

KEY CONCEPTS

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Time

Barbara Adam

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Contents

Acknowledgements	viii
Prologue	1
PART I What is Time?	3
<i>Interlude: Time Is</i>	5
1 Time Stories	6
Gods of Time	6
In the Beginning	8
Paradise and the Fall	11
Encounters with Death	12
Journeys to the Otherworld	13
Cycles of Renewal and Regeneration	14
Beyond Death: Resurrection and Redemption	16
Reflections: Myth for Today's Theory and Practice	17
<i>Interlude: Representations of Time</i>	21
2 Time Theories I	22
Western Philosophy: Ontology to Epistemology	23
Natural Science: Clockwork Universe and Change	29
Enlightenment Theories: <i>A Priori</i> and Dialectic	33
Social Theory: Practice, Value and Category	36
<i>Interlude: Time Perspectives</i>	50

vi *Contents*

3	Time Theories II	51
	Western Philosophy: Time Within	51
	The Sciences of System-Specific Times	60
	Social Theory and the Past, Present and Future	64
	PART II What is the Role of Time in Social Life?	71
	<i>Interlude: Time Transcendence</i>	74
4	Cultural Practices of Time Transcendence	75
	Making Time Stand Still	76
	Knowing Fate, Forging Futures	82
	Creating Immortality and Permanence	89
	Modifying Nature's Times and Rhythms	94
	Superimposing Phases and Social Structure	98
	<i>Interlude: Body Time, Clock Time, Social Time</i>	101
5	In Pursuit of Time Know-how	102
	Reckoning Time	103
	Creating Clock Time	112
	Mobilizing World Time	117
	Networking Instantaneity	119
	<i>Interlude: Time Complexities & Hierarchies</i>	122
6	The Quest for Time Control	123
	Commodification	124
	Compressions	128
	Colonization	136
	Control	143
	<i>Interlude: Futures</i>	149
	Epilogue	150
	Notes	153
	Further Reading	166
	Bibliography	168
	Index	177

To †Michael Young

Inspirational Time Lord
Mentor, colleague & friend
Whose wisdom & acute observations
At our Dartington meetings
Will be deeply missed

INTERLUDE

TIME COMPLEXITIES & HIERARCHIES

Complex
Times Now:
Multiplicity lived
Present enfolding past
Planning with uncertainty
Control with indeterminacy
Futures implicated in the present
Rituals combined with chronologies
Communal times in contexts of difference
Transcendence in situations of embodied time
Time as gift in conditions of economic exchange
Speed is linked to productivity but quality takes time
Standardized industrial time superimposed on local times
Commodified time permeates the fabric of everyday existence

Temporal
Hierarchies:
Trade over giving
Commodity over caring
Speed over slow processes
Public time over private times
Financial wealth over time wealth
Clock time monopolizes vernacular times
Control of the future is valued over precaution
Industrial time is naturalized as norm worldwide
Deviance from the norm means sanctions & low status
Economic time is objective, lived times seen as subjective
Time created to industrial design is tool to create inferior others
Fast means profitable efficiency, slow inefficiency and backwardness

6

The Quest for Time Control

Since the beginning of life and human existence, time, space and matter have formed an inseparable unity. Since prehistory, as I have shown in previous chapters, societies have embodied the temporal relations of their members and institutions, past and present. This is so because all cultures, ancient and modern, have established collective ways of relating to the past and future, of synchronizing their activities, of coming to terms with finitude. *How* we extend ourselves into the past and future, *how* we pursue immortality and *how* we temporally manage, organize and regulate our social affairs, however, has been culturally, historically and contextually distinct. Each historical epoch with its new forms of socioeconomic expression is simultaneously restructuring its social relations of time. The industrial mode of life is no exception. To understand the temporal relations of industrial and industrializing societies requires us to grasp a number of interrelated approaches in their contextual continuity and discontinuity with other forms of temporal knowledge and social relations.

In the preceding chapters I have argued that the search for transcendence is primarily concerned with the finitude of earthly existence, and the pursuit of know-how with the rhythmicity of our environment. In this chapter I want to propose that the quest for control is to a large extent about obtaining dominion over time for economic gain and social

advantage. For this to happen, the locus of control had to be transferred from natural and supernatural to human powers. It required secondly that the sin of usury had to be overcome: the forbidden practice converted into a Christian duty on the path to salvation. This transformation proceeded slowly between the early and late Middle Ages and, according to Max Weber, whose approach has been detailed in chapter 3, the Reformation had a major role to play in the metamorphosis of time from God's gift to *commodified, compressed, colonized* and *controlled* resource. These four Cs of industrial time – commodification, compression, colonization and control – will be the focus in these pages, the fifth C of the creation of clock time having been discussed already in the previous chapter. I show their interdependence and identify some of the socio-environmental impacts of those particular temporal relations.¹

The creation of time to human design in an atemporal, decontextualized form, as outlined in chapter 5, was a necessary techno-material condition for the use of time by industrial societies as an abstract exchange value and for the acceleration, control and global imposition of time. Clock time, the human creation, as I have shown, operates according to fundamentally different principles from the ones underpinning the times of the cosmos, nature and the spiritual realm of eternity. It is a decontextualized empty time that ties the measurement of motion to expression by number. Not change, creativity and process, but static states are given a number value in the temporal frames of calendars and clocks. The artifice rather than the processes of cosmos, nature and spirit, we need to appreciate, came to be the object of trade, control and colonization.

Commodification

Much of contemporary social science writing on the commodification of time has its roots in Karl Marx's work on the subject matter in the *Grundrisse* and *Capital, Volume 1*. Thus, for example, Anthony Giddens draws on it extensively in his *A Contemporary Critique of Historical Materialism*

(1981). For David Harvey it forms the base to his analysis of the contemporary temporal relations under *The Condition of Postmodernity* (1989). I have outlined some of Marx's work on the subject towards the end of chapter 2 and will not repeat it here other than to remind you that Marx's principal point regarding the commodification of time was that an empty, abstract, quantifiable time that was applicable anywhere, any time was a precondition for its use as an abstract exchange value on the one hand and for the commodification of labour and nature on the other. Only on the basis of this neutral measure could time take such a pivotal position in all economic exchange.

When Marx's insights are conjoined to those of Max Weber, who traced the associated instrumental rationalization of time to a move from monastic practice to the Protestants' quest for salvation and the subsequent 'iron cage' of purely economic rational conduct,² we get a sense of the powerful forces at play. Today the time-is-money assumption permeates every aspect of daily life as naturalized and unquestioned fact. We talk of saving, spending or squandering time without giving much thought to what this might mean. As long as the commodification of time functions as a taken-for-granted feature of our lives the associated inequities remain invisible. The task for social theory, therefore, is to render the invisible visible, show relations and interconnections, begin the process of questioning the unquestioned. Before we can identify some of these economic relations of temporal inequity, however, we first need to understand in what way the sin of usury was a barrier to the development of economic life as we know it today in industrial societies.

From a Christian perspective, the selling of time for profit was a sin because time belonged not to human beings but God.³ The trade in time was theft because it was trade in something that could not belong to individuals. As long as earnings on time were deemed to be a sin, the historian Jacques Le Goff explains, capitalism and the money economy could not develop, since, for the merchant, time was one of the prime opportunities for profit.⁴ There could be no charging for interest, no trade in time, no utilization of time as abstract exchange value:

The merchant's activity is based on assumptions of which time is the very foundation – storage in anticipation of famine, purchase for resale when the time is ripe, as determined by knowledge of economic conjunctures and the constants of the market in commodities and money – knowledge that implies the existence of an information network and the employment of couriers. Against the merchant's time the church sets up its own time, which is supposed to belong to god alone and which cannot be an object of lucre.⁵

In medieval Europe the Church as God's representative on earth was the keeper and guardian of time. Not even the sovereign had jurisdiction over it. The sovereign had the monopoly over weights and measures; the churches were in charge of time in all its forms, but most especially calendar time.

While interest and credit had been known and documented since 3000 BC in Babylonia, it was not until the late Middle Ages that the Christian Church slowly and almost surreptitiously changed its position on usury,⁶ which set time free for trade, to be allocated, sold and controlled. It is against this background that we have to read the extracts from Benjamin Franklin's text of 1736, quoted at length in chapter 2, which contains the famous phrases 'Remember, that *time* is money ... Remember that money begets money.'⁷ Clock time, the created time to human design, was a precondition for this change in value and practice and formed the perfect partner to abstract, decontextualized money.

From the Middle Ages, trade fairs existed where the trade in time became commonplace and calculations about future prices an integral part of commerce. In addition, international trade by sea required complex calculations about potential profit and loss over long periods, given that trade ships might be away for as long as three years at a time. The time economy of interest and credit, moreover, fed directly into the monetary value of labour time, that is, paid employment as an integral part of the production of goods and services. However, it was not until the French Revolution that the individual (meaning male) ownership of time became enshrined as a legal right.⁸

When 'time is money' then time costs money and time makes money because the economic practice of charging interest means that capital has a built-in clock that is con-

stantly ticking away. Every second, minute and hour, every day, month and year brings profit on the invested sum of money. Equally, every day, month and year that money is borrowed has to be paid for in interest. This inevitably leads to careful time calculations with respect to the costs arising from the time that goods are stored, that materials spend in warehouses before they are used in the production process, that goods spend in transit, that machines are running, and that products lie idle on the shelves before they are sold. Today the idea that time is money is so deeply entrenched in the industrial way of life that no aspect of social existence is exempt from its practical expression. It is implicated when mothers rush to get the children dressed for school, when we opt for the fastest mode of transport, when we are obliged to wait in the doctor's surgery.

Closer inspection makes it apparent that the unifying clock-time economy of money divides as it unites: not everyone's time is of equal value. While the money rich tend to be time poor, they can exchange their money for time. They can buy labour-saving devices and they can purchase the time of others in the form of skills and services to make up the shortfall of their own time. For the time rich and money poor, in contrast, the equivalent exchange tends not to be an option. The time of children and the elderly, of (unremunerated/unemployed) single parents and carers, of subsistence farmers (predominantly women) and those locked into bartering relations tends not to provide them with a basis for economic wealth creation. As 'unproductive' labour, their unremunerated work in household and school, care relations and food production is rendered invisible, their time decreed 'worthless'. Outside the charmed circle of the tightly delimited time economy, their time gets positioned at the bottom of the hierarchy of temporal relations.

Since the impact of social relations organized to empty, neutral clock time is anything but unbiased in its effects, we need to ask whose time is valuable to whom and whether or not the value involved can and should be translated into money. This means that social science analyses need to go beyond the decontextualized economic investigation of institutions and encompass some of the context-dependent effects on people's everyday lives. They need to understand as inseparable

arable the relations of time and their socio-environmental impacts, underlying assumptions and their material expressions, institutional processes and recipients' experiences, hidden agendas and power relations, unquestioned time politics and 'othering' practices.⁹ The temptation to focus exclusively on the economy or technology, on science or the mode of information, therefore needs to be resisted, simplicity foregone in favour of the disconcerting messiness of complexity in motion.

Compressions

In *Time Wars* Jeremy Rifkin identifies the centrality of speed valorization for the industrial way of life.

If centralization, concentration, and accumulation epitomized the bigger-is-better theme of spatial politics, then efficiency and speed characterize the time values of the modern age . . . The Idea of saving and compressing time has been stamped into the psyche of Western civilization and now much of the world.¹⁰

Where (clock) time is equated with money, speed becomes an important economic value, since the faster a product can be produced, the less money-time is tied up in the process in the form of machinery, interest payments and labour costs. The faster the product can be moved through the system from production to consumption the higher is the profit potential. An alternative way of expressing speed is time compression, the preferred term of Karl Marx and more recently David Harvey.¹¹

In economic production, time compression has been achieved by a number of means: by increasing the activity within the same unit of time (through machines and the intensification of labour), reorganizing the sequence and ordering of activities (Taylorism and Fordism), using peaks and troughs more effectively (flexibilization), and by eliminating all unproductive times from the process (the just-in-time system of production, delivery and consumption). Time compression is an unquestioned economic and political goal as it

increases profit and shows up positively in a country's gross national product (GNP).

At the same time, we need to appreciate that speed valorization is not exclusively a phenomenon of modernity. Speed of movement and reaction, for example, is associated with competitive advantage across species and in many cases vital to survival. Moreover, much of the history of technology can be read as advances in speed, the different wheel and vehicle technologies and various modes of production being key examples. Seen from this perspective, contemporary acceleration and speed valorization are mere variants on the ancient theme of cultural engagement with the time-space limits set by nature. And yet, despite the continuities, there are discontinuities that are worthy of our attention.

The cultural historian Stephen Kern details some of the changes that took place at the turn of the last century. He shows how, during the period from 1880 to 1919, innovations in technology, art, literature and science mutually influenced and inspired each other.¹² The achievement of higher speeds was integral to those developments and permeated the very structure of society. It inspired artists and architects, novelists and poets, whose avant-garde work in turn fired the imagination of scientists and engineers. Motorized transport (trains, cars, aeroplanes) and machine-based production, electricity and gas, film and electronic communication (telegraph, wireless and telephone), are all developments associated with that period, which changed the way people viewed, understood and related to their world.

In the midst of this explosion in speed anything seemed possible. In 1895 H. G. Wells published *The Time Machine* in which he postulated time travel. In 1909 the artist and poet Filippo Tommaso Marinetti founded the Futurist movement, which sought to create entirely new and bold futures. Through a series of manifestos Marinetti made public the Futurists' frequently outrageous claims.

Why should we look back when what we want is to break down the mysterious doors of the impossible? Time and space died yesterday. We already live in the absolute, because we have created eternal, omnipresent speed.¹³

The world's magnificence has been enriched by a new beauty; the beauty of speed... We cooperate with mechanics on destroying the old poetry of distance and wild solitudes, the exquisite nostalgia of parting for which we substitute the tragic lyricism of ubiquity and omnipresent speed.¹⁴

The speed that is celebrated here was in no way tied to the time economy of money. That would have seemed an abhorrently bourgeois idea to its proponents. And yet we need to ask whether or not the abstraction of speed, the celebration of acceleration and the control of the future would have been possible without the prior transformation of time into clock time and whether or not such valorization makes sense without the underpinning deep structure of the time economy of money.

The French political theorist and technology critic Paul Virilio has studied the history of technological development not just over that crucial period at the turn from the nineteenth into the twentieth century but over the last two hundred years.¹⁵ Virilio suggests that we can read the history of modernity as a series of innovations in ever-increasing time compression. He argues that, through the ages, the wealth and power associated with ownership of land was equally tied to the capacity to traverse it and to the speed at which this could be achieved. He likened this speed-based wealth to military prowess, which is inescapably tied to the speed of movement by bodies and missiles across space. He focused his analysis on speed around three Ts of increasing tempo. These encompass nineteenth-century *transport*, twentieth-century *transmission* and twenty-first century *transplantation*, each with their own distinct means of enhancing independence of the social relations of time from space and the body.

With nineteenth-century transport the relation of time and space has been altered. The invention of trains, cars and aeroplanes at the turn of the last century massively increased the speed with which bodies could move across space and dramatically shortened the time involved.¹⁶ Since their inception, all improvements in these modes of transport have been primarily in time compression. Virilio shows how the dramatic advances in speed were accompanied by a number of con-

traditions and paradoxes. Thus, for example, while cars, planes and trains had become progressively faster, the time spent in transit had not been compressed at an equal rate. Standstill and traffic jams, snails' pace and stop-go progression are key features of today's traffic around urban centres. Endless queues in crowded lobbies are a mark of travel by plane, delays and cancellations an integral part of commuting by train. In the light of this evidence, which is fully supported by transport research,¹⁷ Virilio formulated the *dromological* law, which states that increase in speed increases the potential for gridlock.¹⁸

A second inconsistency in the acceleration associated with transport relates to the speed-energy-pollution constellation where, as Rifkin and Howard point out, 'the faster we speed up, the faster we degrade.'¹⁹ Virilio writes despairingly about the social sciences' failure to see and theorize these environmental connections. A third paradox is only hinted at by Virilio, when he suggests that conflict is to be expected between democracy and *dromocracy*, the politics that take account of time and the speed of movement across space.²⁰ It concerns the sociopolitical and socioeconomic relations associated with advances in transport speed, which affect different individuals, groups and classes of society in uneven ways. Thus, for example, the money-rich-time-poor can use their wealth to purchase speed, while the time-rich-money-poor cannot use their time to purchase wealth, that is, exchange their excess time for money. Equally, the traffic jams and waiting times affect different groups of society in unequal ways. Not only the technological developments associated with increased transport speeds, therefore, but also associated economic relations as well as the allied politics and policies thus need to feature centrally in the analysis.

With respect to twentieth-century transmission Virilio has in mind the wireless telegraph, telephone, radio and subsequent developments in computer and satellite communication, which have once more changed the relationship between time and movement across space. Together, these innovations in transmission replaced succession and duration with seeming simultaneity and instantaneity. Duration has been compressed to zero and the present extended spatially to encircle the globe: it became a global present. Globally acces-

sible events and the possibility of concerted action in 'real time' bring into one frame of reference causal and non-causal, instantaneous and sequential processes. The intensive (electronic) present, Virilio suggests, is no longer part of chronological time; we have to conceptualize it instead as *chronoscopic* time. Real space, he argues, is making room for decontextualized 'real-time' processes and intensity takes over from extensity.²¹ This in turn has consequences and, similar to the time compression in transport, the compression in transmission has led to a range of paradoxical effects.

The teletechnologies of real time are . . . killing 'present' time by isolating it from its here and now, in favour of a communicative elsewhere that no longer has anything to do with our 'concrete present' in the world, but is the elsewhere of a 'discreet telepresence' that remains a complete mystery.²²

Here too we find contradictions and paradoxes. The overload of information, for example, is becoming so extensive that taking advantage of only the tiniest fraction of it not only blows apart the principle of instantaneity and 'real-time' communication, but also slows down operators to a point where they lose themselves in the eternity of electronically networked information. Secondly, the potential capacity of exterritorial beings to be everywhere at once and nowhere in particular is inescapably tied to operators that are bounded by their embodied temporal limits of terrestrial existence and sequential information processing. The actual capacity for parallel absorption of knowledge, therefore, is hugely disappointing. Equally, the electronic capacity to be now-here and no-where has brought the body to a standstill. 'We have finally achieved states', Virilio suggests, that border 'on sensory deprivation'.²³ Elsewhere he calls it 'growing inertia'.²⁴ In this area of electronic speed intensification, I am afraid, Virilio's pertinent technology critique does not reach deep enough into the social fabric where the compressions are worked into entirely new structures and social relations of inequity.

Zygmunt Bauman's analysis, for example, points to the exterritorial nature of power when he suggests that, for capitalist relations, communication at the speed of light means

freedom from space.²⁵ When business has attained such liberation from locality it is freed from responsibility and obligation to that local/national community. It can relocate to wherever and whenever profit beckons and abandon those bound to their locality to deal with the consequences: to bear the cost of the social and environmental devastation, the regeneration programmes, the depopulation of rural communities. Baumann suggests further that those at the receiving end of the space-transcending, time-compressing information revolution are confronted with the time equivalent of earlier spatial enclosures. In the case of electronic enclosures, people are barred from access to the high-speed world of information despite ostensibly open access. Money, skill and life chances more generally turn out to be highly effective barriers to this speeded-up world of knowledge production and information overload.

Virilio identifies the time compression afforded by twenty-first century transplantation primarily with prostheses provided by xenotransplantation and nanotechnology. In an essay entitled 'From Superman to Hyperactive Man', Virilio suggests:

After yesterday's *superstructure* and *infrastructure*, we might now envisage a third term, *intrastructure*, since the very recent advent of nanotechnological miniaturization promotes biotechnology's physiological intrusion into, or insemination of, the living organism.²⁶

Time-compressing technological innovation, he argues, has moved from the vastness of planetary and earthly space to the micro spaces of organs and cells to what he calls '*the heart of the living*'.²⁷ In writing that is part reportage, part postulation he sees artificial rhythms replace natural ones: to be speeded up at will and paced to the dictates of the prosthetic machine.

For the biologist, *excitability is the fundamental property of living tissue* . . . If it is to be excited, then to *be alive is to be speed*, a metabolic speed that technology is compelled to increase and improve, the way it has done with animal species.²⁸

While much of Virilio's work on acceleration through transplantation is projective and speculative, we can see how genetic modification of plants and animals has already achieved a phenomenal increase in speed of change. With genotechnology scientists have the capacity to reduce to an instant what took generations to achieve with conventional breeding methods. It is not just that this particular intensification of processes holds out the promise of phenomenal economic rewards, it has equally enormous sociopolitical implications for control, accountability and responsibility, which we will revisit at later points in the chapter.

From the above we can see that Virilio understands human history in terms of a race with time, of ever-increasing speeds that transcend humans' biological capacity. To theorize culture without the dromosphere, that is, the sphere of beings in motion, he therefore suggests, misses the key point of cultural activity and the uniqueness of the industrial way of life. Without an explicit conceptualization of the contemporary dromosphere – or in my terms *timescape* – it is thus difficult to fully understand the human-technology-science-economy-equity-environment constellation. Moreover, it becomes impossible to appreciate that people are the weakest link when the time frames of action are compressed to zero and effects expand to eternity, when transmission and transplantation are instantaneous but their outcomes extend into an open future, when instantaneity and eternity are combined in a discordant fusion of all times. Virilio's work forcefully demonstrates that the political economy of wealth is not the sole motor of cultural change.

For an analysis that treats seriously the relation between technology and the political economy we have to turn to Manuel Castells's *The Rise of the Network Society* (1996). In this work the seductive elegance of Virilio's 3-T analysis gives way to a comprehensive, complex and detailed historical weaving together of technological, economic, political and social forces. Here, practices based on underlying assumptions are related to implicit technological principles, processes to products, intentions to unintended consequences. In Castells's analysis, time is not merely compressed but processed, and it is the network rather than acceleration that constitutes the discontinuity in a context of continuing compression.

In a systematic analysis Castells contrasts the clock time of modernity with the network time of the network society. He demonstrates the importance of time zones as sources of competitive advantage in capital markets that operate in a context of real-time communication. This network time transforms social time into two allied but distinct forms: simultaneity and timelessness.²⁹ Simultaneity refers to the globally networked immediacy of communication provided by satellite television and the internet, which makes real-time exchanges possible irrespective of the distances involved. Timelessness, the more problematic concept, refers to the layering of time, the mixing of tenses, the editing of sequences, the splicing together of unrelated events. It points to the general loss of chronological order and context-dependent rhythmicity. It combines eternity with ephemerality, real time with contextual change. Castells designates timeless time as 'the dominant temporality of our society', which occurs when

the informational paradigm and the network society induce systematic perturbations in the sequential order of phenomena . . . This perturbation may take the form of compressing the occurrence of phenomena, aiming at instantaneity, or else by introducing random discontinuity in the sequence. Elimination of sequencing creates undifferentiated time, which is tantamount to eternity.³⁰

Castells, like Virilio, resists an overly economized analysis without, however, losing sight of the complexity of socio-economic, political and environmental processes that have such a powerful role to play in the creation of modern culture, with its age and class as well as gender and culture-specific 'glocal' inequities.

The eternal/ephemeral time of the new culture does fit with the logic of flexible capitalism and with the dynamics of the network society, but it adds its own, powerful layer, installing individual dreams and collective representations in a no-time mental landscape.³¹

This new culture is perceptively theorized by Robert Hassan, who suggests that emphasis on 'real time' misses the point. At issue are the network and the associated intercon-

nectivity, not the speed of communication. 'Interconnectivity', Hassan suggests, 'is what gives the network time its power within culture and society.'³² It is worth quoting him at length here.

Network time does not 'kill' or render 'timeless' other temporalities, clock-time or otherwise. The embedded nature of the 'multiplicity' of temporalities that pervade culture and society, and the deeply intractable relationship we have with the clock make this unlikely. Rather, the process is one of 'displacement'. Network time constitutes a new and powerful temporality that is beginning to displace, neutralise, sublimate and otherwise upset other temporal relationships in our work, home and leisure environments.³³

In an important move Hassan then links the revolution in information and communication technology to neoliberal globalization and to what Ulrich Beck calls 'organized irresponsibility'.³⁴ With this move Hassan takes the analysis into new directions and opens up a space for critical thought and action.

Colonization

Time has been a most effective colonizing tool. That which has become taken for granted is an ideal vehicle for imperialist purposes since it is no longer discussed and no longer visible. When standard time and world time were established at the beginning of the last century, this significant change engendered impassioned debate and resistance. When today the values associated with this artefactual, commodified time are imposed as norm on societies who organize their lives according to different temporal principles, attempts at discussion about its merits are greeted with incredulity. Furthermore, resistance is met with incomprehension since clock time and commodified time have become an unquestioned and inescapable fact of the industrial way of life. Any group or society that deviates from this 'norm' or endeavours to question its wisdom, value and desirability is considered backward, lazy, uncivilized.

There are two sides to the colonization of time: the global imposition of a particular kind of time which is colonization *with* time, and the social incursion *into* time – past and future, night-time and seasons, for example – which is the colonization *of* time. Colonization *with* time therefore refers to the export of clock and commodified time as unquestioned and unquestionable standard, colonization *of* time to the scientific, technological and economic reach into time – most usually of distant others who have no say in the matter.

Colonization *with* time has been achieved with the aid of standard time, time zones and world time, on the one hand, and with the globalization of industrial time and its associated economic values as common-sense norm, on the other. In the latter case it is the time values and the social relations of industrial time that are being *adopted* as well as *imposed* on a worldwide basis. As I indicated in the previous chapter, Japan and Russia proceeded to 'Westernize' their social relations of time, thus accepting the Western convention as norm and as a value to be embraced and emulated. The political leaders of both societies considered this to be a precondition for becoming a fully fledged industrial nation, which was equated with being 'modern', 'progressive', even 'civilized'. They also realized that there was a heavy economic and political price to pay for any deviance from the industrial norm. In most cases of third world 'development', however, clock time is imposed as norm irrespective of its suitability, and whether or not the recipients consider it desirable.³⁵

This industrial norm, as I suggested above, is fundamentally rooted in clock time and underpinned by naturalized assumptions about not just the capacity but also the need to commodify, compress and control time. The elements of this package of industrial time are both cumulative and mutually supporting and form a coherent, integrated dis/continuous whole. As long as the underpinning assumptions remain naturalized, taken for granted and unquestioned, unwilling recipients will find it difficult if not impossible to make their protests heard and understood, let alone accepted as meaningful and legitimate. Only when fault lines in the logic become exposed and irresolvable contradictions begin to destroy the system from within can alternative visions take hold and openings for change be operationalized.

While the colonization *with* clock time is a relatively recent phenomenon, the colonization *of* time has an exceedingly long history. Night-time and the cold periods of the year, for example, have been colonized since at least the harnessing of fire. And yet, as Murray Melbin's and Stephen Kern's work shows,³⁶ some significant dis/continuities have emerged with industrialization and the technologies of the late nineteenth and early twentieth centuries. Publicly available gas and electricity, for example, have fundamentally altered our relation to the hours of darkness and the seasons. If, with the mere flicking of a switch, night can be turned into day, while summer and winter become interchangeable through heating and air-conditioning, then much of the skill and mystique has been taken out of these time-transcending practices. Dance, magic and ritual are no longer required to pacify the spirits that have been disturbed by the time-transcending intrusion. Today, the colonization of the night and seasons has become mundane, taken for granted, to be recognized in the enormity of its achievement only when it breaks down: when the supply of gas and electricity fails, when darkness, cold and heat remind us of the 'natural condition'.³⁷

In a similar vein we could say that the colonization of past and future has been practised throughout human history, that the transcendence of the present, as I have argued previously, is a mark of culture. In the time-transcending practices I discussed in chapter 4, the efforts were focused on death and finitude, on transience and ephemerality, on seasons and planetary rhythms. Clearly, this is not the only way that industrial societies extend themselves into the future. What then characterizes industrial societies' colonization of time? What differentiates it from other forms of time transcendence? How does the continuity relate to the discontinuity?

In order for the dis/continuity to become apparent, the creation of time to human design, its commodification and compression and its (re)formulation in Newtonian science have to be seen together as mutually supporting and implicating features that construct time as an externalized object, abstracted from the change processes and the phenomena that constitute it.³⁸ The arrangement in the box offers another way of representing its clustered uniqueness and discontinuity with earlier time-transcending practices.³⁹ It demonstrates

political time use	scientific time use	economic time use
regulate time	measure time	use as resource
define time values	create clock time	commodify time
impose time values	impose clock time on nature	impose economic time norm
control (and discount) future	control (and discount) future	control and discount future
globalize clock time	colonize all time	globalize time economy
time is:	time is:	time is:
clock time	clock time	clock time
decontextualized	decontextualized	decontextualized
quantified	quantified	quantified
linear	linear	linear
invariant	invariant	invariant
external	external	external

very clearly that clock time permeates the key institutions of industrial society. It shows that irrespective of the diverse temporal uses of time in the political, scientific and economic spheres, a unified clock time underpins the differences in expressions. All other forms of temporal relations are refracted through this created temporal form, or at least touched by its pervasive dominance.

Once time is disembedded, that is, extracted from process and product, it becomes an object and as such subject to bounding, exchange and transformation.⁴⁰ It is in this form that time is colonized, as distinct from the time embedded in events and processes, which has been subject to cultural efforts of transcendence. It is in the objectified form that the future features in economic activity and becomes the object of colonization for science. The *effects* of the economic and scientific colonizing practices, in contrast, are felt at the lived level of embedded time as intergenerational inequity, environmental disasters and cultural destruction.⁴¹

In economic theory time is a scarce resource. To augment the scarcity, economists seek to expand the resource through incursions into past and future. Economic theorists such as Gary Becker and Clifford Sharp argue that the scarcity of

time derives from our finite existence, that it is the limited amount of time we have allotted to us during our lifetime, which makes time the principal resource in all economic activity.⁴² The problem with this premise is that in order for us to think and talk about time in terms of a quantitative resource that can be used and allocated, it first had to be dis-embedded into a distinct entity. Thus we find no such talk or conception in cultures where time is embedded in events, phenomena and processes. Such cultures seek to transcend the *temporality of earthly existence* rather than colonize time *per se*. The difference may become clearer when we put side by side industrial societies' colonization of the past and the gathering up of the past of ritual practice. Both 'transport' the past into the present but they do it on the basis of fundamentally different principles and assumptions.⁴³

In ritual and myth the past is gathered up in the present to connect origin to destiny, to fuse past practices and experiences with present ones in order to integrate all of existence into a living whole. We may describe this process as presencing or enpresencing. The past here is *not* conceived as an independent resource for exploitation and enhancement of knowledge or economic wealth, whereas this is precisely the basis on which we can talk about colonization of the past. Archaeology, astronomy and geology, for example, provide knowledge of the very distant past which may hold useful insights for the prediction of future developments. Entire industries are building up around the uncovering of the past, that is, the interpretation, representation and reconstruction of the past, both ancient and more recent, for extractive use in the present. Here the past is conceived as an independent resource available for exploitation in the present. This (economic) utilitarian perspective applies almost regardless of application. Distant planets and black holes, our earth history, the lives of ancient cultures, the consumption of heritage, all are resource pasts to be colonized. The basis of this time resource, however, is not the finitude of individual life but the objectification of time. Only as independent, objectified resource can the past be colonized and economically allocated, sold and controlled.

A similar relation pertains to the colonization of the future, which enables us once more to distinguish between tran-

scendence, as outlined in chapter 4, and colonization. The future means uncertainty for present action. Accordingly, the issue of uncertainty is the second way economic theory engages with the issue of time.⁴⁴ Anthony Giddens addresses the colonization of the future as a social theorist when he suggests that 'modern capitalism embeds itself into the future by calculating future profit and loss, and thereby risk, as a continuous process.'⁴⁵ Capitalism is distinct in its relationship to the future whether this be in its systems of credit and interest, insurance or financial trading. Thus, for example, since the sixteenth century the insurance system has redistributed risk. It makes projections about the future on the basis of a known past and promises to financially compensate future loss in exchange for payments in the present. Whether this economic engagement with the future operates at the private, commercial or (welfare) state level, it is based on the belief that the future is amenable to human regulation, extractive exploitation and design in the present.

Furthermore, as I noted in the previous chapter, since the latter part of the Middle Ages the economic future has been understood with reference to the threats, costs and benefits it holds for the present. The economy therefore operates in the sphere between present and future with a view to using the future to secure the present. To achieve that task, it borrows from the future to finance the present. The radical present orientation is demonstrated at its fiercest in the discounting of the future, a convention that is deeply embedded across the breadth of economic theory and practice. Here the value of the future is calculated with reference to the use and extractive value it holds for the present. This applies for both the good and the bad. Thus, for example, an environmental problem such as radiation contamination for successor generations is rendered 'harmless' by the economic sleight of hand that calculates the potential problems with reference to what the contamination means for us in the present: the larger the temporal distance of radiation, the less cost it is to us – so, no problem.⁴⁶

The scientific colonization of the future operates on very similar principles and assumptions. Like the economy, the work of science reaches into the future. This scientific future is projected and predicted, planned and programmed,

pursued and pre-empted, procured and polluted. Knowledge of the past is the basis on which the future is known and forged, foretold and foreclosed, on which innovation is justified and safety established. This applies whether we refer to the chemical, nuclear or biotechnological future. The discounting attitude creeps into scientific reasoning with the what's-in-it-for-us-now approach, which might apply to one or all of the following: economic gain, academic prestige, job security, nationally based pride in scientific prowess.

Genetic manipulation of food crops can serve as example here. With the genetic modification of food, science has achieved a temporal equivalent of spatial globalization. It has extended the scientific reach to the beginning and end of time. The totality of time is invoked on the basis that modification of organisms with genetic material from other species means drawing on genetic bases that have been shared by all life forms since the beginning of the evolution of life, while the effects of those modified organisms in the environment are open to an indefinite, unbounded future: uncontrolled and uncontrollable. The potential for economic gain is enormous. The scientific, individual and national prestige involved is of such magnitude that, no matter how strongly public opinion is amassed against this scientific colonization of time, developments in the genetic modification of food continue unabated with the full support of national governments.

Such radical present-orientation, be this in economics, science or politics, makes parasitic use of the future – our own and that of successor generations. Helga Nowotny conceptualizes those incursions as 'extended present', as a future that is organized, regulated, tamed, safeguarded, colonized and foreclosed *now*.⁴⁷ This is a political act for which perpetrators are not and cannot be held accountable and the potentially affected do not and cannot get redress as long as the five Cs of industrial time – creation, commodification, compression, colonization and control – continue to be applied and imposed as the naturalized norm. Moreover, while the colonization of the future is accomplished on the basis of objectified time, its unintended (and intended?) consequences are played out in the lived temporalities of nature, the intricate choreography of rhythms, in successors' bodies and environments. The abstract and the lived become inseparable

as soon as the conceptions get activated in practice and the materialized ideas are inserted in processes. Dis/continuity therefore is the challenge for a social theory of time, with bringing together what conventional analyses have set apart the task for the immediate social science future.

Control

When we now look at the breadth of responses to earthly time, we can see that social time cannot be encompassed by either the quest for speed and acceleration, or the allocation of time as a scarce resource. Tempering and transcendence, knowledge and know-how, creation and control, I want to argue, are the three pillars around which the various engagements with time have been formed and are still forming. Control is the overarching concept for the five Cs of time – creation, commodification, compression, colonization and control – that mark the distinctiveness of industrial societies' public temporal relations. This control cluster of the five Cs of time, I have suggested, needs to be differentiated from both time tempering and transcendence, on the one hand, and time knowledge and know-how, on the other, since only in the control cluster is time objectified, externalized and constructed to specific design principles.

What then are the 'bare bones', the base structure that we were dealing with when we were focusing on practices associated with time tempering and transcendence, knowledge and know-how, creation and control? I propose that we think about temporal relations with reference to a cluster of temporal features, each implicated in all the others but not necessarily of equal importance in each instance. We might call this cluster a *timescape*. The notion of 'scape' is important here as it indicates, first, that time is inseparable from space and matter, and second, that context matters. When we consider the dominant, public timescape of industrial temporal relations, each of the temporal features identified in the basic timescape cluster is associated with a number of particular practices of transcendence and transformation. In the box overleaf the two timescapes are schematically summarized.

The listed practices in the industrial timescape cluster should be taken as indicative rather than exhaustive and contextualized in the time politics of liberal democracy, science and the global economy.

Grouping practices around a number of time Ts and giving physical shape to the classifications makes their constructed and provisional nature visible. It entices us to embrace multiplicity and explicitly acknowledge the constructed nature of knowledge. At the same time we need to be aware that any system of classification is binding and bounding, is blinding us to processes. With classifications we create pockets of order, invariance and stability in the sea of change complexity. 'Classing remains a static act,' as Michel Serres points out, 'it is the most effective obstruction against strong flux, to disperse it between baffles, to slow it down, to stop it, to freeze it.'⁴⁸ Clearly, we cannot theorize and analyse without some form of classification, which inevitably means some form of

Timescape comprises:

Time frames: seconds, days, years, lifetimes, eras, epochs
Temporality: process, irreversibility, impermanence
Tempo: pace, intensity/rate of activity
Timing: synchronization, Kairos
Time point: moment, Now, instant, juncture
Time patterns: rhythmicity, periodicity, cyclicity
Time sequence: series, cause and effect/simultaneity
Time extensions: duration, continuity: instant to eternity
Time past, present, future: horizons, memory, anticipation
The time entailed is multiplex

Public industrial timescapes comprise:

Time frames: quantity measured, resource, commodity
Temporality: measured, fixed, regulated, controlled
Timing: rationalized, as cost to be externalized
Tempo: increased, maximized, optimized
Time point: extended, commodified
Time patterns: evened out
Time sequences: controlled and edited
Time extensions: investment, opportunity cost, goal
Time Future: prospected, produced, predicted, pre-empted
Multiplex discontinuity accomplished in practice

freezing processes. What is important, therefore, is that we remain cognisant of the classing action and its effects, the imposition and the product, and that we avoid conflating the construction with the processes under consideration.

Looking at the schematic representation of the industrial timescape, the first thing to appreciate is that the control over the objectified resource leaves no temporal feature untouched. Time frames and timing, temporality and tempo, time point, duration and succession have all become subject to control, that is, to speeding up and slowing down, to rearrangement of sequence and order, to evening out and accentuating of peaks and troughs. The variable, rhythmic times of life are regulated and disciplined to conform to uniform, invariable temporal patterns. Through socioeconomic technologies, transport, transmission and transplantation, time is compressed and processed. Clock time is used to regulate and rationalize the pace and seasonality of organisms and beings, social activities and institutions. With its aid rhythmicity is transformed into a rationalized beat.

The principles at the root of the successes of time control, however, are also becoming the sources of its demise. Industrial food production can serve as a first example. The industrial way of producing food is well placed to illustrate both the complexity and the paradoxical results of time control. Its achievements include the speeding up of growth and maturation and the control of the rate of ripening and decay during production and transit, storage and shelf-life. Fallow periods have been transformed into productive ones. The dormant season is as much as possible negated or at least shortened by artificial means through, for example, electric light, hydroculture and/or genetic modification. As part of contemporary industrial societies' overall project of rationalization and predictable control, the control of time is extended to the seasonal rhythmicity of nature, to the variable patterns and cycles of activity and rest, growth and decay. Sexual, seasonal and maturational rhythms are hormonally regulated. Their genetic control is busily worked on in science laboratories across the world. This impressive level of time control, however, is almost invariably accompanied by an equivalent loss of control over (unintended) consequences. As Castells notes, the mastery of time and the control of rhythms

restructure temporality and, in the process, usher in contradictory logics.⁴⁹ Thus efforts to impose an invariable beat on the variable rhythmicity of life, to speed up and slow down species-specific rates of growth and decay, and to extend or shorten processes of ripening and maturation, are undermined by disease and crop failure, threats to public safety and consumer boycotts.

With the temporal innovations in transport, transmission and transplantation, we have seen already how the increase in mastery is accompanied by a decrease in control. Electronic transmission is a particularly strong case in point. Time has been compressed to its limit; space eliminated in the process. Information and money move at the speed of light. No-where and now-here have become interchangeable. This allows for trillions of dollars to circulate and change virtual hands every day. However, as Mark Poster points out, 'the new level of interconnectivity heightens the fragility of the social networks.'⁵⁰ The source of control now undermines its execution. For clock time to exist and thus to be measurable and controllable there has to be duration, an interval between two points in time. Without duration there is no before and after, no cause and effect, no stretch of time to be measured. The principles of instantaneity and simultaneity of action across space, as I have shown in chapter 3, are encountered in quantum physics; they have no place in the Newtonian world of causality and bodies in motion, the world that we as embodied beings inhabit. The control of time that has reached the limit of compression has been shifted into a time world where notions of control are meaningless. More like the realm of myths and mysticism, the electronic world of interchangeable no-where and now-here requires knowledge and modes of being that are alien to the industrial way of life. Other modes of temporal existence, therefore, may hold some vital keys, their 'primitive' understanding of time pointing not to control but to more appropriate ways of being in the realm of instantaneity.

With the transplantation of genes, science controls not just nature's products but its processes. It controls time at the level of reproduction, which means it controls life and the temporality of being. Genotechnology, therefore, has the potential of realizing the time rationalizers' dream: precise control of

reproduction and instantaneous change in unlimited quantities. Changes introduced in the present may alter the life course and evolution forever. However, here too control achieved in the laboratory is not matched by control over environmental outcomes. Control is relinquished once the gene has been spliced into the organism and once that modified reproductive organism has been released into the environment.⁵¹ This is the context of reflexive modernization, to use Ulrich Beck's term,⁵² where the source of successes is implicated in excesses and where the principles underpinning the industrial system undermine it from within, destroy its base of existence, thus confronting us with questions of meaning.

At the end of the quest for control we have come full circle to where we started the book. What has slipped out of sight with the industrial way of life emerges from the shadow. We are once more confronted with questions about collective life and death, origin and destiny. Intuitively, some of the public protestors against genetic modification (and nuclear power) seem to have grasped the depth of the issues in question. Our politicians have not. A significant number of scientists are aware but pursuing powerful agendas that bracket those unsettling ideas and concentrate instead on seeing their work as part of the solution, that is, the route to a new and better destiny. Modern science located individual immortality in the genes; it embodied transcendence. By working on the gene itself, contemporary science has (re)introduced collective immortality, forging collective embodied futures to eternity. The quest to *create* alternative futures has found its holy grail, while, the quest for *control* is failing proportional to its successes.

The pursuit of temporal control confronts us with the (im)possibility of the task, tempers the industrial hubris. When so much control fails and converts intended actions into unintended consequences, there is a need to (re)consider the place and role of humans in the cosmic scheme of things, to take stock of the ways we approach finitude and the temporal limits to human being. Despite the very clear imperative, however, the reflective turn is *unlikely* to come from science or politics. The powerful agendas mentioned above are potent disincentives to reflection. A more likely source is

the control/loss of control associated with the network society. Instantaneity and absolute connectivity expose the fault lines of the logic and confront users with entirely new temporal limits and possibilities that require the restructuring of socioeconomic relations. The social relations of time are central to this revision and renewal.

INTERLUDE

FUTURES

We tell futures
Druids & wizards
Oracles & prophets
Astrologers & palmists
Scientists and soothsayers
All but different means & modes

We know futures
From past experiences
Forecasts & forebodings
By prevision & premonitions
Through clairvoyance & intuition
To indeterminate degrees of certainty

We create futures
Through technology
Science & economics
For ourselves & others
Here & in distant locations
With no responsibility for effects

We colonize futures
With clock time values
And unintended outcomes
With econo-political impacts
And techno-scientific innovations
With impunity & freedom from redress

We eliminate futures
Our own & successors'
Through present-orientation
In politics, science and business
With the help of economic discounting
And no guardians to safeguard environments

We risk others' futures
Trading opportunity costs
For personal & political gain
Without being held to account
For potential harm to those affected
With no plans to protect new generations

Epilogue

At the end of this story we can see why the question 'What is time?' on its own is of little interest to social scientists. What time is, how it is conceptualized, what it means in practice, how the parameters set by nature are transcended across the ages, what changes are wrought by the quest for know-how and control, all these issues belong together. Collectively, they illuminate the wider picture and provide us with a basis from which to get a sense of the role of time in cultural existence in general and contemporary social life in particular. The conceptual re-presentation and construction of this temporal complexity, historically contextualized, is the task of social theory.

The conventional historical way to make sense of the changes is to tell sequential stories: first this, then that, followed by the next development, with each event-phenomenon located in an objective chronology. The traditional social science way, in contrast, is to impose dualistic categories on the complexity: traditional and modern, sacred and profane, natural and social, qualitative and quantitative time, to pick out just a few of the most prominent ones. Both traditions provide excellent means of illuminating difference and setting boundaries for the phenomena under investigation, but they leave unaddressed the relation of discontinuity to continuity, that is, continuity in the light of fundamental change, of change in relation to the past, and the influence

of context on the merger of present and past. Imposition of chronology and categorization fragments the subject matter, abstracts it from both continuity and the larger picture and grounds the analysis in irreducible difference. Focus on difference, in turn, has the effect of losing sight of the power relations involved, both in the subject matter and in the creation of the subject matter: them and us, then and now, there and here. It fails to note that the 'us', the 'here' and the 'now' always take the unquestioned privileged position from which the subject is transformed into a distant object.

To categorize temporal relations and processes in dualistic terms engages theorists in boundary work, in establishing absolute distinctions, in active detemporalization of the subject matter. To categorize is to abstract from process, to fix and delimit, to construct otherness, to enforce either-or thinking. In the process of categorization theorists not only classify according to absolute criteria that eliminate what falls outside the definitional boundaries, they also render the thus excluded invisible. Lost are processes that bind levels of existence into a unified whole. Lost are practices as contextual process. Lost are difference and deviation from norms. Lost is any sense of negotiation and constructedness. Lost is the role of the theorist in the theory making. The anthropologist Johannes Fabian exposed the political nature of this tradition, showed the inherent distancing of subjects, their translation into objects and the denial of coevalness.¹

The approach I have taken in this book (and in previous work) pursued a different agenda, took us into a number of alternative conceptual terrains. Focus on practices and temporal relations shifted the emphasis away from boundary work to engagement with processes and interdependencies. It opened the pores of encased subjects and softened the edges of bounded relations. It reanimated the ossified object, set it in motion. My intention throughout has been to minimize distance, to see together what conventional analysis had set apart. Through a variety of conceptual, literary and rhetorical devices I have sought to render the distant close and the strange familiar.

No matter where and how we were educated, so my reasoning goes, stories about creation and destiny, beginning and end, about a time before time and a time for redemption,

about water, fire and the cycles of life and death, constitute the bedrock of how our elders have located us in the continuity of existence since time immemorial. Clearly the encounter with death has lost none of its pertinence and terror. The strategies to combat this most existential of concerns may differ between cultures and individuals but every one of us can recognize the fear of nothingness in the multitude of responses I have detailed in these pages. In our confrontation with temporality, so my argument goes, we find our common humanity.

With the spirit tempered by the encounter with death, we are open to the ancient stories and myths, to the projection of immortality on to gods and the comfort derived from rituals. Temporal distance across millennia evaporates as we recognize ourselves in the efforts to come to terms with the inescapability of the existential condition and to temper the effects of time, irrespective of when and where they occurred. Attempts to transcend finitude by cultural means permeate human existence. Differences in the modes of transcendence, as they were and are practised across time and space, can thus be located in the wider context of a common endeavour. Each move can be interpreted within this expanded frame of reference, each culturally based difference located in the pan-human quest, each distant past recognized for its place and relevance in the present.

To acknowledge the power of naming, accept the constructive nature of enquiry (scientific, historical, philosophical) and recognize the constitutive nature of knowledge is to understand social theory as a political endeavour: political in its processes of re-presentation and in its social consequences. From this perspective there is no innocent position from which to produce neutral knowledge, no objective realm from which to conduct acontextual investigations. Thus it deeply matters how we theorize the social relations of time past and present, their geneses and their projected futures. This is nowhere more pertinent than when we engage in analyses of the contemporary condition as theory intersects an open process and reflexively alters condition and outcome.

Notes

Part I What is Time?

1 Time Stories

- 1 Re is also called Ra. As sun god Re is fused with Amun the hidden God and Atum the creator God, the perfect being, the complete one. Thus his name appears not just in the single form but also as Amun-Ra and Re-Atum. See Assmann, *The Search for God in Ancient Egypt*; Geddes & Grosset, *Ancient Egypt*; Hornung, *The Ancient Egyptian Books of the Afterlife*; and Littleton, *Mythology*, pp. 22–30.
- 2 Lippincott et al., *The Story of Time*, p. 3.
- 3 Ibid., pp. 32–3.
- 4 Ibid., p. 32.
- 5 Assmann, *The Search for God in Ancient Egypt*; Geddes & Grosset, *Ancient Egypt*; Hornung, *The Ancient Egyptian Books of the Afterlife*; Littleton, *Mythology*, pp. 26, 36.
- 6 Franz, *Time*, p. 6; Lippincott et al., *The Story of Time*, p. 38.
- 7 In Fagg, *The Becoming of Time*, the triple constellation is presented as Brahma the creator, Vishnu the preserver and Shiva the destroyer, driving the cosmic cycle as successive manifestations of the supreme Brahman (pp. 81, 221). Fagg suggests that the flexible Brahmanical tradition also allows for Vishnu to assume the three roles. See also Franz, *Time*, pp. 7 and 71, plates 31 and 27; Lippincott et al., *The Story of Time*, p. 25.
- 8 Franz, *Time*, pp. 8, 71.

- 9 See Wood, *The Celtic Book of Living and Dying*, p. 37.
- 10 In the cosmology of the Second Dynasty, Ptah was the first god and creator of Ra. He was coeval with the waters.
- 11 See Franz, *Time*, pp. 66–7; Littleton, *Mythology*, p. 139.
- 12 For the gods of chance and fortune, see Franz, *Time*, p. 25.
- 13 Quoted in Whitrow, *Time in History*, pp. 34–5.
- 14 See Dunne, *Time and Myth*, pp. 54–6; also Lippiucott et al., *The Story of Time*, p. 22; Littleton, *Mythology*, pp. 84–6.
- 15 Quoted in Fagg, *The Becoming of Time*, p. 97, from Long, *Alpha*, p. 173, and Reanne, *The Death of Forever*, pp. 97, 99; also Littleton, *Mythology*, pp. 664–6.
- 16 Quoted in Reanne, *The Death of Forever*, pp. 98, 99.
- 17 The concept of 'dream time' was first used in the late nineteenth century by anthropologists who sought to make Aborigine culture comprehensible to Westerners. There is no one word for it but a set of concepts: the Yulngo 'wangarr', the Warlpiri 'tjukurrpa' and the Arrernte 'altyerrenge' are just three prominent examples of reference to an ancestral time-space that plays a central role in Aborigine present and future (Morphy, 'Australian Aboriginal Concepts of Time', p. 265).
- 18 Information drawn from Franz, *Time*, p. 94; Littleton, *Mythology*, pp. 646–9; Morphy, 'Australian Aboriginal Concepts of Time', pp. 264–7; Reanne, *The Death of Forever*, pp. 85–8.
- 19 Extracted from Dunne, *Time and Myth*, pp. 55–6.
- 20 This story is told in Ferguson, *The History of Myths Retold*, pp. 20–3; see also Littleton, *Mythology*, p. 279.
- 21 From the *Oxford Annotated Bible*, p. 1. The creation story of Islam does not differ significantly from the Judeo-Christian one.
- 22 From *New Jerusalem Bible*, p. 1744.
- 23 Rees, 'Understanding the Beginning and the End', p. 287.
- 24 The fine details may differ, but the story of a blissful beginning forms part of the mythology of cultures across the world – Aborigine and Maori, African, Amerindian, Aztec, Chinese, Egyptian, Greco-Latin, Indian, Iranian, Nordic, Tibetan – and of the major religions – Judaism, Christianity, Buddhism, Hinduism and Islam.
- 25 Mbiti, in *African Religions and Philosophy*, cites a great number of those conditions as told in the myths of African tribes: 'Bambuti were forbidden to look at God; the Banyarwanda were forbidden to hide death which God was hunting, the Bartose were forbidden to eat animals which

- should have been their brothers; the Pare were forbidden to eat eggs and the Chagga forbidden to eat one type of yam (*ula*)' (p. 97).
- 26 The apple is a magical fruit in the myths of many cultures, among them Greek, Celtic, Gypsy. For the Myth of the Golden Apples of Idun, see Ferguson, *The History of Myths Retold*, pp. 72–5; Littleton, *Mythology*, p. 308.
- 27 This story which dates from c.2000 BC, is preserved on twelve clay tablets. Its title and first line, 'Sa nagba imuru', are variously translated as, for example, 'He Who Knew All Things' or 'He Who Saw Everything' (Dunne, *The City of the Gods*; Dunne, *Time and Myth*; Ferguson, *The History of Myths Retold*; Littleton, *Mythology*, pp. 116–33; Pritchard, *Ancient Near Eastern Texts*).
- 28 Quoted in Reanne, *The Death of Forever*, p. 93.
- 29 See Littleton, *Mythology*, pp. 42–3, 50–5; Reanne, *The Death of Forever*, pp. 104–5.
- 30 Homer's *Odyssey*, trans. Murray; Dunne, *The City of the Gods*; Dunne, *Time and Myth*; Littleton, *Mythology*, pp. 228–34.
- 31 Dunne, *Time and Myth*, p. 20.
- 32 The poet Dante Alighieri (1265–1321) lived and worked in Florence at a time of great social change and renewal.
- 33 Dante's *Inferno*, Canto XXIV lines 46–51, quoted in Macey, *Encyclopedia of Time*, p. 154.
- 34 Quoted in Dunne, *Time and Myth*, p. 29.
- 35 See Ferguson, *The History of Myths Retold*, pp. 52–3; Littleton, *Mythology*, p. 551.
- 36 This myth is recounted in Ferguson, *The History of Myths Retold*, pp. 112–15; see also Littleton, *Mythology*, pp. 96, 103.
- 37 For this Greek myth, see Ferguson, *The History of Myths Retold*, pp. 120–3; Graves, *The Greek Myths*, pp. 91–8; Littleton, *Mythology*, pp. 162–5.
- 38 See Ferguson, *The History of Myths Retold*, pp. 36–7; also Littleton, *Mythology*, p. 340.
- 39 Matthew 28, *Oxford Annotated Bible*, p. 1212.
- 40 Revelation 20–2, *New Jerusalem Bible*, pp. 2049–51.
- 41 I use the word spirit rather than mind to steer away from scientific mind-brain associations and to retain the mind-spirit connection that is expressed through the German concept of *Geist*.
- 42 For the most explicitly formulated exposition of this theory, see Dawkins, *The Blind Watchmaker*.
- 43 Reanne, *The Death of Forever*, p. 244.

2 Time Theories I

- 1 In addition to primary texts, my account of the classical philosophers' approaches to time draws on Jaspers, *The Great Philosophers*; Russell, *History of Western Philosophy*; A. Weber, *History of Philosophy*; Whitrow, *Time in History*.
- 2 Aristotle, *Physics*, Book IV, extracted in Gale, *The Philosophy of Time*, p. 15; also quoted in Whitrow, *Time in History*, p. 43.
- 3 Aristotle, *Physics*, Book IV, extracted in Gale, *The Philosophy of Time*, p. 17.
- 4 Ibid., p. 18.
- 5 Ibid., p. 21.
- 6 Thompson, 'Time, Work-Discipline and Industrial Capitalism', p. 57.
- 7 Adam, *Time and Social Theory*.
- 8 Quoted in Shallis, *On Time*, p. 17, and Zohar, *Through the Time Barrier*, p. 115.
- 9 Denbigh, *Three Concepts of Time*, p. 4.
- 10 Prigogine, *The End of Certainty*; Prigogine and Stengers, *Order out of Chaos*.
- 11 A. Weber, *History of Philosophy*, p. 357.
- 12 Jaspers, *The Great Philosophers*, p. 420.
- 13 Hegel, *Phaenomenologie des Geistes*, p. 558, my translation. *Geist* is variably translated as mind or spirit. I prefer to use spirit since, as far as I understand Hegel's theory, spirit is the next level, the dialectical synthesis of mind and body.
- 14 Hegel, *The Philosophy of Nature*, p. 230.
- 15 Ibid., p. 231.
- 16 Ibid.
- 17 As I discovered in secondary texts that focused explicitly on time in Hegel's work such as Gosden, *Social Being and Time*; Heidegger, *Being and Time*; Kirkland, 'Hegel, Georg Wilhelm Friedrich'; Mays, 'Temporality and Time in Hegel and Marx'.
- 18 Marx, *Grundrisse*, p. 140.
- 19 On the issue of commodified time, see also Giddens, *A Contemporary Critique of Historical Materialism*, pp. 118–20, 130–5; Harvey, *The Condition of Postmodernity*; Ingold, 'Work, Time and Industry'.
- 20 It was prefigured in Marx's 1844 *Economic and Philosophical Manuscripts*, as well as his 1857 *Grundrisse*.
- 21 Marx, *Capital*, Volume I, p. 534.
- 22 Ibid., p. 542.

- 23 Franklin, 'Necessary Hints to Those that would be Rich', p. 80, quoted in M. Weber, *The Protestant Ethic and the Spirit of Capitalism*, pp. 48–50.
- 24 M. Weber, *The Protestant Ethic and the Spirit of Capitalism*, pp. 118–19. Social scientists, such as Lewis Mumford (*The Human Prospect*) and Eviatar Zerubavel (*Hidden Rhythms*), writing later on this theme, concentrated exclusively on the Benedictine monks for their elaborations on these connections.
- 25 M. Weber, *The Protestant Ethic and the Spirit of Capitalism*, pp. 118–19, 154.
- 26 Ibid., p. 124.
- 27 Albrow, *Max Weber's Construction of Social Theory*.
- 28 H. Hubert published his essay 'Étude sommaire de la représentation du temps dans la religion et la magie' (in English as *Essay on Time*) in 1905. M. Mauss wrote a critique and both essays were published in 1909 as *Mélanges d'histoire des religions*. Durkheim gave a first lecture course on religion in 1894–5 and he lectured on 'The Elementary Forms of Religious life' in 1900–1 and again on 'Religious Origins' in 1906–7 (Lukes, *Émile Durkheim*). He published *The Elementary Forms of Religious Life* in 1912; the first English translation was published in 1915.
- 29 Durkheim, *The Elementary Forms of Religious Life*, p. 9.
- 30 Ibid., pp. 18–19. I will come back to this statement in the next chapter when I discuss Mead's response to the same question.

3 Time Theories II

- 1 Plotinus, Third Ennead, Seventh Tractate, sections 7–13, extracted in Gale, *The Philosophy of Time*, pp. 30–7, here at p. 30.
- 2 Ibid., pp. 31, 33, 37.
- 3 St Augustine, *Confessions*, Book XI, extracted in Gale, *The Philosophy of Time*, p. 45. In the translation by Dodds, extracted in Bourke, *The Essential Augustine*, p. 234, this same passage is translated as: 'My mind burns with eagerness to gain knowledge of this complicated problem . . .'
- 4 St Augustine, *Confessions*, Book XI, extracted in Gale, *The Philosophy of Time*, p. 39.
- 5 St Augustine, *The City of God*, Book XI, 5–6, extracted in Bourke, *The Essential Augustine*, p. 109.

- 6 St Augustine, *Confessions*, Book XI, extracted in Bourke, *The Essential Augustine*, p. 242.
- 7 His most quoted passage on the matter is extracted in Bourke, *The Essential Augustine*, pp. 228–9, and in Gale, *The Philosophy of Time*, p. 40.
- 8 St Augustine, *Confessions*, Book XI, quoted in Jaques, *The Form of Time*, p. 5.
- 9 Kierkegaard, *The Concept of Dread*, quoted in Dreyfus, 'Human Temporality', p. 151, and Fagg, *The Becoming of Time*, p. 178.
- 10 Dreyfus, 'Human Temporality', p. 151.
- 11 Bergson's major theories of time are to be found in his *Time and Free Will* (1889), *Matter and Memory* (1896) and *Creative Evolution* (1907).
- 12 Game, *Undoing the Social*, p. 95.
- 13 Bergson, *Creative Evolution*, pp. 48–9.
- 14 Phenomenology was a much-used philosophical concept before Husserl developed it as a systematic method of scientific inquiry.
- 15 Perry, *Philosophy since 1860*, p. 586.
- 16 Husserl, *The Phenomenology of Internal Time Consciousness*, p. 110.
- 17 Gosden, *Social Being and Time*, p. 108.
- 18 Heidegger, *Being and Time*, pp. 426–7.
- 19 Whitehead, *An Enquiry Concerning Principles of Natural Knowledge*, p. 17.
- 20 Whitehead, *Process and Reality*, p. 32.
- 21 Adam, *Time and Social Theory*.
- 22 Barnett, *The Universe and Dr Einstein*, p. 41.
- 23 Adam, *Time and Social Theory*.
- 24 Capra, *The Turning Point*, p. 75.
- 25 *Ibid.*, p. 83.
- 26 On the importance of Mead's time theory see also Adam, *Time and Social Theory* and *Timewatch*; Bergmann, 'The Problem of Time in Sociology'; Eames, 'Mead's Concept of Time'; Flaherty and Fine, 'Present, Past and Future'; Giddens, *Central Problems in Social Theory*; Luhmann, 'World-Time and System History'; Joas, G. H. Mead.
- 27 Mead, *The Philosophy of the Present*, pp. 19–20.
- 28 *Ibid.*, p. 1.
- 29 *Ibid.*, p. 22.
- 30 In his later work Bergson too moved towards this conceptualization, see Capek, *Bergson and Modern Physics*, pp. 190–4.
- 31 Schutz, *The Problem of Social Reality*, pp. 172–3.

Part II What is the Role of Time in Social Life?

- 1 Gosden, *Social Being and Time*, pp. 34–5.
- 2 E. Becker, *The Denial of Death*, p. ix.
- 3 Heidegger, *Being and Time*, p. 427.

4 Cultural Practices of Time Transcendence

- 1 Gosden, *Social Being and Time*, p. 9.
- 2 The work of Evans-Pritchard (*The Nuer*), Lévi-Strauss (*Structural Anthropology*) and Whorf (*Language, Thought and Reality*) can serve as prime exemplars for this approach; see Adam, 'Perceptions of Time'.
- 3 I have written on this classical perspective and argued extensively against this position. For more detailed discussions see Adam, *Time and Social Theory*; 'Perceptions of Time'; *Timewatch*.
- 4 Reanne, *The Death of Forever*, p. xxi.
- 5 Eliade, *The Myth of Eternal Return*, p. xii. Eliade designates myths 'exemplary models', 'paradigms' and 'archetypes'. To avoid conceptual confusion with the very different meanings given to the concepts by Thomas Kuhn and C. G. Jung respectively I will avoid the terms paradigms and archetypes.
- 6 *Ibid.*, pp. 6, 21.
- 7 *Ibid.*, p. 34.
- 8 The emphasis is on origin rather than the beginning since only origin can be 'enpresenced'.
- 9 Eliade uses both 'abolished' and 'suspended' (*The Myth of Eternal Return*, p. 35) and I wonder whether we are encountering here a problem of translation since only suspension of profane time seems to me to be appropriate to the processes in question. He also uses the term 'annulment', which I find as problematic as abolishment. The German *Aufhebung* with its triple meaning would be a very helpful concept here: ceasing/stopping/getting rid of, safe-keeping out of sight, and lifting to a higher level (see chapter 2).
- 10 Dossey, *Space, Time and Medicine*, pp. 28–31.
- 11 For these thoughts on monumental architecture I draw primarily on the work of Critchlow, *Time Stands Still*, who has written most perceptively on the temporality of megaliths and Neolithic artefacts.
- 12 Critchlow, *Time Stands Still*, p. 151.
- 13 Cohen, *Behaviour in Uncertainty*.
- 14 Black, *Nostradamus*.

- 15 Assmann, *The Search for God in Ancient Egypt*, p. 35.
- 16 See *ibid.*; Geddes & Grosset, *Ancient Egypt*; Hornung, *The Ancient Egyptian Books of the Afterlife*; Littleton, *Mythology*.
- 17 Based on much earlier coffin texts from the Sixth Dynasty, about 2658–2185 BC.
- 18 While in the old kingdom the transfer to eternity was the preserve of pharaohs, in later times it was open to anyone who could afford the rituals necessary for safe passage.
- 19 Littleton, *Mythology*, p. 185.
- 20 In Nordic myths too there is a strong tendency for prophecies to come true no matter how hard gods and mortals try to avert the destiny thus prophesied. In the myth of 'The Death of Balder the Beautiful', even the all-powerful Odin, god of light, and his wife, Frigg, are unable to prevent the killing of their son, as foretold in the prophecy (Ferguson, *The History of Myths Retold*, pp. 38–43; also Littleton, *Mythology*, pp. 286–93).
- 21 Littleton, *Mythology*, p. 223.
- 22 Zohar, *Through the Time Barrier*, p. 16.
- 23 Quoted in *ibid.*, p. 18.
- 24 It was C. G. Jung's interest in the *I Ching* that opened it up to the West, and his writings on Synchronicity that explained the difference between causal thought and the understanding of significant coincidences. See Jung, *Synchronicity*; Franz, *Number and Time*; Franz, *Time*; Franz, *On Divination and Synchronicity*.
- 25 Jung, *Collected Works*, vol. 1, pp. iii–iv, quoted in Franz, *Time*, pp. 26–7.
- 26 It is however in tune with some of the basic tenets of quantum physics, as outlined in chapter 3. On the similarities with and differences from quantum physics see, for example, Capra, *The Tao of Physics*, and Zohar, *Through the Time Barrier*.
- 27 We know about the earliest human cultures because they left records of their activities. Archaeological records suggest that they buried their dead, harnessed fire, used tools and created artefacts and architecture. Each of these marks of culture encompasses specific temporal relations and particular engagements with finitude and transience. For archaeological records of approaches to time see Gosden, *Social Being and Time*.
- 28 For an overview of time in the major religions, see Balslev and Mohanty, *Religion and Time*; Fagg, *The Becoming of Time*, chs 6 and 12; relevant chapters in Macey, *Encyclopedia of Time*; and for Christian thought see Russell, *History of Western Philosophy*.

- 29 See Balslev, *A Study of Time in Indian Philosophy*; Hopkins, *The Hindu Religious Tradition*; Fagg, *The Becoming of Time*, chs 6 and 12.
- 30 Note the parallels with quantum physics, outlined in chapter 3, and Capra's suggestion that 'There is motion but there are, ultimately, no moving objects; there is activity but there are no actors; there are no dancers, there is only the dance' (*The Turning Point*, p. 83). For Buddhist approaches to time see Balslev, *A Study of Time in Indian Philosophy*; also Macey, *Encyclopedia of Time*.
- 31 See also St Augustine (chapter 3) who is considered to be the principal theorist of Christian time.
- 32 Goodman, 'Time in Islam', p. 139, quoted in Fagg, *The Becoming of Time*, p. 89.
- 33 There is evidence of burial, for example, from the megalithic period on the Scottish islands of Orkney and Arran, in Wales and Brittany, from the early Bronze Age in Denmark and Turkey, from the Neolithic period in the Outer Hebrides of Scotland and the South of England.
- 34 Barrett, Bradley and Green, *Landscape, Monuments and Society*.
- 35 Gosden, *Social Being and Time*, p. 88.
- 36 Mbiti, *African Religions and Philosophy*, pp. 149–66.
- 37 Plato, *Epinomis*, 991E1–4, quoted in Critchlow, *Time Stands Still*, p. 51.
- 38 For the background information to my argument I draw exclusively on Keith Critchlow's chapter 'Platonic Spheres – a Millennium before Plato', in *Time Stands Still*, pp. 131–49.
- 39 *Ibid.*, p. 132.
- 40 *Ibid.*, p. 145.
- 41 Plato, *The Timaeus, and the Critias*, pp. 173–5, cited in Critchlow, *Time Stands Still*, ch. 7.
- 42 For those two myths in particular, see Ferguson, *The History of Myths Retold*, pp. 66–9.
- 43 Eliade, *The Myth of Eternal Return*, pp. 28–9.
- 44 For the temporalities of text, image and film see Gross, 'Reading Time'.
- 45 Van Gennep, *The Rites of Passage*.

5 In Pursuit of Time Know-how

- 1 For a detailed analysis of the history of culture from archaic via magical and mythological to mental and integrated systems of existence, see the two-volume work of Jean Gebser, *The Ever-Present Origin*.

- 2 Coser and Coser, 'Time Perspective in Social Structure'; Elias, *Time*; Jaques, *The Form of Time*; Lauer, *Temporal Man*; Lewis and Weigert, 'Structures and Meanings of Social Time'; Nowotny, 'Time Structuring and Time Measurement'; Sorokin, *Sociocultural Causality, Space and Time*; Sorokin and Merton, 'Social Time'; Zerubavel, *Hidden Rhythms*; Zerubavel, *The Seven Day Circle*.
- 3 Elias, *Time*, pp. 6, 8.
- 4 For detailed analyses and histories of calendar systems from across the world, see Landes, *Revolution in Time*; Richards, *Mapping Time*; Borst, *The Ordering of Time*. For general introductions, see Macey, *Encyclopedia of Time*, entries under Archaeoastronomy, Archaeology and Time's Measurements and Divisions, as well as Lippincott et al., *The Story of Time*, pp. 30–169.
- 5 Aveni, *Archaeoastronomy in Pre-Columbian America*; Aveni, *Skywatchers of Ancient Mexico*; Aveni, 'Archaeoastronomy'; Heggie, *Archaeoastronomy in the Old World*; Ruggles, *Megalithic Astronomy*; Ruggles, *Records in Stone*; Ruggles, 'British Archaeoastronomy'.
- 6 See also chapter 4 on the cultural time practices of transcendence, especially the sections on monumental architecture and the carved stone spheres of Neolithic Britain.
- 7 See Ruggles, 'British Archaeoastronomy', pp. 68–9, and on the changing relation to death see also Gosden, *Social Being and Time*, esp. ch. 5.
- 8 Zerubavel, *The Seven Day Circle*, p. 31.
- 9 Durkheim, *The Elementary Forms of Religious Life*, p. 23.
- 10 See Eliade, *The Sacred and the Profane*; Leach, *Rethinking Anthropology*; Lévi-Strauss, *The Savage Mind*.
- 11 Durkheim, *The Elementary Forms of Religious Life*.
- 12 For information on Maya and Mesoamerican calendars and chronology see, for example, Aveni, *Skywatchers of Ancient Mexico*; Closs, 'Maya Calendars and Chronology', pp. 364–9; Thompson, 'Maya Astronomy', pp. 83–98.
- 13 For cultural variations on the week, see Zerubavel, *The Seven Day Circle*, esp. ch. 3.
- 14 On time in India, see Lippincott et al., *The Story of Time*, pp. 42–8.
- 15 For transcendence of seasonal cycles, see also chapter 4.
- 16 Landes, *Revolution in Time*, p. 33.
- 17 For details of these two fascinating attempts to change the calendar, see Zerubavel, *The Seven Day Circle*, ch. 2.
- 18 For information on Japan's Westernization of time, see Nishimoto, 'The "Civilization" of Time', pp. 237–60.

- 19 Mumford, *The Human Prospect*, p. 3.
- 20 Landes, *Revolution in Time*, p. 17.
- 21 Mumford, *The Human Prospect*, p. 9.
- 22 For work detailing that slow development see Thrift, 'Owners' Time and Own Time' and 'Vicos Voco'.
- 23 Landes, *Revolution in Time*, pp. 59–64.
- 24 M. Weber, *The Protestant Ethic and the Spirit of Capitalism*.
- 25 For example by the historians Landes, *Revolution in Time*, and Le Goff, *Time, Work and Culture in the Middle Ages*, as well as the social scientists Mumford, *The Human Prospect*, and Zerubavel, *Hidden Rhythms*, ch. 2.
- 26 Landes, *Revolution in Time*, p. 60.
- 27 Ibid., p. 93.
- 28 Mumford, *The Human Prospect*, p. 5.
- 29 See Bartky, *Selling the True Time*, for a detailed historical account of the establishment of standard railway time in North America.
- 30 For a documentary novel on the subject see Sobel, *Longitude*, and for a brief account of the entire history see Andrewes, 'Longitude', pp. 346–50; also Landes, *Revolution in Time*.
- 31 Andrewes, 'Longitude', p. 346.
- 32 Kern, *The Culture of Time and Space 1880–1919*.
- 33 Ibid., pp. 66–8.

6 The Quest for Time Control

- 1 Some of this chapter's material has been researched for two recently completed journal articles: Adam, 'The Gendered Time Politics of Globalisation' and 'Reflexive Modernisation Temporalised'. A certain amount of overlap with that work is therefore unavoidable.
- 2 M. Weber, *The Protestant Ethic and the Spirit of Capitalism*.
- 3 This perspective also applies to Islam but not to Judaism. The difference was one important reason why the time merchants of the Middle Ages were predominantly Jewish traders.
- 4 See Le Goff, *Time, Work and Culture in the Middle Ages*, especially his illuminating part 1 on 'Time and Labour'.
- 5 Ibid., p. 30.
- 6 For further detail see ibid., pp. 29–100.
- 7 Franklin, 'Necessary Hints to Those that would be Rich', quoted in M. Weber, *The Protestant Ethic and the Spirit of Capitalism*, pp. 48–50.
- 8 Schultz, *Der erregende Mythos vom Geld*, p. 193.
- 9 For examples of such an approach, see Adam, *Timescapes of Modernity* and 'The Gendered Time Politics of Globalisation'.

- 10 Rifkin, *Time Wars*, pp. 3–4.
- 11 Harvey, *The Condition of Postmodernity*.
- 12 Kern, *The Culture of Time and Space 1880–1919*.
- 13 Marinetti (1909) in Apollonio, *Futurist Manifestos*, pp. 1–24.
- 14 Marinetti (1909) in Flint, *Marinetti*, p. 41.
- 15 For my outline of Virilio's work on speed I draw on a number of publications: Virilio's exhibition catalogue *La Vitesse*, and two of his translated books, *The Art of the Motor* and *Open Sky*.
- 16 For a detailed cultural analysis of these changes, see Kern, *The Culture of Time and Space 1880–1919*.
- 17 See, for example, Whitelegg, *Transport for a Sustainable Future*; Whitelegg, *Critical Mass*.
- 18 Virilio, *La Vitesse*; *Open Sky*.
- 19 Rifkin and Howard, *Entropy*, p. 264.
- 20 Virilio, *La Vitesse*, p. 65.
- 21 Virilio, *Open Sky*. In contrast to Virilio, Zygmunt Bauman writes about 'dephysicalization' where the power holders of global finance and cyberspace, for example, become truly extraterritorial, even extraterrestrial (*Globalization*, p. 19).
- 22 Virilio, *Open Sky*, pp. 10–11.
- 23 Virilio, *The Art of the Motor*, p. 85.
- 24 Virilio, *Open Sky*, p. 20.
- 25 Bauman, *Globalization*, pp. 8–9.
- 26 Virilio, *The Art of the Motor*, p. 99.
- 27 Ibid., p. 100.
- 28 Ibid., p. 123.
- 29 Castells, *The Rise of the Network Society*, p. 461.
- 30 Ibid., p. 464.
- 31 Ibid., p. 463.
- 32 Hassan, 'Network Time and the New Knowledge Epoch', p. 234.
- 33 Ibid., p. 235.
- 34 Beck, 'The Politics of Risk Society', p. 15.
- 35 Adam, 'The Gendered Time Politics of Globalisation'.
- 36 Melbin, *Night as Frontier*; Kern, *The Culture of Time and Space 1880–1919*.
- 37 A particularly powerful account of such an occasion is given in Raymond Murphy's 'Nature's Temporalities and the Manufacture of Vulnerability', an essay on the temporality of an unusually fierce winter ice storm in Canada which, in some cases, left people without electricity and heating for over one week.
- 38 For the creation of clock time see chapter 5, for commodification and compression see the earlier sections in this chapter, for the (re)formulation in Newtonian science see chapters 2 and 3.

- 39 The material in this box is replicated from Adam, 'Reflexive Modernisation Temporalised'.
- 40 On the subject of disembedded time see also Giddens, especially *The Consequences of Modernity*.
- 41 For an expanded argument, see Adam, *Time and Social Theory*, pp. 138–48, and *Timescapes of Modernity*.
- 42 G. S. Becker, 'A Theory of the Allocation of Time'; Sharp, *The Economics of Time*.
- 43 I have already alluded to a similar distinction in chapter 4 where I was explaining the difference in time arresting and eliminating practices by contrasting the performance of a ritual with listening to a Beethoven piano concerto on a compact disc.
- 44 See for example the classic work of Shackle, *Time in Economics*.
- 45 Giddens, *Reith Lecture 2: Risk*, p. 2.
- 46 For an economic treatise on discounting, see Price, *Time, Discounting and Value*. For a brief socio-environmental comment on the practice, see Adam, *Timescapes of Modernity*.
- 47 Nowotny, *Time*.
- 48 Serres, *Genesis*, p. 93.
- 49 Castells, *The Rise of the Network Society*.
- 50 Poster, *The Mode of Information*, p. 3.
- 51 For a more detailed argument on this subject, see Adam, *Timescapes of Modernity* and 'The Temporal Gaze'; Kolle, 'The Limits of Experimental Knowledge'.
- 52 Beck, 'The Reinvention of Politics'.

Epilogue

- 1 Fabian, *Time and the Other*; Fabian, *Time and the Work of Anthropology*.

Further Reading

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Index

- a priori* knowledge *see* knowledge
- action: Schutz on 67-9
- African mythology 154-5*n*
- agriculture 88; genotechnology 142; technical control 96-7
- Albrow, M. 44
- Anaxagoras 25, 63
- Anne, Queen 118
- anthropology: structure and number 93-4
- Apaches 9
- archaeology 93, 160*n*;
Neanderthal burials 92; time reckoning 104-5
- Aristotle: form and measure of motion 27-9; Newton and 29; *Physics* 28
- art and architecture: ancient megalithic temples 80-1; arresting time 79-81
- Assmann, Jan 84
- astronomical bodies: calendars and 109-11; cycles of 105-8; mythology of cycles 6; rhythms of 99
- Augustine, Saint 157*n*; *The City of God* 53; *Confessions* 52, 53; consciousness of time 52-4; later influence 57, 65; past/present/future 69; Plotinus and 51
- Australian Aborigines: arresting time 77; dream time 9, 154*n*
- Aztecs 105, 107; mythology 7, 14-15
- Babylonia 110; mythology 15; reckoning time 104-5, 107
- Barrett, J. 91
- Bauman, Zygmunt 132-3
- Beck, Ulrich 136, 147
- Becker, Ernest: *The Denial of Death* 72
- Becker, Gary 139-40
- being and becoming *see* existence
- Being and Time* (Heidegger) 57-9
- Bergson, Henri 30, 55-6; Heidegger and 58; Mead and 65

- Big Bang theory 10–11
 birth and fertility 14–15
 Bohr, Niels 62
 Boltzmann, Ludwig Eduard 31
 Book of the Dead 84
 Bradley, R. 91
 Britain: global clock-time 117;
 Neolithic 107
 Buddhism 90–1
 burials *see* death and decay;
 funeral rites

 calendars 103, 104;
 astronomical cycles 109–11;
 first cultures and 107–8;
 Mayan 108–9; revolutionary
 111; sacred and profane time
 110–11
Capital (Marx) 38, 39
 capitalism: clock-time and
 113–14; production 128–9;
 relation to future 141
 Capra, Fritjof 63
 Castells, Manuel: *The Rise of
 the Network Society* 134–5
 causality: Aristotle on 27;
 foretelling and 87
 Celtic culture 7 *see also* Druids
 change 74; Aristotle on 28;
 beliefs and 91; Marx's
 perspective 40
 China: the calendar 111;
 clock-time and 113, 114–15;
 heavenly cycles 6; *I Ching*/
 Book of Changes 86;
 reckoning time 104–5, 107
 Christianity 90, 91;
 commodified time 125–6;
 creation 10; resurrection
 16–17; Weber on 'Protestant
 ethic' 41–5
 classification 144
 clock-time 44, 49, 66, 70, 101;
 colonization and 136–9;
 control and 145–7;
 creation of 112–17;
 cultural differences 112–13,
 114–15; nature to mechanics
 113–16; social relations and
 127–8; speed and 128;
 transmitted time signals 119
 Cohen, John 82
 coincidence 8, 87
 colonization 124; clock-time
 and 136–9; economics of
 139–41; other cultures
 136–8; science and the future
 141–2
 communication: instantaneity
 119–21, 131–3
 compression 124; economics of
 128–9; technology and
 130–8
*The Condition of
 Postmodernity* (Harvey) 125
 consciousness 67–9
*A Contemporary Critique of
 Historical Materialism*
 (Giddens) 124–5
 control 124; technology and
 145–7; timescapes and
 143–5
 cosmology 110
 creation: Big Bang theory
 10–11; mythology 7–11
 Critchlow, Keith 80–1, 94
The Critique of Pure Reason
 (Kant) 34–5
 culture: clock-time and
 112–13; practices 71–2;
 rhythms of 94–8
 cycles 74; archaic societies
 75–6; death and 98–100;
 heavenly 105–8; knowledge
 and 102; of life in society
 98–9; reckoning time 104–5
 see also rhythm
 Dante Alighieri: *Divine
 Comedy* 13–14
 death and decay 74; burial and
 rituals of 89–90, 92, 93–4;

- cycles and 98–100; fear of
 72, 152; mythology and
 12–13 *see also* immortality
 Delphic oracle 85
 Democritus 25–6, 63
 Denbigh, K. G. 31
The Denial of Death (Becker)
 72
Divine Comedy (Dante)
 13–14
 dreams: Aboriginal dream time
 9, 154n; conceptions of 19
 Dreyfus, H. L. 55
 dromological law 131
 Druids 85–6
 Durkheim, Émile 22, 157n; on
 calendars 107; *Elementary
 Forms of Religious Life* 46,
 103; Plato's influence 27;
 social theory 36–7; social
 time 45–9

 economics: compression of
 time 128–36; inequalities
 127, 131; labour time
 38–40, 126–7; time as
 resource 41–5, 139–40
 education 116
 Egypt 83; Book of the Dead
 84; mythology of 6–7, 7,
 12–13, 77, 92–4, 153n;
 reckoning time 104–6, 107;
 seasons 110
 Einstein, Albert: relativity
 theories 61–2
*The Elementary Forms of
 Religious Life* (Durkheim)
 46, 103
 Eliade, Mircea 77, 97, 159n
 Elias, Norbert 104
 energy: entropy 29;
 thermodynamics and 31–3
 Enlightenment thought 33–4
 see also Hegel, Georg W. F.;
 Kant, Immanuel
The Enneads (Plotinus) 51–2

 environment: economic analysis
 and 135; prediction and
 87–9; social sciences and
 131
 epistemology: Husserl on 57
 see also knowledge
 eternity: structure and
 numbers 93–4 *see also*
 immortality
 events: capturing performance
 79
 existence: fear of non- 72;
 Kierkegaard on 54–5
 experience 69; knowledge and
 47

 Fabian, Johannes 151
 fate and foretelling 149; Greek
 oracles 85; history of
 divination 82–7; science and
 technology 87–9; use of past
 140
 food preservation 96
 Fordism 128
 France 104; revolutionary
 calendar 111, 112
 Franklin, Benjamin 44, 126;
 time is money 41–2
 funeral rites 89–90, 92, 93–4;
 of Neanderthals 92
 future *see* fate and foretelling;
 past/present/future

 Game, Ann 55–6
 Genesis, Book of 10
 Gennep, Arnold van 98–9
 genotechnology 96–7, 142,
 145–6, 147
 geographical time 117–19
 George III, King 118
 Geronimo 9
 Giddens, Anthony 141; *A
 Contemporary Critique of
 Historical Materialism*
 124–5
 Gilgamesh, Epic of 12

- globalization: of clock-time 117–19; instant communication 119–21; time signals 118–19; Westernized time systems 111–12
- Gosden, Christopher 71, 75, 91
- Greece: mathematics 93; mythology 7–8, 15–16; oracles 85; philosophy and time 23–9
- Green, M. 91
- Greenwich Mean Time (GMT) 117
- Grundrisse* (Marx) 38
- Harrison, John 118
- Harvey, David 128; *The Condition of Postmodernity* 125
- Hassan, Robert 135–6
- Hegel, Georg W. F. 23; dialectical reasoning 35–6; eternal time 36; Marx and 37; Newton's influence on 30; ontology 36; *Phenomenology of Mind* 36; *Philosophy of Nature* 36; religio-cultural change 44
- Heidegger, Martin 69, 71; *Being and Time* 57–9; fear of non-existence 72
- Heisenberg, Werner 62, 63–4
- hell *see* other worlds
- Heraclitus 24–5, 36
- Hidden Rhythms* (Zerubavel) 108
- Hinduism 6, 7; 'Churning of the Ocean of Milk' 16; Moksha 90
- history: Durkheim on 47–8; Marxism and 40–1
- Homer: *The Odyssey* 13
- Howard, T. 131
- Hubert, H. 157n
- Husserl, Edmund 65, 66, 69; Heidegger and 58; living present 56–7; *The Phenomenology of Internal Time Consciousness* 57
- I Ching*/Book of Changes 86
- Icelandic mythology 9–10
- immortality 123; burial of dead and 89–90, 92, 93–4; fear of death 152; knowledge and 19; resurrection 13, 16–17, 77, 92; science and 147
- Incas 105
- India: arresting time 77; mythology 153n; reckoning time 104–5, 107; time stories 6, 7, 16
- industry: colonizing with time 137–8; time control and 123, 143–5 *see also* capitalism
- instantaneity/simultaneity 103, 146; communication and 119–21, 131–3, 135
- institutions 1
- International Meridian Conference 117
- Inuit moon spirit 6
- Islam 90, 91; non-mechanical time 113, 115
- Japan: Westernizing time 137
- Jews and Judaism 90, 91, 163n; creation 10; fate and foretelling 83; prayer time 115; rhythms of life 108
- John, Gospel of 10
- Jung, Carl Gustav 86, 160n
- Kant, Immanuel: *The Critique of Pure Reason* 34–5; Newton's influence on 30;

- noumenon* 35; *a priori* knowledge 45–6; religio-cultural changes 44
- Kern, Stephen 119, 129, 138
- Kierkegaard, Søren 51, 57–8, 65
- knowledge: eternal life and 19; experiential 47; external representations 79–81; the future and 142; Heidegger's Being 58; information processing 132; know-how 102–3; perception of time 66; as political endeavour 152; *a priori* 33–5, 45, 55–6; transcendent 47, 70
- labour: commodified time and 38–41, 126–7
- Landes, David 111, 113, 115
- Le Goff, Jacques 125–6
- Le Roy, Pierre 118
- Lévi-Strauss, Claude: *The Savage Mind* 77
- literature 1; narrative rhythm 97–8; other worlds and 13–14 *see also* mythology
- Lockyer, Sir J. Norman 105
- Longitude Act 118
- Longitude* (Sobel) 118
- luck: deities of 8; Mayan calendars and 109
- Maori mythology 9
- Marconi, Guglielmo 119–20
- Marinetti, Filippo Tommaso 129–30
- Marx, Karl 22, 128; *Capital* 38, 39, 124; change and 40; commodified labour-time 38–41, 124–5; *Grundrisse* 38, 124; Hegel and 36, 37; historical time 40–1; Plato's influence 27; social theory 36–7
- mathematics: as ritual 93–4; structure and number 93–4
- Mauss, Marcel 157n
- Maxwell, James Clark 119
- Mayans 105, 107; calendar of 108–9
- Mbiti, John 93
- Mead, George Herbert 22, 53–4; *The Philosophy of the Present* 64–6; Whitehead and 60
- medical technology: transplantation 130, 133–4
- Melbin, Murray 138
- Merlin 85–6
- Mesopotamian mythology 8–9
- motion: Aristotle on 27–9; atoms in 25–6; Einstein's relativity 61–2; quantum physics and 63; time and 51–3
- Mumford, Lewis 111, 112, 114, 115
- Murphy, Raymond 164n
- music: performance of 79, 165n; rhythm and 97
- mythology 1; arresting time 77–9; contemporary meaning and 17–20; controlling time 146; creation 7–11; death and resurrection 12–13, 13, 16–17; earthly cycles 6–7; Egyptian 84, 92; Eliade on 159n; fear of death and 152; heavenly cycles 6; of moments 8; paradise and loss 11, 18; renewal and regeneration 14–16, 18; of time stories 4 *see also* literature
- Native Americans: Apache creation myth 9
- nature: clocks and 113 *see also* astronomical bodies

- Newton, Isaac: Aristotle and 29; clockwork universe 29–31; overturned 31–3, 60–1, 63; *The Principia* 29
 Norse myth 12, 160n
 Nostradamus 83
noumena 49; Aristotle on 29; Kant and 35; Plato's 26–7; Whitehead and 60
 Nowotny, Helga 142
 nuclear power 88–9, 147
- The Odyssey* (Homer) 13
 ontology: Greek thought 23–4; Hegel on 36
 other worlds: Egyptian Book of the Dead 84; fear of death and 72; myth and literature 5–6, 13–14, 15–16; Plato's *noumena* 19, 26–7
- paradise 11, 18
 paradox of Zeno 24
 Parmenides 24, 25, 65
 past/present/future 149; colonization of 140–3; existence and becoming 54–60; historical sense 150–1; Mead on 64–6; social theory 69; St Augustine on 53–4 *see also* fate and foretelling
 permanence: beliefs and 89–94 *see also* immortality
 Perry, R. B. 56–7
 phenomenology: Husserl 56–7; Schutz and 66–9
The Phenomenology of Internal Time Consciousness (Husserl) 57
Phenomenology of Mind (Hegel) 36
 phenomenon 35
Philosophy of Nature (Hegel) 36
- The Philosophy of the Present* (Mead) 64–6
 Plato 35; numbers and geometry 93, 94; theory of ideas/*noumena* 19, 26–7, 60
 Plotinus: *The Enneads* 51–2
 politics 139
 Poster, Mark 146
 power relations 1
 prediction *see* fate and foretelling
 Prigogine, Ilya: dissipative structures 32–3
The Principia (Newton) 29
The Protestant Ethic and the Spirit of Capitalism (Weber) 41–5
 Pythagoras 94, 106
- quantum physics 62–4, 160n
- reality: time as expression of 59–60
 Reaney, D. 20, 76
 reason: *a priori* knowledge and 34–5; dialectical 35–6, 37
 reckoning *see* calendars; clock-time
 religion and belief systems: ancient concepts 3–4; change 91; Durkheim on 45–6; immortality and permanence 89–94; prayer time 115
 resurrection *see* immortality
 rhythm: clock-time and society 116; counting time and 103; modifying 94–8; music and literature 97–8
 Richard II the Lionheart 85–6
 Rifkin, Jeremy 131; *Time Wars* 128
The Rise of the Network Society (Castells) 134–5

- ritual: arresting time 77–9; life cycles and 98–9; technology replaces need for 138
 Russia: revolutionary calendar 111, 112; Westernizing time 137
- sacred and profane time 108; calendars and 110–11
The Savage Mind (Lévi-Strauss) 77
- Schurz, Alfred 22, 53–4, 66–9; *The Problem of Social Reality* 67
- science 139; atoms in motion 25–6; Big Bang theory 10–11; colonization of future 141–2; Einstein's relativity 61–2; Newton overturned 60–1, 63; Newton's clockwork universe 29–31; prediction 87–9; Prigogine's dissipative structures 32–3; quantum physics 62–4, 160n; space-time 56; thermodynamics and energy 31–3
- Serres, Michel 144
 Sharp, Clifford 139–40
 shipping 118
 Sobel, Dava: *Longitude* 118
 social science theory 1–2; constructivism 47–8; context of concepts 150–3; Durkheim's social time 45–9; engagement in time 22–3; environment and 131; Mead's past/present/future 64–6; from ontology to practice 36–7; as political endeavour 152; Weber on economics of time 41–5
 society 1, 101; archaic 75–6; rhythms of 99, 116;
- structures of 71–2; transplants and 130
 soul/spirit: defining 155n; Greek thought 26; Kierkegaard on existence 54–5
 space-time 55–6
 Standard Railway Time 117
 Su Sung 113
 Sumeria 107
- Taoism 86, 90, 91
 Taylorism 128
 technology 2; agriculture 96–7; clocks 112–13, 118–19; communication 119–21, 131–3; compression and 130–8; conquest of cold and dark 138; control of time with 145–7; cultural effects 73; fire and daily rhythms 95–6; genetic 142, 145–6, 147; information processing 132–3; scientific prediction and 87–9; transplants 133–4; transport 130–1
 telegraphy 119–20
 thermodynamics, laws of 31–3
 Thom, Alexander 106
 Thompson, E. P. 29; 'Time, Work-Discipline and Industrial Capitalism' 113–14
 time: absolute 30–1; arresting 77–81; categorizing relations 151–2; colonization 136–43; commodified 38–41, 139–40; complexities and hierarchies 122; compressions 128–36; control with 143–8; controlling 121, 123–4; defining 3–5, 21, 50; as eternal 36; linear 75–6;

time (*cont'd*)

multiple expressions of 1-2;
reckoning 103-12;
representation and 79-81;
space and 55-6;
transcendence 74 *see also*
calendars; clock-time;
rhythm
The Time Machine (Wells) 129
time travel 129
Time Wars (Rifkin) 128
timescapes 143-5
transcendence 74, 143, 152;
immortality and 147;
knowledge and 47, 70
transience 74
transplants 133-4, 146
travel and transport:
compression of 130-1;
controlling time 146;
standard global time 117-19

Virilio, Paul: 'From Superman
to Hyperactive Man' 133-4;
technological compression
130-4

Weber, Alfred 34-5

Weber, Max 22, 124; Plato's
influence 27; *The Protestant
Ethic and the Spirit of
Capitalism* 41-5; Schutz and
66; social theory 36-7; time
as a resource 41-5, 115, 125

Wells, H. G.: *The Time
Machine* 129

Whitehead, Alfred North:
Mead and 65; time as
expression of reality 59-60

Zeno of Elea: paradox of 24

Zerubavel, Eviator 107;
Hidden Rhythms 108