumanism: Evolutionary Futurism and the Human Technologies of Utopia*. Minneapolis: University of Minnesota Press.
- Pitts, F.H. (2017) 'Beyond the Fragment: postoperaismo, postcapitalism, and Marx's "Notes on machines", 45 years on', *Economy and Society*, 43(3–4), pp.324–345.
- Pompa, L. (1967) 'Family Resemblance', *The Philosophical Quarterly*, 17(66), pp.63–69.
- Pope, L. (2013) *Papers, Please*. [video game.] 3909.
- Popescu, G.H., Petrescu, I.E., Sabie, O.M., Muşat, M. (2018) 'Labour-Displacing Technological Change and Worldwide Economic Insecurity: How Automation and the Creation of Innovative Tasks Shape Inequality', *Psychosociological Issues in Human Resource Management*, 6(2), pp. 80–85.
- Postman, N. (1987) *Amusing Ourselves to Death*. York: Methuen & Co.
- Prassl, J. (2018) *Humans as a Service: The Promise and Perils of Work in the Gig Economy*. Oxford: Oxford University Press.
- Price, B. (2021) 'Covid has "accelerated" industrial automation in Wales', *BBC News*, 11 August. Available at: <https://www.bbc.co.uk/news/uk-wales-58166015> (Accessed: 31 August 2021).
- Quigley, A. (2020) *Closing the Reading Gap*. London: Routledge.
- Ralston, J., Reid, D., Hargrave, C., Hainsworth, D. (2014) 'Sensing for advancing mining automation capability: A review of underground automation technology development', *International Journal of Mining Science and Technology*, 24, pp.305–310.
- Ramaswamy, K.V. (2017) 'Technological Change, Automation and Employment: A Short Review of Theory and Evidence', *Indian Society of Labour Economics*. DOI:10.13140/RG.2.2.21433.06241
- Ramaswamy, V. (2021) *Woke, Inc.: Inside Corporate America's Social Justice Scam*. New York: Center Street.
- Ramsay, H. (2005) *Reclaiming Leisure: Art, Sport and Philosophy*. London: Palgrave Macmillan.
- Ratcliffe, M. (2010) 'The Phenomenology of Mood and the Meaning of Life', in *The Oxford Handbook of Philosophy of Emotion*. Oxford: Oxford University Press.

- Ravina-Ripoll, R., Marchena Domínguez, J., Montañés Del Rio, M.Á. (2019) 'Happiness Management in the age of Industry 4.0/Happiness Management en la época de la Industria 4.0.', *Retos: Revista de Ciencias Administrativas y Económicas*, 9(18).
- Read On. Get On. (2014) *How reading can help children escape poverty*. London: Save the Children, pp.1–64. Available at: [https://cdn.literacytrust.org.uk/media/documents/Read\\_On\\_Get\\_On\\_launch\\_report\\_2014.pdf](https://cdn.literacytrust.org.uk/media/documents/Read_On_Get_On_launch_report_2014.pdf) (Accessed: 12 June 2021).
- Redick, K. (2009) 'Feet Forbidden Here', *Environment, Space, Place*, 1(2), pp.7–26.
- Redshaw, S. (2018) 'Combustion, Hydraulic, and Other Forms of Masculinity', *Transfers: Interdisciplinary Journal of Mobility Studies*, 8(1), pp.86–103. <https://doi.org/10.3167/TRANS.2018.080107>.
- Reeves, J. (2016) 'Automatic for the people: the automation of communicative labor', *Communication and Critical/Cultural Studies*, 13(2), pp.150–165.
- Richardson, A., Potter, J., Paterson, M., Harding, T., Tyler-Merrick, G., Kirk, R., Reid, K., McChesney, J. (2017) 'Office design and health: a systematic review', *NZMJ*, 130(1467).
- Richardson, K. (2015) 'The Asymmetrical "Relationship": Parallels Between Prostitution and the Development of Sex Robots', *SIGCAS Computers & Society*, 45(3), pp.290–293.
- Richardson, R.E., Gordey, L., Hall, R. (2020) 'Amazon's Fast Delivery: The Human Cost', *Journal of Business Ethics*, 17, pp.251–254. <https://doi.org/10.5840/jbee20201716>.
- Richardson, W. (2012) *Why School?: How Education Must Change When Learning and Information Are Everywhere*. New York: TED Conferences.
- Rifkin, J. (1995) *The End of Work*. New York: G. P. Putnam's & Sons.
- Riggs, W., Boswell, M.R., Yudowitz, L., Kawashima, M. (2019) 'Climate change and automation: Do we have an emissions problem?' in Riggs, W. (ed.) *Disruptive Transport: Driverless Cars, Transport Innovation and the Sustainable City of Tomorrow*. London: Routledge.
- Riskin, J. (2010) 'Machines in the Garden', *Republic of Letters: A Journal for the Study of Knowledge, Politics, and the Arts*, 1(2).
- Robaszkiewicz, M., Weinman, M. (2022) *Hannah Arendt and Politics*. Edinburgh: Edinburgh University Press.

- Robertson, A.F. (2001) *Greed: Gut Feelings, Growth, and History*. London: Polity Press.
- Robinson, H. (1935) *Multi-Movement Tabby Silencer* [Illustration]. Available at: <https://www.bbc.co.uk/news/magazine-27813927> (Accessed: 14 January 2022).
- Roemer, J. (1982) *A General Theory of Exploitation and Class*. Cambridge: Harvard University Press.
- Roessler, B. (2012) 'Meaningful Work: Arguments from Autonomy', *The Journal of Political Philosophy*, 20(1), pp.71–93.
- Rojek, C. (2009) *The Labour of Leisure: The Culture Of Free Time*. London: SAGE Publications.
- Rose Hill, S. (2020) 'Where loneliness can lead', *Aeon*. Available at: <https://aeon.co/essays/for-hannah-arendt-totalitarianism-is-rooted-in-loneliness> (Accessed: 05 December 2021).
- Rosen, W. (2012) *The Most Powerful Idea in the World: A Story of Steam, Industry, and Invention*. Chicago: University of Chicago Press.
- Rosenberger, R. (2021) 'Localizations of Dystopia', *Foundations of Science*. DOI:10.1007/s10699-020-09756-z
- Rosenberger, R., Verbeek, P.P. (eds.) (2015) 'A field guide to postphenomenology', in *Postphenomenological Investigations: Essays on Human-Technology Relations*. London: Lexington Books, pp.9–41.
- Rosheim, M.E. (1994) *Robot evolution: the development of anthropotics*. New York: John Wiley & Sons, Inc.
- Ross, A. (2021) 'A Road Trip with David Hockney and Richard Wagner', *The New Yorker*, 18 January. Available at: <https://www.newyorker.com/magazine/2021/01/18/a-road-trip-with-david-hockney-and-richard-wagner> (Accessed: 12 March 2021).
- Ross, B. (2020) *The Philosophy of Transhumanism: A Critical Analysis*. Bingley: Emerald Publishing Limited.
- Roy, E.A. (2020) "'Jacinda Ardern flags four-day working week as way to rebuild New Zealand after Covid-19'", *The Guardian*, 20 May. Available at: <https://www.theguardian.com/world/2020/may/20/jacinda-ardern-flags-four-day-working-week-as-way-to-rebuild-new-zealand-after-covid-19> (Accessed: 07 June 2020).

- Russell, B. (2008) 'Call centres: A decade of research', *International Journal of Management Reviews*, 10(3), pp.195–219.
- Russell, R.C.G. (2003) 'Limitations of work hours: The UK experience', *Surgery*, 134(1), pp.19–22.
- Russell, S. (2019) *Human Compatible: AI and the Problem of Control*. London: Allen Lane.
- Russell, S., Norvig, P. (2021) *Artificial Intelligence: A Modern Approach*. 4th edn. London: Pearson Education.
- Ryall, E., Russell, W., MacLean, M. (eds.) (2013) *The Philosophy of Play*. London: Routledge.
- Ryan, B.D., Campo, D. (2013) 'Autopia's End: The Decline and Fall of Detroit's Automotive Manufacturing Landscape', *Journal of Planning History*, 12(2), pp.95–132.
- Sadler, P. (2010) *Sustainable Growth in a Post-Scarcity World: Consumption, Demand, and the Poverty Penalty*. London: Routledge.
- Sainato, M. (2021) 'US workers continue unionization fight – but will Amazon prevail?' *The Guardian*, 9 May. Available at: <https://www.theguardian.com/us-news/2021/may/09/us-workers-amazon-unions> (Accessed: 23 June 2021).
- Sale, K. (1995) *Rebels Against The Future: The Luddites And Their War On The Industrial Revolution*. Cambridge: Perseus Publishing.
- Sanders, T. (2001) 'Female street sex workers, sexual violence, and protection strategies', *The Journal of Sexual Aggression*, 7(1), pp.5–18.
- Savage, M. (2020) 'Has the meaning of work changed forever?' *BBC News*, 12 November. Available at: <https://www.bbc.com/worklife/article/20201112-has-the-meaning-of-work-changed-forever> (Accessed: 31 January 2022).
- Sayers, S. (1998) *Marxism and Human Nature*. London: Routledge.
- Scanlan, S.J., Stoll, L.C., Lumm, K. (2008) 'Starving for change: The hunger strike and nonviolent action, 1906–2004', *Research in Social Movements, Conflicts and Change*, 28, pp.275–323.

- Schmidt, K.L., Lingler, J.H., Schulz, R. (2009) 'Verbal communication among Alzheimer's disease patients, their caregivers, and primary care physicians during primary care office visits', *Patient Education and Counseling*, 77(2), pp.197–201.
- Schmitt, R. (1959) 'Husserl's Transcendental-Phenomenological Reduction', *Philosophy and Phenomenological Research*, 20(2), pp.238–245.
- Schopenhauer, A. (1851) *The Wisdom of Life*. 2004 edn. New York: Dover Publications.
- Schor, J. (1993) *The Overworked American: The Unexpected Decline Of Leisure*. New York: Basic Books.
- Schwab, K. (2017) *The Fourth Industrial Revolution*. New York: Portfolio Penguin.
- Schwarz, E. (2018) *Death Machines: The Ethics of Violent Technologies*. Manchester: Manchester University Press.
- Scott, D., Flynn, N. (2014) *Prisons & Punishment: The Essentials*. London: SAGE Publications.
- Screpanti, E. (2019) *Labour and Value: Rethinking Marx's Theory of Exploitation*. Cambridge: Open Book Publishers.
- Scripter, L. (2018) 'Ordinary Meaningful Lives', *International Philosophical Quarterly*, 58(1), pp.79–91.
- Searle, J.R. (1969) *Speech Acts: An Essay in the Philosophy of Language*. Cambridge: Cambridge University Press.
- Semel, B. (2021) 'Listening Like a Computer: Attentional Tensions and Mechanized Care in Psychiatric Digital Phenotyping', *Science, Technology, & Human Values*, pp.1–25.
- Semuels, A. (2020) 'Millions of Americans Have Lost Jobs in the Pandemic—And Robots and AI Are Replacing Them Faster Than Ever', *Time*, 17 August. Available at: <https://time.com/5876604/machines-jobs-coronavirus/> (Accessed: 12 May 2021).
- Shannon, K., Kerr, T., Strathdee, S.A., Shoveller, J., Montaner, J.S., Tyndall, M.W. (2009) 'Prevalence and structural correlates of gender based violence among a prospective cohort of female sex workers', *BMJ*, 339.
- Sharlin, A.N. (1974) 'Max Weber and the Origins of the Idea of Value-Free Social Science', *European Journal of Sociology*, 15(2), pp.337–353.

- Sharma, P., Ueno, A., Kingshott, R. (2021) 'Self-service technology in supermarkets – Do frontline staff still matter?' *Journal of Retailing and Consumer Services*, 59.
- Sharma, R., Singh, D., Gaur, P., Joshi, R. (2021) 'Intelligent automated drug administration and therapy: future of healthcare', *Drug Delivery and Translational Research*, 11, pp.1878–1902.
- Shepherd, J. (2016) 'Star Wars: Why C3PO has a red arm in The Force Awakens', *The Independent*, 14 April. Available at: <https://www.independent.co.uk/arts-entertainment/films/news/star-wars-why-c3po-has-a-red-arm-in-the-force-awakens-a6984071.html> (Accessed: 01 April 2020).
- Shieler, D.K. (2005) *The Working Poor: Invisible in America*. New York: Vintage Books.
- Sicart, M. (2014) *Play Matters*. Cambridge: MIT Press.
- Silverstone, B. (1983) 'Society Economy - A System of Exploitation', *Unity*, 6(15), pp.7–20.
- Simon, M.A. (1969) 'When is a Resemblance a Family Resemblance?' *Mind*, 78(311), pp.408–416.
- Skidelsky, R. (2019) 'How to achieve shorter working hours'. Progressive Economy Forum. Available at: [https://progressiveeconomyforum.com/wp-content/uploads/2019/08/PEF\\_Skidelsky\\_How\\_to\\_achieve\\_shorter\\_working\\_hours.pdf](https://progressiveeconomyforum.com/wp-content/uploads/2019/08/PEF_Skidelsky_How_to_achieve_shorter_working_hours.pdf) (Accessed 10 September 2019).
- Skidelsky, R. (2020) 'The Future of Work', in *Work in the Future: The Automation Revolution*. London: Palgrave Macmillan.
- Skidelsky, R. (2021) 'Automation can be our friend, but we must not let it turn into a foe', *The Guardian*, 25 September. Available at: <https://www.theguardian.com/business/2021/sep/25/automation-can-be-our-friend-but-we-must-not-let-it-turn-into-a-foe> (Accessed: 01 November 2021).
- Slavin, S. (2003) 'Walking as Spiritual Practice: The Pilgrimage to Santiago de Compostela', *Body & Society*, 9(3), pp.1–18.
- Sleaford Mods (2020) *Jobseeker*. [CD] London: Rough Trade.

- Smith, D. (2015) 'The Internet as Idea: For a Transcendental Philosophy of Technology', *Techné: Research in Philosophy and Technology*, 19(3), pp. 381–410.
- Smith, D. (2018) *Exceptional Technologies: A Continental Philosophy of Technology*. London: Bloomsbury Academic.
- Smith, D. (2020) 'Making Automation Explicable: A Challenge for Philosophy of Technology', *New Formations*, (98), pp. 68–85.
- Smith, D. (2021) 'Taking Exception: Philosophy of Technology as a Multidimensional Problem Space', *Foundations of Science*.  
<https://doi.org/10.1007/s10699-020-09735-4>.
- Smith, J.E. (2020) *Smart Machines and Service Work*. London: Reaktion Books.
- Smith, P. (1992) *The Emotional Labour of Nursing: Its Impact on Interpersonal Relations, Management and Educational Environment*. London: Palgrave Macmillan.
- Smith, P. (2011) *The Emotional Labour of Nursing Revisited: Can Nurses Still Care?* London: Bloomsbury Publishing.
- Smith, T., Sonnenfeld, D.A., Pellow, D.N. (eds.) (2006) *Challenging the Chip: Labor Rights and Environmental Justice in the Global Electronics Industry*. Philadelphia: Temple University Press.
- Soete, L. (2018) 'Destructive creation: Explaining the productivity paradox in the digital age', in Neufeind, M., O'Reilly, J., Ranft, F. (eds.) *Work in the Digital Age: Challenges of the Fourth Industrial Revolution*. London: Rowman & Littlefield.
- Somers, J. (2013) 'The Man Who Would Teach Machines to Think', *The Atlantic*. Available at:  
<https://www.theatlantic.com/magazine/archive/2013/11/the-man-who-would-teach-machines-to-think/309529/> (Accessed: 14 February 2022).
- Soojung-Kim Pang, A. (2020a) *Shorter: How Working Less Will Revolutionise the Way You Get Things Done*. London: Penguin Books.
- Soojung-Kim Pang, A. (2020b) 'To Safely Reopen, Make the Workweek Shorter. Then Keep It Shorter', *The Atlantic*, 30 April. Available at:  
<https://www.theatlantic.com/ideas/archive/2020/04/safely-reopen-make-workweek-shorter/610906/> (Accessed: 07 June 2020).

- Sorgner, S.L. (2009) 'Nietzsche, the Overhuman, and Transhumanism', *Journal of Evolution and Technology*, 20(1), pp.29–42.
- Sparkes, M. (2021) 'Tesla is building an AI humanoid robot called Optimus, says Elon Musk', *New Scientist*, 20 August. Available at: <https://www.newscientist.com/article/2287792-tesla-is-building-an-ai-humanoid-robot-called-optimus-says-elon-musk/> (Accessed: 01 September 2021).
- Spencer, D. (2018) 'Fear and hope in an age of mass automation: debating the future of work', *New Technology, Work and Employment*, 33(1), pp.1–12.
- Spencer, D. (2022) *Making Light Work: An End to Toil in the Twenty-First Century*. London: Polity Press.
- de Spiegelaere, S., Piasna, A. (2017) *The why and how of working time reduction*. European Trade Union Institute. Available at: <https://www.etui.org/publications/guides/the-why-and-how-of-working-time-reduction> (Accessed: 10 May 2020).
- Srnicek, N., Williams, A. (2015) *Inventing the Future: Postcapitalism and a World Without Work*. New York: Verso Books.
- Staaby, A., Hansen, K.S., Grønli, T-M. (2021) 'Automation of Routine Work: A Case Study of Employees' Experiences of Work Meaningfulness', *Proceedings of the 54th Hawaii International Conference on System Sciences*, pp.1–10.
- Staccioli, J., Virgillito, M.E. (2021) 'Back to the past: the historical roots of labor-saving automation', *Eurasian Business Review*, 11, pp.27–57.
- Standage, T. (2003) *The Mechanical Turk: The True Story of the Chess-Playing Machine that Fooled the World*. London: Penguin.
- Standing, G. (2017) *The Corruption of Capitalism: Why Rentiers Thrive and Work Does Not Pay*. London: Biteback Publishing.
- Steger, M.F. (2019) 'Meaning in Life and in Work', in Yeoman, R., Bailey, C., Madden, A., Thompson, M. (eds.) *The Oxford Handbook of Meaningful Work*. Oxford: Oxford University Press.
- Stewart, J.B. (2013) 'Looking for a Lesson in Google's Perks', *New York Times*, 16 March. Available at: <https://www.nytimes.com/2013/03/16/business/at-google-a-place-to-work-and-play.html> (Accessed: 16 March 2021).
- Stewart-Brown, S. (1998) 'Emotional wellbeing and its relation to health: Physical disease may well result from emotional distress', *BMJ*, 317(1608).

- Stiegler, B. (1993) 'Questioning Technology and Time', *Tekhnema*. Translated by R. Beardsworth and A. Sumits, 1, pp. 31–44.
- Stiegler, B. (2016) *Automatic Society: Volume 1: The Future of Work*. London: Polity Press.
- Stiegler, B. (2019) *The Age of Disruption: Technology and Madness in Computational Capitalism*. Cambridge: Polity Press.
- Stiglitz, J. (2016) 'Inequality and Economic Growth', *The Political Quarterly*, 86(S1), pp.134–155.
- Strawser, B.J. (2013) *Killing by Remote Control: The Ethics of an Unmanned Military*. Oxford: Oxford University Press.
- Strober, M., Donahoe, J. (2017) *Sharing the Work: What My Family and Career Taught Me About Breaking Through (and Holding the Door Open for Others)*. Cambridge: MIT Press.
- Stronge, W., Harper, A. (2019) *The Shorter Working Week: A Radical And Pragmatic Proposal*. Autonomy. Available at: <https://autonomy.work/portfolio/the-shorter-working-week-a-report-from-autonomy-in-collaboration-with-members-of-the-4-day-week-campaign/> (Accessed: 06 September 2020).
- Stronge, W., Lewis, K. (2021) *Overtime: Why We Need A Shorter Working Week*. London: Verso Books.
- Sturiale, L. and Scuderi, A. (2019) 'The Role of Green Infrastructures in Urban Planning for Climate Change Adaptation', *Climate*, 7(119).
- Susskind, D. (2017) 'A Model of Technological Unemployment', *Will life be worth living in a world without work? Technological Unemployment and the Meaning of Life*, (819).
- Susskind, D. (2020) *A World Without Work: Technology, Automation and How We Should Respond*. London: Penguin Publishing.
- Susskind, D. (2022) 'Technological Unemployment', in Bullock, J. (ed.) *Oxford Handbook of AI Governance*. Oxford: Oxford University Press.
- Susskind, R., Susskind, D. (2017) *The Future of the Professions: How Technology Will Transform the Work of Human Experts*. Oxford: Oxford University Press.
- Suzman, J. (2019) *Affluence Without Abundance: What We Can Learn from the World's Most Successful Civilisation*. London: Bloomsbury Publishing.

- Suzman, J. (2021) *Work: A History of How We Spend Our Time*. London: Bloomsbury Publishing.
- Swier, G.M. (2014) 'Determining technology: myopia and dystopia', *South African Journal of Philosophy*, 33(2), pp.201–210.
- Talora, J. (2020) 'TfL planning expansion of DLR services to Thamesmead', *East London and West Essex Guardian*, 21 December. Available at: <https://www.guardian-series.co.uk/news/18959309.tfl-planning-expansion-dlr-services-thamesmead/> (Accessed: 03 February 2022).
- Taylor, A.J. (ed.) (1975) *The Standard of Living in Britain in the Industrial Revolution*. London: Methuen & Co (Debates in Economic History).
- Tegmark, M. (2018) *Life 3.0: Being Human in the Age of Artificial Intelligence*. London: Penguin Books.
- Teiwes, J., Bänziger, T., Kunz, A., Wegener, K. (2016) 'Identifying the Potential of Human-Robot Collaboration in Automotive Assembly Lines using a Standardised Work Description', *IEEE Industrial Electronics Magazine*. DOI: 10.1109/IConAC.2016.7604898.
- Tesla (2022) *The Future of Driving*. Available at: [https://www.tesla.com/en\\_GB/autopilot](https://www.tesla.com/en_GB/autopilot) (Accessed: 21 January 2022).
- The Telegraph (2017) 'The top 8 robotic healthcare breakthroughs: from gene mapping to robot nurses', *The Telegraph*, 11 February. Available at: <https://www.telegraph.co.uk/education/stem-awards/innovation/robotic-healthcare-breakthroughs/> (Accessed: 03 April 2021).
- Theodosius, C. (2008) *Emotional Labour in Health Care: The unmanaged heart of nursing*. London: Routledge.
- Thunberg, G. (2019) *No One Is Too Small to Make a Difference*. London: Penguin.
- Tigadi, A., Gujanatti, R., Gonchi, A. (2016) 'Advanced Driver Assistance Systems', *International Journal of Engineering Research and General Science*, 4(3).
- Tillich, P. (1956) *The Dynamics of Faith*. 2001 edn. London: HarperOne.
- Topf, D. (2020) "'Useless Class" or Uniquely Human? The Challenge of Artificial Intelligence', *Journal of Interdisciplinary Studies*, 32(1/2), pp.17–38. <https://doi.org/10.5840/jis2020321/22>.
- Topol, E. (2015) *The Patient Will See You Now: The Future of Medicine is in Your Hands*. New York: Basic Books.

- Topol, E. (2019) *Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again*. New York: Basic Books.
- Tozer, T. (2020) 'What Computers Will Never Be Able To Do', in Skidelsky, R., Craig, N. (eds.) *Work in the Future: The Automation Revolution*. London: Palgrave Macmillan.
- Triggs, O.L. (2012) *The Arts & Crafts Movement*. New York: Parkstone International.
- Tuhiwai Smith, L. (1999) *Decolonizing Methodologies: Research and Indigenous Peoples*. 2012 edn. London: Zed Books.
- Turkle, S. (2011) *Alone Together: Why We Expect More from Technology and Less From Each Other*. New York: Basic Books.
- Turnbull, P.J. (1988) 'The limits to "Japanisation"—Just-in-Time, labour relations and the UK automotive industry', *New Technology, Work and Employment*, 3(1), pp.7–20.
- Turner, B. (2016) 'Life and the Technical Transformation of Différance: Stiegler and the Noopolitics of Becoming Non-Inhuman', *Derrida Today*, 9(2), pp. 177–198.
- Turner, B. (2021) "'Above and Beyond the Market": The Family, Social Reproduction and Conservatism in Bernard Stiegler's Politics of Work', *Angelaki: Journal of the Theoretical Humanities*, 26(6), pp.68–85.
- Turner, B., van Milders, L. (2021) 'Introduction: Why Should Political Theorists Care About Work?' *Theory & Event*, 24(4), pp.1035–1049.
- Um, N-H. (2012) 'Seeking the holy grail through gay and lesbian consumers: An exploratory content analysis of ads with gay/lesbian-specific content', *Journal of Marketing Communications*, 18(2), pp.133–149.
- Umbrello, S., Capasso, M., Balisteri, M., Pirni, A., Merenda, F. (2021) 'Value Sensitive Design to Achieve the UN SDGs with AI: A Case of Elderly Care Robots', *Minds and Machines*, 31, pp.395-419.
- Veltman, A. (2010) 'Simone de Beauvoir and Hannah Arendt on Labor', *Hypatia*, 25(1), pp.55–78. <https://doi.org/10.1111/j.1527-2001.2009.01084.x>.
- Veltman, A. (2016) *Meaningful Work*. New York: Oxford University Press.
- Vermeulen, B., Kesselhut, J., Pyka, A., Saviotti, P.P (2018) 'The Impact of Automation on Employment: Just the Usual Structural Change?' *Sustainability*, 10.

- Victor, D. (2017) 'Pepsi Pulls Ad Accused of Trivializing Black Lives Matter', *New York Times*, 5 May. Available at: <https://www.nytimes.com/2017/04/05/business/kendall-jenner-pepsi-ad.html> (Accessed: 08 May 2021).
- Vidal, R. (2013) *Death and Desire in Car Crash Culture: A Century of Romantic Futurism*. Oxford: Peter Lang.
- de Visser, E.J., Pak, R., Shaw, T.H. (2018) 'From "automation" to "autonomy": the importance of trust repair in human– machine interaction', *Ergonomics*, 61(10), pp.1409–1427.
- Verbeek, P.P. (2005) *What Things Do: Philosophical Reflections on Technology, Agency, and Design*. Pennsylvania: Pennsylvania State University Press.
- Vreeland, B. (2007) 'Bridging the Gap Between Mental and Physical Health: A Multidisciplinary Approach', *The Journal of Clinical Psychiatry*, 68(4), pp.26–33.
- Wagstaff, Jr., S. (1966) 'Talking With Tony Smith', *Artforum*. Available at: <https://www.artforum.com/print/196610/talking-with-tony-smith-36795> (Accessed: 12 March 2021).
- Wajcman, J. (2017) 'Automation: is it really different this time?' *The British Journal of Sociology*, 68(1), pp.119–127.
- Wall, T.D., Clegg, C.W., Davies, R.T., Kemp, N.J., Mueller, W.S. (1987) 'Advanced manufacturing technology and work simplification: An empirical study', *Journal of Organisational Behaviour*, 8(3), pp.233–250.
- Wallace-Wells, D. (2019) *The Uninhabitable Earth: A Story of the Future*. London: Penguin.
- Ward, J., McMurray, R. (2016) *The Dark Side of Emotional Labour*. London: Routledge.
- Ware, R. (1982) 'Marx, The Division of Labour, and Human Nature', *Social Theory and Practice*, 8(1), pp.43–71.  
<https://doi.org/10.5840/soctheorpract1982812>.
- Warhol, A. (1962) *Campbell's Soup Cans* [Synthetic polymer paint on thirty-two canvases].

- Weber, J., Kröger, F. (2018) 'Autonomous Driving and the Transformation of Car Cultures', *Transfers: Interdisciplinary Journal of Mobility Studies*, 8(1), pp.15–23. <https://doi.org/10.3167/TRANS.2018.080103>.
- Weeks, K. (2011) *The Problem with Work: Feminism, Marxism, Antiwork Politics, and Postwork Imaginaries*. Durham: Duke University Press.
- Weinstone, A. (2003) *Avatar Bodies: A Tantra for Posthumanism*. Minneapolis: Minnesota University Press.
- Wertenbroch, K. (2021) 'Marketing Automation: Marketing Utopia or Marketing Dystopia?' *Marketing Automation*, 13(1).
- West, D. (2018) *The Future of Work: Robots, AI, and Automation*. Washington D.C.: Brookings Institute Press.
- White, J. (1997) *Education and the End of Work: A new philosophy of work and learning*. London: Cassell.
- Wijayaratna, M. (1990) *Buddhist Monastic Life*. Cambridge: Cambridge University Press.
- Williams, C. (2003) 'Sky Service: The Demands of Emotional Labour in the Airline Industry', *Gender, Work & Organization*, 10(5), pp.513–550. <https://doi.org/10.1111/1468-0432.00210>.
- Wittgenstein, L. (1953) *Philosophical Investigations*. 2009 edn. Edited by P.M.S. Hacker and J. Schulte. London: Wiley-Blackwell.
- Witty, P. (2012) 'Malcolm Browne: The Story Behind The Burning Monk', *Time*, 28 August. Available at: <https://time.com/3791176/malcolm-browne-the-story-behind-the-burning-monk/> (Accessed: 31 January 2022).
- Wolkenstein, A. (2018) 'What has the Trolley Dilemma ever done for us (and what will it do in the future)? On some recent debates about the ethics of selfdriving cars', *Ethics and Information Technology*, 20, pp.163–173.
- Wood, S. (1987) 'The Deskilling Debate, New Technology and Work Organization', *Acta Sociologica*, 30(1), pp.3–24.
- Wooldridge, M.J. (2021a) *A Brief History of Artificial Intelligence: What It Is, Where We Are, and Where We Are Going*. New York: Flatiron Books.
- Wooldridge, M.J. (2021b) *The Road to Conscious Machines: The Story of AI*. London: Pelican Books.

- Yeoman, R. (2021) 'The future of meaningfulness in work, organizations, and systems', in Breen, K., Deranty, J-P. (eds.) *The Politics and Ethics of Contemporary Work*. London: Routledge.
- Young, S. (2012) 'Formula One Racing: Driver vs. Technology', *Intersect*, 5.
- Zoller, D. (2017) 'Skilled Perception, Authenticity, and the Case Against Automation', in Lin, P., Abney, K., Jenkins, R. (eds.) *Robot Ethics 2.0: From Autonomous Cars to Artificial Intelligence*. Oxford: Oxford University Press.
- Zuboff, S. (2019) *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*. London: Profile Books.
- Zuckerberg, D. (2019) 'Sex strikes have always been about patriarchal power, not women's rights', *The Washington Post*, 17 May. Available at: [https://www.washingtonpost.com/outlook/sex-strikes-have-always-been-about-patriarchal-power-not-womens-rights/2019/05/17/89dcd3ea-77f0-11e9-b7ae-390de4259661\\_story.html](https://www.washingtonpost.com/outlook/sex-strikes-have-always-been-about-patriarchal-power-not-womens-rights/2019/05/17/89dcd3ea-77f0-11e9-b7ae-390de4259661_story.html) (Accessed: 12 July 2021).
- Zuzanek, J. (2020) *Time, Leisure and Well-Being*. London: Routledge.