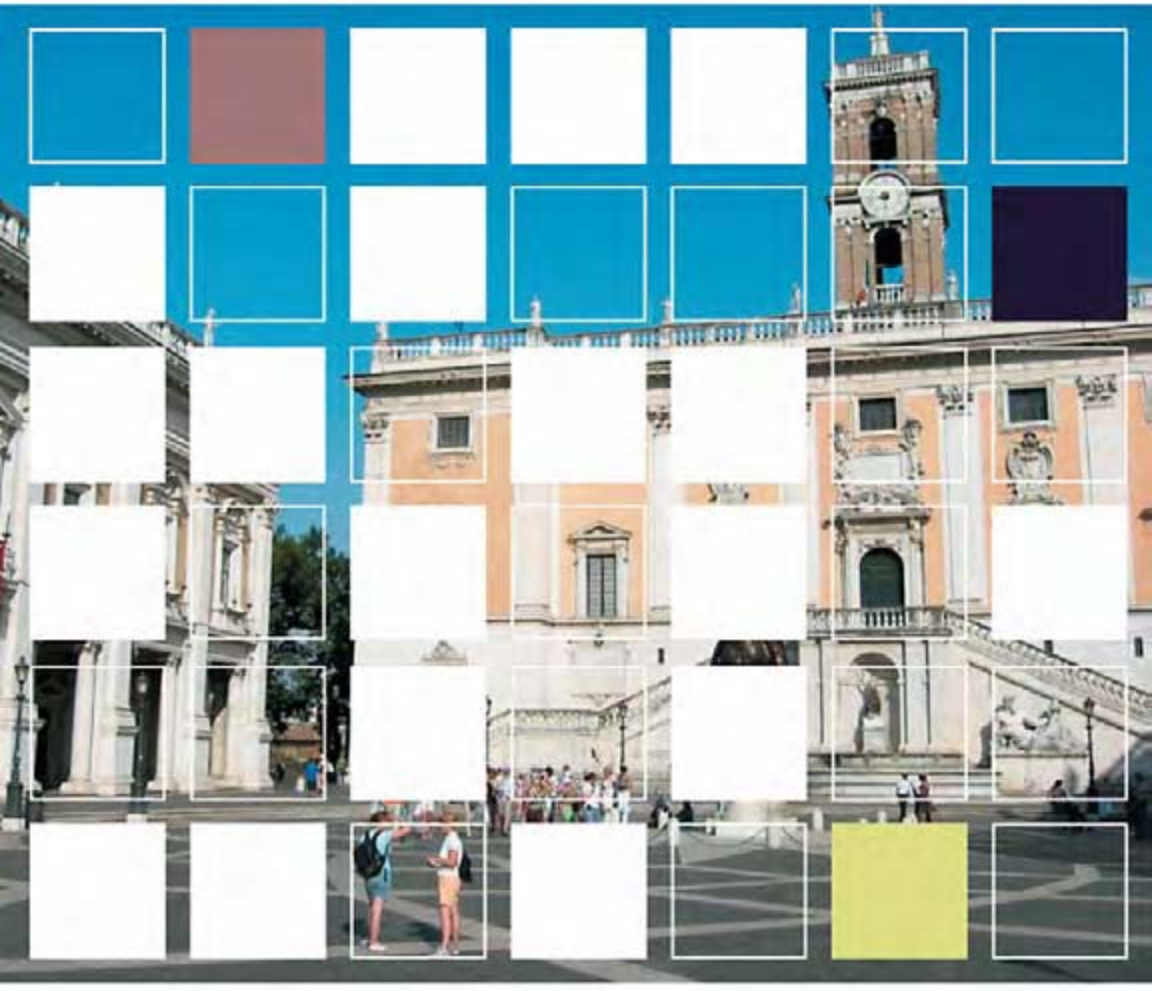

Designing the City of Reason

Foundations and Frameworks

Ali Madanipour

Designing the City of Reason

Modernist urban design has often been criticized for its rationalism, and its associations with science and technology in contrast to faith, emotion and experience. But how have cities before and after modernism differed? What is reason, and what does a city of reason consist of? *Designing the City of Reason* investigates the meaning of reason and looks at how it has been applied in contemporary city design and urban development.

Looking at the connections between abstract ideas and material realities, this book provides a social and historical account of ideas which have emerged out of the particular concerns and cultural contexts which inform the ways we live. By considering the changing foundations for belief and action, and their impact on urban form, it follows the history and development of city design in close conjunction with the growth of rationalist philosophy. Building on these foundations, it goes on to focus on the implications of this for urban development, exploring how public infrastructures of meaning are constructed and articulated through the dimensions of time, space, meaning, value and action.

With its wide-ranging subject matter and distinctive blend of theory and practice, this book will serve to further the scope and range of urban design by asking new questions about the cities we live in and the values and symbols which we assign to them. Employing examples from across the globe, *Designing the City of Reason* will be a valuable contribution for both academics and practitioners working throughout the fields of architecture, planning and urban design.

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Routledge
Taylor & Francis Group
LONDON AND NEW YORK

First published 2007
by Routledge
2 Park Square, Milton Park, Abingdon, Oxon OX14 4RN

Simultaneously published in the USA and Canada
by Routledge
270 Madison Ave, New York, NY 10016

Routledge is an imprint of the Taylor & Francis Group, an informa business

British Library Cataloguing in Publication Data
A catalogue record for this book is available from the British Library

Library of Congress Cataloging in Publication Data
Madanipour, Ali.
Designing the city of reason : foundations and frameworks / Ali Madanipour.
p. cm.
Includes bibliographical references.
1. City planning—Philosophy. 2. Rationalism. I. Title.
NA9050.M27 2007
711′.4—dc22
2006034626

ISBN 0–203–96213–3 Master e-book ISBN

ISBN10: 0–415–42091–1 (hbk)
ISBN10: 0–415–42092–X (pbk)
ISBN10: 0–203–96213–3 (ebk)

ISBN13: 978–0–415–42091–4 (hbk)
ISBN13: 978–0–415–42092–1 (pbk)
ISBN13: 978–0–203–96213–8 (ebk)

Contents

Acknowledgements

Chapter 6 contains material prepared for workshops at the Leibniz Institute for Regional Development and Structural Planning, Berlin; Office of Deputy Prime Minister, London; and the Urban Design Group's Annual Conference, Birmingham. All photographs are taken by the author, apart from Figure 6.5, which is used by kind permission from the Cambrian Residents Group. Support material for the book was collected partly through research projects and events funded by the European Commission, Economic and Social Research Council, Commission for Architecture and Built Environment, Cambridge-MIT Institute, Centre National de la Recherche Scientifique, as well as Aarhus School of Architecture, Denmark; Technical University of Berlin; Trinity College, Dublin; Helsinki University of Technology; Mimar Sinan University, Istanbul; California State University, Los Angeles; University of Southern California, Los Angeles; University of Lund; Piet Zwart Institute, Rotterdam; University of Tehran; New Towns Development Corporation, Tehran; Waseda University, Tokyo; Virginia Tech University, Blacksburg and Alexandria, Virginia; and Newcastle University.

Chapter 1

Introduction

Many have criticized modernist urban design for its rationalism. Does this mean that cities before and after modernism are cities of unreason? Many have associated reason closely with modern science and technology. Does this mean that the cities that were built before modern scientific and technological advances were irrational? Many have contrasted reason with faith, emotion and experience. Does this mean that no trace of these notions can be found in a city of reason? What is reason after all, and what is a city of reason like? To find answers to these questions, the book searches for a meaning of reason and how it has been applied in city design and development.

Following the failure of the twentieth century to prevent the horrors of world wars and environmental degradation, some sceptics, who had lost all hope in human ability to deliver a better future, have used the word reason as a pejorative term. For them, it symbolized a new dogmatism, characterized by cold and calculating relations, male domination, colonial supremacy, genocide, abuse of natural resources, etc. Does this mean that reason is no longer held as a valuable human capacity? Does it mean that we should abandon it and replace it with something else? Or does it mean that we should redefine it and be aware of its limitations?

The roots of modern urbanism go back for thousands of years. Learning to live in large groups, to think in abstraction, to evaluate instrumentally, to provide accounts, to link up actions, to imagine and implement new orders and hierarchies, to practise geometry and employ it for design and communication, and to develop new technologies have always been present in urban living. Similarly, challenges to these systems of abstraction and order have always existed: by refusing to acknowledge orders and hierarchies, by imagining alternative ways of living, by drawing on the multiple realities of everyday life, by providing alternative accounts and meanings, and by celebrating raw energies rather than calculated representations. It is the combination of these diverse trends that has created cities.

In this study, I have searched for possible connections between reason and the city. There are many references to reason and rationality in a

variety of disciplines. In search of clarity, I have tried to find out how the experts in the study of reason, i.e. philosophers, formulate it. As Michel Foucault explains, 'the central issue of philosophy and critical thought since the eighteenth century has always been, still is, and will, I hope, remain the question: *What* is this Reason that we use? What are its historical effects? What are its limits, and what are its dangers?'[1] At the same time, I have been interested in the way reason is manifested in the social world of the city, particularly in urban space. The connection between abstract ideas and material reality, however, could only be made through social and historical investigation. Through social and historical accounts of how abstract ideas emerged out of particular concerns and cultural contexts, how they were applied in practice, and how they were interpreted, we can see the relationship between reason and city building. Two main sources of information and analysis, therefore, will help this search: the history of city design and development, where different approaches and forms can be found and compared, and the history of philosophy, where reason has been a key concept. The book, however, will not be a work of history, nor will it provide practical advice for specific design problems; it addresses the contemporary urban society and space.

This work draws on a number of key concepts: accounts and connections, dynamic multiplicity, scales of abstraction, and public infrastructures. Reason is reflected in connected thought and connected action, and in providing and accepting accounts that attempt to justify these connections. Dynamic multiplicity refers to the notion that the best way to study a phenomenon is through its process of growth and transformation,[2] from a variety of perspectives,[3] within a particular context.[4] It also means that action should draw on multiple values and forms of reasoning (theoretical, practical and productive), rather than solely resorting to a single basis. Furthermore, for a better understanding of urbanism, it is important to approach the city at the intersection of its physical and social dimensions. Abstraction, which is manifest in the way words, images and other symbols are created and used, lies at the heart of knowledge and communication.[5] It takes place through scales, and moving up and down this scale (towards more abstract or towards more concrete) is only possible through interpretation. Such interpretation, which is and always should be open to questioning,[6] not only by alternative interpretations but also by sense and experience,[7] is based on analysis and synthesis,[8] developed and expressed through collective symbolization,[9] which relies on public infrastructures of meaning. These public infrastructures are collections of common symbols, formed of deeply rooted implicit conventions, explicit formal agreements, and the physical objects that embody and reproduce them. Scales of abstraction and public infrastructures of meaning, therefore, are mutually interdependent.

Reason is the capacity to deal with complexity, so as to break it down

to manageable pieces, then reconstruct it in an intelligible way, hence controlling its complexity to a level deemed graspable by the human mind, so that it can be expressed in words. Reason is the human faculty that, through intuition and calculation, makes judgements about, and provides accounts for, what to believe and how to act. In doing so, it engages in connected thought, in a process of analysis and synthesis, drawing on intellectual foundations that are made of systems of common symbols. The main pitfall has often been the temptation to close this process to outside influences, turning it into a purely intellectual exercise, developing syntheses without taking notice of the diversity of life experiences and the need of this diversity to be expressed, rather than be limited within a rigid and predetermined straitjacket.

The use of reason is an interpretive process that, as Descartes reminds us, is formed of analytical and synthetic stages.[10] To understand the world, we subdivide it into small pieces and assign them with symbolic value. These pieces have social and psychological meanings, from splitting sounds into syllables through to segmenting time, space, meaning and value to measurable units. The next phase is synthetic, in which we reassemble these pieces to constitute new things, in a new cycle of interpretation, in ways that our minds can understand. The synthetic process is often what builds our material world, using as its building blocks the measurable units that our interpretive endeavours had produced. These interpretive and constitutive processes reflect, and shape, part of our biological make-up, social conventions and power relations. Through this process of segmentation and reconstitution, we construct concepts, which form our knowledge, and objects, which form our material world.

A set of problems emerge when the analytic and synthetic processes are confused and overlapped. The logic of analysis is fragmentary; we subdivide phenomena into smaller pieces to understand them. However, if we apply this analytic logic to the process of design and development, which is a synthetic process, we only create fragmented processes and fragmented environments. The logic of synthesis, on the other hand, is constitutive, bringing different pieces together to produce complex concepts, objects and environments. If we apply synthetic logic to the process of analysis, however, we will mystify phenomena rather than clarify them. Another set of problems emerges when we treat these cycles of analysis and synthesis as closed and exclusive, only open to experts or elites. This generates power imbalances, as some have the power of stamping their interpretation, imposing their will on others, who are alienated from this process. Those who are excluded find the resulting concepts, objects and environments as alien and abstract, far from their own experiences and concerns.

Yet another, but related, set of problems is linked to the normative nature of rationality. We call something rational to approve of it, but we are not entirely clear on what basis we have arrived at such a normative

notion. How do we judge that conclusions follow premises through connected thought? Is it merely compliance with our social conventions or personal preferences that would give us the main criteria? These problems indicate shortcomings that should be questioned and potentially be corrected. Rather than rejecting reason altogether, i.e. denying the human ability to analyse and synthesize or the necessity of connected thought and action, we need to be critical of where these abilities are not used appropriately.

This work is part of a continuous process of research into urbanism.[11] It has investigated the social significance of urban space, the nature of urban design process and some of its key themes such as neighbourhoods and public spaces, the dynamics of the agencies involved in urban transformation and its impact on disadvantaged social groups.[12] A key thread running through this work is a critique of the processes that carve up the urban space into polarized fragments, and an argument for mending the socio-spatial fabric along the fractures. This book will now explore the theoretical bases of these fragmentary processes, investigating whether reason tends only to fragment and analyse, or also to regroup and synthesize, and whether it favours any particular source of authority in this process.

The book is organized in two parts: foundations for belief and action, and frameworks that make city design and development possible. Part I investigates our changing foundations for belief and action, and their impact on urban form. Trust in science and technology has taken over from supernatural beliefs, but it is confronted by challenges that nature and society pose. For most of history and in most cultures, supernatural foundations have shaped social organization and urban form. Believing in numerous embodied gods or in a single disembodied God has had direct implications for the way cities have been structured and shaped (Chapter 2). The Renaissance shifted the centre of gravity to humans and their intuitive reason, envisaging the universe as a mechanical clock and the humans at the centre of the world. This changed the urban form into a human-centred geometry designed by a single designer (Chapter 3). The Industrial Revolution expanded the productive capacities of the scientific age, to the extent that productive reason took centre stage, at the expense of other forms of reasoning. Since then, new technologies have generated multiple and disengaged geometries (Chapter 4).

These attempts to master society and nature, however, created consequences and critical reactions, showing that narrow functionalism could not be sufficient for complex societies. Sense and experience challenged the supremacy of reductive science, in search of expressive freedom. Humans were part of nature, not outside it. From biological impulses to global environmental changes, natural forces could not be ignored; so the city was either abandoned, or made more colourful (Chapter 5). Humans were

also part of society, not outside it, showing the limits on the autonomy of embodied and embedded humans. So the challenge was how to design and manage democratic cities that address stratification, diversity and the social consequences of globalization (Chapter 6).

Based on these foundations, public infrastructures of meaning are constructed, which include social conventions as well as physical environments. Part II deals with these public infrastructures, and their construction through analytic and synthetic stages of reasoning, and their implications for urban design and development, focusing on the problems of time, space, meaning, value and action.

Time has been segmented into units and recomposed in a temporal order, with abstract notions and social routines to shape our urban landscape and daily lives. The age of speed intensifies this process, but the lived time of individuals has its own dynamism (Chapter 7). Space has also been segmented and measured, according to public standards, and assigned monetary and functional value. Thinking about space generates abstract methods of thought. But segmentation creates fragmentation and alienation, which are at odds with the experience of lived space (Chapter 8).

While some deny the presence of value in scientific knowledge and rational conduct, it is inherent in all thoughts and practices. City building may be dominated by consideration for exchange value, creating abstract landscapes, but use value is another side of the coin that is, and needs to be, taken into account. Symbolic value of places gives them meaning and significance beyond use and exchange (Chapter 9). A sign of reason is the need to give and receive convincing accounts of our beliefs and actions, which is a process of communication: using words, gestures, images and objects as symbols of communication. Despite its normative nature and its shortcomings, communication is the key to building public infrastructures of meaning (Chapter 10). Action was segmented through the division of labour, and reconstructed in the form of hierarchical social orders. Practical reason deliberates for the best course of action, and so employs both competition and collaboration in making these decisions. However, calculative, instrumental reason is not enough (Chapter 11).

Some of the key themes of the investigation are then brought together (Chapter 12), to offer an overall account of how cities have been designed and developed on the basis of certain foundations for belief and action; how these foundations have been intertwined with the development of public infrastructures that shape urban society and space, through segmentation and reconstruction of time and space, meaning, value and action; and how changing circumstances and individual experiences challenge and change these foundations and frameworks. It argues that different forms of reason, theoretical, practical and productive, are needed in design and development of the city, employing the dynamic multiplicity of perspectives and processes, rather than relying on a static, narrow definition of

reason from only one perspective and only one form of reasoning; that regard for society and nature should be integrated in any such reasoning; and that the shape of a city of reason can never be finalized, as a living city constantly changes and evolves in new directions. Connected thought and connected action are often the main reflections of rationality, but these connections are, and should be, complex and multi-layered, rather than simplistic and rigid.

Part I

Foundations

Chapter 2

City of temples

Supernatural foundations

All cities are, in a sense, cities of reason: creations of intelligent human beings engaged in purposeful action. Since the dawn of urban living, the use of human intelligence is evident in building magnificent palaces and temples, as well as humble houses, irrigation systems, defensive walls, etc. They exemplify continuous attempts to employ the best available technology and the most innovative ideas to provide spaces best fit for their intended purpose.

The bases on which humans have relied to justify their work, however, have changed through the ages. The process of justification has involved giving an account for the beliefs that people have embraced and actions that they have performed. It has always been important for humans to be able to construct a narrative, to provide an account for what they believe in and what they do, mainly due to the social and linguistic nature of human societies. They have often constructed these accounts on some foundation, in search of a solid basis to provide, and accept, an account. Part I investigates the changing nature of these bases, from supernatural to scientific and technologic, the challenges posed by the material and social worlds, and their implications for urban form.

For most of the history of cities, the main ground for belief and action has been a metaphysical one. In this chapter, we see how looking for a higher order of things has created close linkages between spiritual and temporal, which was echoed in the shape of cities. While many have contrasted reason with faith, we see how the two were intertwined in city building from early on. The source of a supreme order may have changed through millennia, but searching for the certainty of a higher order has not.

While a distinction may be held in general between reason and faith, there are some areas in which they overlap and are intertwined. By looking at some historical patterns of city building, this chapter will show how supernatural foundations have been a part of a continuous pursuit of certainty and knowledge. This search has taken different forms, including believing in numerous embodied gods, in a single disembodied God, or in a

confident interpretation of human reason. Whatever its form, it has indicated a search for a reliable source of authority, which could provide the necessary but elusive certainty and security that people have always sought. This certainty has provided a public infrastructure for communication and a basis for the development of many subsidiary beliefs and actions.

Gods in the city: connecting the natural and the supernatural

The western civilization is commonly identified to be drawing on two sources of influence: biblical and Hellenic. The biblical world with its religiosity, absolute monotheism and moralism; and the ancient Greek world with its enlightenment, promotion of human beings, and discipline of mind and intelligence, were two strands that were combined and reflected in Christianity.[1] These two strands also influenced the Islamic civilization, which used both these ingredients, although in different proportions.[2] In turn, these two sources of influence, biblical and Hellenic, owe their development to the ancient Mesopotamian civilization.[3] From its rise around 5000 BC, the sparsely populated region of small agricultural villages grew within three millennia to a population of hundreds of thousands, many with specialized occupations, living in large cities with rich economies and magnificent architecture.[4] As Bottéro puts it, 'It is a wellspring to which, directly or indirectly, the Greeks and the authors of the Bible all went to find the source of their own civilizations, before giving birth, through them, to our own.'[5] It is in ancient Mesopotamia that cities were born, that writing, reasoning and religion originated, where history as a whole, and the civilization of the land in particular, started. This civilization evolved out of the encounter between the Sumerians, who came from the southeast and were the leaders of the nascent civilization, and the Akkadians, who came from the northwest and later engulfed the Sumerians.

Looking for some underlying order lies at the heart of the development of reasoning, which is rooted in its birthplace in Mesopotamia. Sumerians, followed by Akkadians, seemed to have a great curiosity about things, searching for clarity, which led them to analyse, compare, classify and order things. In doing so, they developed rules of mental behaviour, used to advance their knowledge, which was to become the starting point of our 'logic'.[6] These rules were still immersed in mythology, as myths, those 'uncontrolled, calculated imaginings' were the only way many secrets of the world could be explained.[7] The world was filled with gods, each in charge of directing and operating a different domain.[8] City living was associated with the division of labour. A functional division of life into different areas of activity was accompanied by a division of labour among gods, so that there were specialized gods for fertility, war, health and so on. This was a form of segmentation of the world into different parcels and assign-

ing a divinity to each parcel, a way of finding an account that would explain, and cope with, the mysteries of the universe.

From at least the beginning of the second millennium BC, a new profession developed in Mesopotamia; its practitioners specialized in recording all the unusual events in the world, which could be taken as signs from gods regarding future events. They produced extensive lists of the movement of stars and planets, human and animal appearances at birth or during their lifetime, and all kinds of phenomena which could occur in daily life. This generated detailed lists, 20,000 lines in one case, tabulating these occurrences with future events. For example, rain on the day of the festival of the town's god meant the town's god would get angry with the town, or if a man had a flushed face it meant that his elder brother would die. This was only possible through long-term observation of objects and events, recording unusual occurrences that had coincided with these events, and trying to establish a real or imaginary causal link between two sets of occurrences. Afterwards, it was possible to project this connection into future, turning it into an oracle, a divine message regarding the future.[9] Our present-day horoscopes and manuals for interpreting dreams are a continuation of the Mesopotamian divination and astrology. These practices may appear to us as pure fantasy. Some, however, believe that this system of 'deductive divination', based on systematic observation, recording, and connection between phenomena, even though arbitrary and imaginary, lies at the root of scientific methods, which were developed further by the Greeks and passed on to the modern world.[10]

The early human civilizations constantly looked for a supreme source of order, which they found in the other worlds, in the configuration of stars and planets, and of gods and their representatives on earth. These civilizations felt surrounded by confusion and chaos of an unknown universe, and wished to establish an orderly system that would offer them a clear understanding of the world and of their own place within it. This needed an underpinning that was strong and infallible, unlike the human orders that were fragile and subject to change; a supreme reason, which could support the development of a reliable set of beliefs and practices. In ancient civilizations, these searches led to the creation of cosmological orders around gods, ancestors and kings, who linked this world and the heavens, providing an anchor around which a social order could be developed and maintained. The development of this cosmological framework and the social and political orders were closely intertwined, and often became manifest in their application to city building.

The Chinese city was a prime example of this cosmological order. The Chinese believed in a correlation between the cosmic and natural phenomena and the world of humans.[11] The point of connection between these two worlds, and in charge of keeping harmony between them, was the emperor. A Han dynasty philosopher explains the relationship:

> If the ruler is correct, then the primal pneuma (*qi*) will be harmonious and compliant, winds and rain will be timely, auspicious stars will appear, and the yellow dragon will descend. If the ruler is not correct, then above a (strangely) transformed heaven and (below) rebellious acts will appear at the same time.[12]

The city and the location of the emperor's palace within it mirrored this link.[13] The traditional belief in a square-shaped universe was reflected in a four-sided city that was bounded with walls and had the emperor, the Son of Heaven, at its centre. Each of the four walls had gates opening to one quarter of the world, which was associated with a symbolic animal, colour, metal, season, etc. The south was the privileged direction, where the emperor faced when in the hall of audience, and where all cities had a main gate. The south was associated with the colour vermilion, the summer, fire and the bird, which was often a phoenix.[14] The space of the city was then organized according to these sets of beliefs about the place of the emperor, or his governors in provincial cities, in the cosmic order. Another manifestation of the correlation between the two worlds was the practice of siting, or *feng shui* (literally meaning wind and water); the belief that harmonious relationships between natural phenomena (mountains, land, water, wind) can lead to auspicious human existence.[15]

The city's palaces, temples and gates reproduced and consolidated a social order by linking it to a cosmic one (Figure 2.1). The cosmic order was expressed in a clear geometry, showing how, since the early stages of human civilization, geometry was so closely associated with order and harmony. The location of the emperor in the centre of the universe and the city was enhanced by two or more rectangular walled enclosures, which included the palatial compounds elevated on raised platforms.[16] The earliest references to a city in the Chinese language are found on oracle bone or bronze vessel inscriptions from the second millennium BC, among which a pictograph for city wall shows a square with two or four gates.[17]

The construction of the imperial city of Wangcheng in the late second millennium BC is described in a famous text:[18]

> [The master craftsman][19] constructs the state capitals. He makes a square nine *li* on each side; each side has three gates. Within the capital are nine north–south and nine east–west streets. The north–south streets are nine carriage tracks in width. On the left (as one faces south, or, to the east) is the Ancestral Temple, and to the right (west) are the Altars of Soil and Grain. In the front is the Hall of Audience and behind the markets.

The Chinese imperial city, with its clear geometry of walls, gates and streets, its significance of the centre and of the cardinal points of the

Figure 2.1 Temples, palaces and gates connected the material and spiritual worlds (Tainan, Taiwan).

compass, reflected the merger of cosmological and social orders, generating a higher order of things that ruled people's lives. The ancient Persian city was also formed on the basis of a marriage of cosmology and temporal power, with some similarities to the Chinese city (Figure 2.2). The Persian city was square shaped, with four gates on four sides connected to each other through two intersecting main axes, a significant southern gate, and raised and walled citadels inside the city.[20] In the Mesopotamian city, built long before the Chinese and Persian cities, the centre was occupied by a group of temples and palaces, displaying a marriage of this and other worlds, walled and separated from the rest of the city, which in turn was walled and protected from the countryside.[21]

In ancient Greece, gods lived in high places, looking down on humans but always interacting with them. In Athens, they lived in the temples on the Acropolis, on top of the hill; the site of the city's prehistoric settlement, where the spirit of ancestors lingered (Figure 2.3). In ancient Egypt, the pharaoh was the god king, and magnificent monuments such as the pyramids were built to ensure everyone believed this account.

Religious and secular were intertwined in the Greek and Roman cities, where the law courts and the temples flanked the agora and the forum. In the layout of a new Roman town, sacrifice, divination and augury were used first for the selection of the best site (Figure 2.4).[22] Within the city walls, a grid was established, and sites for public places for temples and forums were determined. Temples were spread across the town to facilitate a close relationship between the gods and the town's everyday activities. The location of temples related to their gods' particular area of expertise, as well as their position in the hierarchy. Some were located next to the theatre (Apollo and Father Liber (Bacchus/Dionysus)), some in the forum (Mercury) or in the marketplace (Isis and Serapis), some near the circus, especially in cities without gymnasia and amphitheatres (Hercules). The highest place, 'the vantage from which to see the greatest possible extent of the city walls', was reserved for the gods who protected the city (Jupiter, Juno and Minerva).[23] Some temples were also located outside the city walls (Venus, Vulcan and Mars), so that the city could be saved from lust, fire or civil war. According to Vitruvius, who wrote in around 30–20 BC:

> shrines of Venus, Vulcan, and Mars should be located outside the walls so that venerated lust will not become a commonplace for the city's adolescents and matriarchs. By summoning Volcanic energy out of the city by means of rites and sacrifices, the city's buildings are thought to have been delivered from the danger of fire. And if the divinity of Mars is honoured outside the city walls, there will not be armed conflict among citizens, rather, he will ensure that the walls serve only to defend the city from its enemies and the danger of war.[24]

Figure 2.2 The ancient Persian city displayed a marriage of cosmology and temporal power (Persepolis, Iran).

By using the city walls to control the dangers of lust and violence, even within a mythological account of sites and functions, we see how city design was searching for an order and a way of justifying it, relying on the necessity of controlling and even excluding the emotions. Minerva, the goddess of wisdom, was located in the best place next to the king and

Figure 2.3 The Acropolis on the hilltop, the site of the city's prehistoric settlement, where the spirit of ancestors lingered (Athens, Greece).

queen of gods. At the same time, not all emotions were banned from the city, as exemplified by Bacchus, the god of wine and theatre. The city in the ancient world, therefore, was a place where the natural and the supernatural lived together side-by-side in a social world. Presence of the gods, and the places they inhabited, were determining factors in shaping the urban space. Urban form not only mirrored the everyday functions of the urban society, it also reflected their cosmology. The division of labour among the gods echoed the broad scheme of human concerns, as well as the social functions of everyday life. This was a higher order that not only shaped the city, it also ruled the entire world. It was a source of certainty and order, which was replicated in the geometry of the city.

Searching for these links between the two worlds may appear to modern observers to be no more than measures for social and political control or mere superstition. The clarity that was produced was only one way of seeing things among many possible ways, and the social order it created primarily privileged an elite and undermined others. These were also attempts at understanding the world and mobilizing their efforts at building an orderly city in a chaotic world, showing how reason and

Figure 2.4 Complex rituals were involved in the planning and development of a new Roman town (Volubilis, Morocco).

emotion, knowledge and faith were intertwined to make sense, and give order to, the life of the city.

City of supreme reason: dualism of the natural and the supernatural

The gods who lived near humans and interacted with them created a shaded image of right and wrong. Gods could fight, or fall in love, and their actions could follow their desires. Humans, however, looked for a supreme form of power that could be associated with goodness, could be reliable at all times, looking after, rather than competing with, them. A single, all-powerful but disembodied God who had a safe distance from human desires could provide this level of certainty. Inherent in this heightened certainty was a dualism of good and evil. No longer was it possible for the God to engage in wrongdoing, as some mischievous gods of earlier times were.

The gods of the ancient world were often embodied; they lived in temples, where their statues were a proof of their presence. The monotheistic religions, however, believed in a disembodied, omnipresent God, who

could be contacted in the temple and elsewhere, but could not be seen or touched. This generated the idea of a city of supreme reason, which was essentially a disembodied city, which could only be realized in the afterlife. Embodied gods and embodied cities were ultimately referring to human relationships with each other. A disembodied city, however, could not be marred by these relationships; it referred to something beyond reach and therefore completely divine. It was difficult to relate the supreme reason with the irrationalities of everyday life. The only solution seemed to be giving up the idea of a city of supreme reason in this world.

By referring to the opposition between good and evil, St Augustine, writing in AD 426, described two cities, a City of God and an earthly city.[25] The City of God was a fellowship of godly men, which included past and future generations. It was a city that transcended time and space, rather than a city built of brick and mortar, but ruled by divine law. He contrasted this city to an earthly city, which was formed of ungodly men. This city also included past and future generations of lost people. For Augustine, the earthly city was a sign of sin, as the first city was founded by Cain, the son of Adam who killed his brother. The state was an expression of destructive emotions and impulses, which sought dominance over others. The state was 'a consequence of sin and an occasion for sin'.[26] The difference between the two cities was in their focus, in what they each loved. According to St Augustine:

> Two cities, then, have been created by two loves: that is, the earthly by love of self extending even to contempt of God, and the heavenly by love of God extending to contempt of self. The one, therefore, glories in itself, the other in the Lord; the one seeks glory from men, the other finds its highest glory in God, the Witness of our conscience.[27]

On this earth, the two cities are mingled together, their visible separation postponed until the end of history, when damnation and salvation will be decided upon. In this way, if supreme reason was associated with God, there was no way that a city of supreme reason could be created here and now (Figure 2.5). St Augustine's City of God was disembodied and existed outside the frameworks that characterized life on earth.

A continuous line of thought has held that reason and feeling are conflicting parts of human beings. This dualism has been associated with a dualism between mind and body; the belief that the mind is the place of reason, whereas the body generates feelings and desires. From the ancient times to the present day, this conflict has shaped the way reason and feelings are formulated and their roles defined. For Socrates, Plato and Aristotle, body and mind were separate, with the body being the inferior part. The medieval religious doctrines followed this belief, separating the soul from the body, whereby there was an afterlife for the soul and decline for

Figure 2.5 St Augustine's City of God could not be built in this world, so it had to mingle with the earthly city (York, UK).

the body. Following the soul would lead to salvation, while following the body could only end up in loss.

In some religious traditions, the inferior position of the body in the mind–body dualism was extended to all material objects, especially to possessions, with the consequence that it was necessary for a devout follower

to give up the possibility of living a normal life, of investing time or energy in creating what was after all considered temporary. From Hinduism and Buddhism to Islamic and Christian mysticism, it was essential to concentrate on the soul, and discard the body and any other material objects. Building a house or a city was this-worldly, distracting attention from the other world and from the inner life of the soul. The gnostic and Manichean traditions considered the physical world a result of the fall or entrapment of the spirit in matter, which meant the righteous were expected to rid themselves of material attachments.[28]

St Augustine converted to Christianity from Manichean beliefs. Manichean dualism drew on Zoroaster, the ancient Iranian philosopher prophet, who formulated the role of humans as supporting the good and fighting the evil, by performing 'good thought, good speech and good deed', which became the main motto of Zoroastrians.[29] This was a praise of human judgement and of reason, which was to be the basis for a system of classification and simplification to achieve a clear and understandable order of things. Manichean dualism grew out of Zoroaster's clear division of temporal and spiritual forces into good and evil. The Muslim writers in Iran also followed this line of thought, as exemplified by Sohrevardi, the founder of the philosophy of illumination, who wrote in the twelfth century about 'red reason', as somewhere between light and darkness.[30] The classical Persian poet, Ferdowsi, opened his masterpiece (completed in the year 1010), in the name of the god of soul and reason.[31] In a period known as the Persian Renaissance,[32] he started his story of creation and the epic of kings, told to this day by storytellers around the country, by praising reason: it was the best of god's gifts, it empowered whoever owned it, it showed the way and it caused joy and rejuvenation. For later generations, however, this optimistic belief in human reason was not enough, as it was not autonomous and free of desires. Two and half centuries later, after the devastating Moghul invasion, another classical Persian poet who wrote about reason was Rumi, the mystic whom the Whirling Dervishes of today consider as their founder. He believed in two types of reason: a particular and a universal. The particular reason was that of the human being, engaged in the matters of daily life in this world, and subordinate to desires. In contrast, the universal reason only belonged to God, but was also deeply hidden in the soul. Through absorption in God and giving up their own particular reason, humans could find this hidden treasure and embrace this universal reason with its eternal wisdom.[33]

Disembodied gods in embodied cities

The complete separation of the city of supreme reason from the worldly city and its everyday concerns and problems is one characteristic of medieval thought. Many European cities of the Roman era deteriorated

during the long centuries of the early medieval period. The earthly city of sin, however, was not abandoned, and the second millennium witnessed the rise of cities in Europe once again, with the Christian church undertaking a central role in medieval society. The connection between the two worlds was made by the church, as shown by the location of its buildings at the heart of the medieval city.

Despite the poor conditions of life, the late medieval city was a relatively successful phenomenon, laying the groundwork for the modern period. Its primary function was the production and exchange of goods and services, which it performed rather well. The sign of its success was that it was crowded with people and activities. The ultimate sign of a city's failure, as has happened frequently throughout history, is abandonment and depopulation. Rather than merely a negative feature, overcrowding was a sign of vibrancy and success. After the Renaissance, the preoccupation of city authorities was to order this vibrant organism, somewhat in the same way that the twentieth century had wanted to order the cities it inherited from the nineteenth century. Both used the language of geometry as a symbol of order and reason.

We make frequent references to medieval cities, but it is true that we have very little topographical evidence of what medieval cities were actually like. According to Saalman, 'It is the Renaissance butterfly we are looking at, not the medieval caterpillar'.[34] What buildings left of the medieval cities are mainly in the forms taken in the late fifteenth and sixteenth centuries. It is very rare that a secular building can be found to be older than the fifteenth century, and many are indeed from the seventeenth century or later. The medieval town that Pugin idealized had indeed a Tudor flavour. Other such recollections also show the same trend of referring to the fifteenth to eighteenth centuries, rather than the actual historical period of the Middle Ages: Goethe recalling the 'Gothic' Strasbourg, Ruskin's Venetian stones, and the Wagnerian Nuremberg of Hans Sachs.[35] Even earlier depictions of the medieval city could not provide much accurate information about these cities; the most accurate representations of the 'medieval city' are all from the late sixteenth and seventeenth centuries. Street patterns, however, are most resistant to change, and it is in these patterns that we can see any trace of the medieval urban form.

Medieval cities were places of trade, marketplaces at crossroads (Figure 2.6).[36] They provided a refuge from the countryside, an enclosed safe space for the production and exchange of goods and services. That is why the city wall, with its towers and gates, was a major but necessary investment by the town. Inside the wall, the street pattern was like a starfish, connecting a dense centre to the gates along the arterial roads. Just outside the gates, businesses and entire neighbourhoods grew along these roads, the *faubourgs*, where trade could be as vibrant as inside the gates without paying the gate and sales tax.

Figure 2.6 Medieval cities were places of trade, marketplaces at crossroads (Brussels, Belgium).

Focus on trade provided a basis for transition out of a religious and into a secular framework, which provided the groundwork for the emergence of Renaissance humanism. The walls that surrounded the city and the church that formed its spiritual (and at times temporal heart) were the common infrastructures of the medieval city. They contained and shaped the medieval society and were the point of reference for actions and beliefs of the city dwellers. The city wall was a manifestation of the temporal power, while the church represented the spiritual power. Together, they largely shaped the city, providing a common framework within which social life of the city was organized. Both these frameworks, however, were constantly tested by actions and beliefs that would not be constrained by them. The rise of *faubourgs* challenged the temporal power of the state, while the rise of humanist science did the same to church teachings. There was a constant tension between existing accounts that claimed validity and the competing accounts that were emerging. These were actions and beliefs that did not fit within the accounts that had a claim to truth and universality.

Some cities, such as Rome, continued to be known as a city of faith. At the end of the medieval period, Rome was revived on the basis of promoting pilgrimage. From 1300 onwards, jubilees were held in Rome, which

were a time of pilgrimage and a source of income for the city, with which vital repairs were made. Pope Nicholas V (1447–1455) saw the rebuilding of the city as an instrument of establishing Rome as the undisputed capital of faith for Christians. He wrote:

> To create solid and stable convictions in the minds of the uncultured masses there must be something that appeals to the eye: a popular faith, sustained only by doctrines, will never be anything but feeble and vacillating. But if the authority of the Holy See were visibly displayed in majestic buildings, imperishable memorials and witnesses seemingly planted by the hand of God himself, belief would grow and strengthen like a tradition from one generation to another, and all the world would accept and revere it. Noble edifices combining taste and beauty with imposing proportions would immensely conduce to the exaltation of the chair of St Peter.[37]

For some Christians, the earthly city continued to be a city of sin, and was better to be abandoned. For others, there was still hope to build a city that served God. In 1630, a group of 700 Puritans left England, crossing the Atlantic Ocean to found a godly community in the new world.[38] The pilgrims believed they were leaving behind the emerging individualism of a 'sinful land' and would settle in a community, a model Christian society in which they could serve God, live according to religious rules, and look after each other. On board their flagship, *Arbella*, a lawyer who later became the first governor of the Massachusetts Bay commonwealth, John Winthrop, delivered a lay sermon in which he reminded his fellow immigrants of their common purpose. The sermon included a famous phrase: 'For we must consider that we shall be as a city upon a hill, the eyes of all people are upon us.'[39] This was a city where each settler would have a house and a garden; it was to be surrounded by agricultural fields, but its core was dominated by a church, a seat of government, and a fortified refuge. The city they created was Boston, but far from a godly community, it was to become a modern secular city (Figure 2.7). Within only two months of their arrival, Winthrop wrote that the forces of evil were against them, and that he thought 'here are some persons who never showed so much wickedness in England as they have done here'.[40]

Another modern city developed in the new world on religious grounds was Philadelphia, a 'holy experiment' by Quakers who founded it in 1683, as they fled from persecution in England.[41] Cities such as Boston and Philadelphia were carefully planned to establish a religious community. In designing these cities, however, there were other layers of connection to supernatural. In Washington, DC, it has been argued, zodiacal symbolism was used in the geometry of the city, and its establishment followed the logic of stars.[42] These were modern attempts to connect the temporal and

Figure 2.7 The Puritan city upon a hill became a modern secular city (Boston, USA).

spiritual worlds, and to create some forms of rational orders at the intersection of the two worlds, hoping that the spiritual would guide the temporal. This was taming the spontaneous and the everyday life by the orderly and unchangeable logic of a supreme reason.

These religious experiments were attempts to create real godly cities,

materializing an embodied city at the service of a disembodied god. The tide of secularization, however, undermined the Puritans of Massachusetts and Connecticut and the Quakers of Philadelphia. They were unable to sustain the supremacy of religious ideals against the availability of cheap land and private opportunity. By the time of its revolution at the end of the eighteenth century, secular privatism, rather than religious communities, had become the American tradition. The essence of privatism was its focus on the individual and the individual's search for wealth.[43]

The drive to protect the human world from the apparent complexity and chaos of the natural world and the need for a robust and reliable basis for human beliefs and action was manifested, therefore, in the notion of supreme reason, which was other-worldly but had causal connections with this world. Whether embodied in the ancestors, gods and kings, or disembodied and out of reach, the connection between supreme reason and human reason found manifestation in the shape of the city, as it occupied the centre and influenced the social and spatial relationships around it. An intricate social and spatial order, which had developed around this core, could then be justified and legitimized. The social and physical places of those who connected the two worlds became the anchor points for a public infrastructure that shaped the city.

When the search for order was systematically applied, it took on a geometrical regularity, as evident in ancient civilizations from China to Greece. As will be discussed in Chapter 8, geometry emerged as a practical tool for measuring the land, but when codified and systematized, it was turned into an instrument of ordering space and society. Geometry became a structure of significance, a publicly understandable system of meaning. Together, at least two sets of spatial orders formed a public infrastructure: the centre-periphery and geometrical regularity. The centre was occupied by the palace and temple, and geometry ordered the position of others in the city.

This was an early manifestation of the way an abstract order was formulated and imposed on a diverse human world. The search for abstract and reliable rules that can explain the world led to the development of modern science. The shift from metaphysical to scientific sources of supreme reason showed the continued need for clear meaning and for understandable order. It also shared some of the same difficulties of imposing a single order on a complex world.

Evolving accounts

One of the key characteristics of reason in the modern scientific age has been its distinction from, and even contrast with, faith. If we cannot prove something through reliable, observable evidence, we have no firm basis for accepting it: so we either have to reject it, or to rely on faith as a basis for

accepting it. The general distinction is that we either believe in something through the use of human reason, or believe in it only with trust but without logical proof.[44] Faith, therefore, is based on a voluntary act of will, which leads to a conviction of the truth of some doctrine.[45] Would this contrast mean that a city based on faith cannot by definition be a city based on reason? We know, however, that religious beliefs and cosmological notions have shaped many cities through the ages (Figure 2.8). Religious systems are complex systems of theory and practice, which, although based on doctrinal belief, contain elements that also use human reason. St Aquinas, for example, held that some elements of belief can be proved by unaided reason, while other elements, such as the Holy Trinity or incarnation in Christianity, cannot be proved in the same way and are known to believers only through revelation.[46] Therefore, even within the religious domain, there is a contrast made between reason and faith.

No matter how these systems of beliefs were arrived at, through reasoning or trusting in others, they could influence and shape action. Furthermore, building cities is a practical and social exercise, involving many actors involved in complex processes of organization and use of resources. Whatever the system of ideas that influence the shaping of the city, the way the city is built is often limited within the range of possibilities pro-

Figure 2.8 Religious beliefs and cosmological notions have shaped many cities through the ages (Istanbul, Turkey).

vided by rational and logical frameworks of knowledge and action. The ideas that are used to design places can be led or inspired by imagination, rational arguments or faith. The practice of city building, however, can implement only those ideas that are possible to implement.

In these ancient cities, we can identify why the city has been shaped in a particular way, and so we are able to provide an account for the structure of the city, and how it mirrored the political and economic structure of society. Some of those who built the cities at that time have also given us their accounts of why they built it the way they did. Does this mean that these cities were cities of reason, because we are able, then as now, to give an account for their socio-spatial configuration? After all, they demonstrated an overall order, one in which different functions and groups had a particular role to play, and the urban form was ruled by the rules of geometry or some form of spatial organization to reflect this order.

Do the abilities to give an account, to use geometry, and to manage urban form towards some desirable outcome make an urban form rational? After all, these cities were manifestations of connected thought, which is one of the broad definitions of reason.[47] They were developed as unified systems in which every part fitted in an overall whole. The teleological nature of some of these accounts may not be convincing to modern observers, who will find it hard to see how the imperial orders could be justified on the basis of the metaphysical accounts given. They may be suspicious of the location and role of the mediators between the two worlds, and the duties of others in such a system. Furthermore, scientists, who search for observable connections, may even doubt the existence of a metaphysical world alongside the material world.

One possibility is to evaluate these cities in their own context, which shows they were orderly and probably well-built places, employing the best skills and technologies available at the time. The questions that emerge, however, are whether that particular order was a true reflection of the best form of reasoning, or whether it merely suited a minority? Was it not possible to build a city of reason without resorting to imperial and divine orders? How do these orders appear to us, as we are looking at them from our vantage point many centuries later? These are questions that apply equally to cities based on a new form of supreme reason, the modern science.

These questions partly reveal the inherently normative nature of rationality. We call reasonable that which fits our expectations, that which is possible to prove either by scientific evidence or by common sense argumentation. The change in expectations from an account is a major distinction between the modern mind and most of the ancient accounts. For us geometry and verbal accounts seem no longer sufficient to make them rational; we need other ingredients, such as the degree of fitness for purpose, a direct relationship between the resources spent and the quality

of their outcome, careful use of natural resources, equality of treatment for different citizens, and good quality of environment for all. A question today would be: who provided the connected thought; whose account was it that shaped the city? Our notion of a city of reason, therefore, appears to be a more complex notion than the ancient one. Nevertheless, the ancients searched for knowledge in the same way that moderns do; and if this was the way they could provide commonly agreeable accounts for the world, then it was probably the most rational explanation they could find in their circumstances.

No matter how rational and logical, however, a single order, in the ancient or modern cities, cannot last for long, as the city constantly changes and evolves. Through natural or social change, new circumstances emerge to which new responses are given, creating multi-layered orders, which may or may not correspond to one another. Unless cities are built from scratch every day, their order is always a cumulative and complex one, never representing a single or final process of reasoning.

Foundations for a public infrastructure

During the Renaissance, belief in human reason started to take over from belief in the authority of scriptures, which characterized the medieval thought.[48] The presence of reason was not doubted, as intuitive reason was often seen as a human's only guide to find the way out of complexity and confusion. What emerged was a new confidence to place it at the centre of the human world (Figure 2.9).

Aristotle's rational ethics and St Augustine's moral theology lay at the basis of the medieval theories of practical reason.[49] St Augustine's ideas, which dominated the Latin west until the thirteenth century, equated the supreme reason with the eternal law. This divine law was immutable, necessary and eternal, and morality for humans demanded that they obeyed its prescriptions. Morality, therefore, meant conformity to the divine law. This was different from Aristotle's practical reason, which relied on societal norms, traditions and human actions. Despite their contradiction, these two trends of thought were combined in the medieval thinking on practical reason.

For Thomas Aquinas, correct reasoning was based on the human ability to discover an underlying order in any field of inquiry. Practical reason starts with the principle that all human acts are directed to an end. It leads to a basic principle which forms the heart of ethics: to do good and to avoid evil. Practical reasoning, or '*ratio practica*', therefore, was concerned with moral action, rather than scientific knowledge. Where human reason was deficient, it had to turn to the eternal reason.[50]

The modern thinkers, such as Descartes, moved the centre of gravity from an external, eternal law to the human mind. To overcome doubt, it

Figure 2.9 The centre of gravity has changed to humans, even if religious iconography is still employed (Gateshead, UK).

was necessary to rely on reason as an internal force. The medieval thinkers had seen rationality as conformity to the divine law. With the rise of humanism, human reason became the only reliable foundation upon which any laws could be understood and justified. The medieval thought, therefore, was not concerned with the opposition between reason and faith, as

it saw faith as the embodiment of a supreme reason. The scholastic tradition was indeed intellectualist, by making extensive use of the notion of intuitive reason, which Aristotle had employed. It was with the emergence of the human reason as the measure of human beliefs and actions that this opposition between reason and faith was stressed. Now it was the cognitive faculty that dealt with evidence, rather than relying on the authority of others, whether human or divine.

In the modern period, the ancient dualism between the mind and the body was reaffirmed by Descartes, and hence has since been called Cartesian dualism.[51] He argued that the mind (or soul), is non-physical and is distinct from the body or other material objects: '... this "I", that is to say, the mind, by which I am what I am, is entirely distinct from the body'.[52] This gave him a solid rational foundation for knowledge, which was thinking: 'I think, therefore I am.'[53] This separation has been challenged by later generations, to the extent that now most philosophers consider themselves anti-Cartesian in this respect, adopting a kind of materialism which integrates the mind and the body.[54] Psychoanalysts have argued that body can influence the mind.[55] Neuroscientists have also shown a two-way traffic between the brain and the body, and how the way people behave can change if their brains are damaged, hence challenging the divide.[56] The implications of this challenge include a reduction in the clarity that the divide offered, inviting new understandings that would allow for overlap and ambiguity in this division of labour, or a new, more precise map of human faculties and their functions. It also shows that a clear-cut distinction between reason and emotion is not possible to maintain, as the separation of mind and body has been questioned.

The post-medieval world of humanism and the Enlightenment are characterized by the gradual move to establish reason as the basis of human belief and action. To move away from the long centuries in which religious belief dominated, the new world relied on the human ability to find a rational, scientific basis for beliefs and actions. The Enlightenment thinkers attacked not religion but 'superstition', those aspects of religion, such as belief in miracles, which could not be supported by rational explanation. Thinkers of this period attempted to reconcile science and faith by trying scientifically to explain the existence of god and the rationality of religious beliefs. These attempts, however, became less widespread, as by the end of the nineteenth century science was ready to replace religion as the basis on which people relied for their beliefs. In the early nineteenth century, it was still possible for a philosopher, Johann Fichte, to suffer substantially for suspected atheism.[57] By the end of the century, however, Marx had called religion the opium of the masses, and Nietzsche could announce the 'death of god' and openly attack religion as promoting slave morality.[58]

The Renaissance was associated with the revival of the ancient traditions of Greece and Rome, changing the emphasis from a spiritual to a

temporal one, from disembodied cities to embodied ones. Indeed, for the humanist political theorist Machiavelli, the ancient religion of Rome was preferable to Christianity.[59] Rather than promoting qualities required for a free and vigorous civic life, Christianity had 'glorified humble and contemplative men'; rather than placing any value 'in grandeur of mind, in strength of body', it had 'set up as the greatest good humility, abjectness, and contempt for human things'.[60] Rather than promoting civic glory, this other-worldly notion of excellence had led to the decline of nations and corruption of communal life.[61]

Throughout the ages, the search for certainty worked through identifying, or constructing, a common framework for a shared system of beliefs. If the members of a society could all subscribe to a particular view of the world, for example belief in a common group of gods, then a common infrastructure of meaning could be established. This could then be a reliable basis for the other subsidiary beliefs and actions, which formed a public infrastructure that included public rituals, political institutions and the material world, which included the urban space. Personal beliefs and private realms could also be built on the basis of this public infrastructure, which, like the streets of a city, linked the private realms and beliefs of individuals and groups together. Of particular interest to our investigation is that these public infrastructures have soon found a spatial manifestation, (re)organizing the urban space in such a way that they are instantly recognizable, well placed to be widely shaping other practices and beliefs.

The development of a supernatural foundation was a rational undertaking: it was providing a first principle, an abstract notion that could be taken as reliable, and then draw every other concept from it. This is what Descartes wanted to achieve in his method, which became the method of scientific discoveries in the modern age. Arriving at this ultimate abstraction could not be scientifically proven, which is why faith comes in as the route to this belief. The distinction between a supernatural and a rational foundation for belief and action was in the method of arriving at that foundation; but once there, it was on the basis of this foundation that everything else could be proven. Establishing a supernatural foundation was leading to the creation of a public infrastructure to which the members of society could relate and on which they could draw to shape cultural habits and norms. A common infrastructure for meaning and action was then in place to shape the society through creating new, and adjusting the old, social institutions, partly through physical consolidation and embodiment of these institutions as the anchor points of the urban environment. The temples of a city were these nodes in a public network of places and institutions that formed the physical backbone for social beliefs and practices.

In all these stages, and with different foundations, a particular spatial order was created and presented to people, to shape and control their life

and behaviour. The complexity of urban life, however, meant that people have often lived in ways that were not predicted in these arrangements. The development of these anchors had profound impacts on cities and the lives of their citizens. Yet the growth of cities, and the spontaneity and unpredictability of life also pressed to find a way out of these frameworks, shaping cities in new ways.

Secular cities

In secular cities today, few new churches are built. The falling number of worshippers has been followed by rationalization of properties, creation of joint congregations, disposal of vicarages, and even sale of churches, which are then used by new owners as houses, offices or shopping centres. Wherever new churches are built, their location, size and design follow the same architecture and town planning procedures as schools and hospitals. Different denominations may compete with one another to attract worshippers, while in some places, building new houses of worship causes objection by neighbours, who are worried about traffic and noise. In short, they are subject to the same market and regulatory conditions that other urban functions are, no longer occupying the privileged position they once enjoyed in the urban hierarchy. Historic churches are treated not as spiritual cornerstones of cities, as once they were, but as picturesque landmarks, good for attracting tourists and for maintaining a sense of identity for cities. As their temporal and spiritual hold has deteriorated, they have become objects of aesthetic experience, monuments through which the past is remembered, or landmarks with which to navigate the city.

An example is St Paul's Cathedral in London. Since AD 604 London has had a cathedral dedicated to St Paul, and the current building is the fourth to occupy the site, designed by Sir Christopher Wren after the Great Fire of 1666. The building is described as 'the spiritual focus for the Nation', a place in which, since its first service in 1697, 'people and events of overwhelming importance to the country have been celebrated, mourned and commemorated'.[62] Even a building of this significance, however, is mentioned in the 420-page long *London Plan* only in relation to the management of views, as a landmark that should not be blocked by other buildings.[63] The Cathedral has had to compete with the growing number of ever taller buildings in the city, to the extent that the views towards it and other major landmarks are now protected by the Greater London Authority in its city plan (Figure 2.10). However, the criteria for protection are not about the spiritual significance of the building, but about its role as a major landmark. The *London Plan* identifies 'strategically important landmarks', and protects them from being blocked by other buildings, 'where the landmark is easy to see and to recognise, provides a geographical or cultural orientation point, and is aesthetically attractive'.[64]

Figure 2.10 St Paul's Cathedral has to compete with other buildings for attention (London, UK).

Even in societies that consider religion a pivotal part of their life, temples, churches and mosques seem to have lost their old position in the life of the city, at least as far as their distribution in the city and their size and significance relative to other functions are concerned. As urban populations have grown, and movements and functions in cities have become ever more complex and diversified, new modes of working and living have emerged. While religious beliefs and practices may rule social norms and public conduct, they do not determine the built form or the spatial structure of the city. As cities have grown, the new urban areas and suburbs have hardly caught up in their numbers of houses of worship with the older central parts. The phenomenal growth of urban areas in the twentieth century has primarily been a secular one.

This shows a profound change in the way knowledge is generated, and action is accounted for. The foundations and the public infrastructures that shaped social norms and physical environments have been substantially transformed, once by the rise of scientific reason, followed by challenges to broaden it further by taking nature and society into account. Yet during most of human history, cities were built for gods, and were structured according to an order that revolved around supernatural beings, who

had a presence in temples. Building the city involved some reasoning, which was often based on supernatural foundations. Temples provided the underlying institutions for belief and action; they were fonts of all knowledge, repositories of political power, and mediators of social cohesion; sources of certainty and crucial nodes for the spatial structure the city.

Conclusion

For most of the history of cities, the social and spatial order of cities has been based on a higher, deeply rooted notion of order. At the same time, the everyday life in the city and its practical needs have also generated a logic which has been at work in shaping the city. In this chapter, we have looked for this higher notion and its change throughout history. For most of human history, this was a spiritual basis, which shaped the city. Ever since the rise of modern era, this has gradually shifted to a temporal basis, which is measured and managed by human reason.

The establishment of a foundation, or an anchor, was important in the development of a particular order. This foundation is a key social institution, which acts as a medium of developing, justifying and spreading a particular account, belief or behaviour in society. It is provided by the social order and contributes to developing and maintaining it further. This is a foundation on which particular accounts are given, particular values are promoted, and particular forms of behaviour are expected. It is a basis for developing a public infrastructure, which can influence the shape of the rest of society to a large degree.

There are two types of supernatural foundations: one that somehow integrates the natural and the supernatural, giving predominance to the latter over the former, but nevertheless seeing both as parts of the universe. The other is placing such a great distance between the natural and supernatural that nothing of this world can reach or represent the other-worldly nature of the supernatural. The implications of these two different approaches are different for cities. One approach builds cities in which places for the divinity are integrated into the urban fabric. The examples of the ancestoral temples that are part of the traditional Chinese house, and the temples of gods around the Roman city, both show a close integration of this and other worlds. The other, however, as exemplified by St Augustine's City of God, finds it difficult to build cities at all, as they will be all places of this world, unable to reach the other world, which is completely free from materiality.

A brief historical sketch of some examples of patterns of urban form and human thought has provided us with a broad answer to the questions posed by the chapter: that alongside the everyday order of things, and often superimposed on it, searching for a higher order has always been a hallmark of human societies, which is a sign of human reason at work.

This higher order has been intertwined with the everyday social order, providing a basis for shaping cities. This higher order has been transformed from a spiritual one to a temporal one; it has been a transition in which spiritual institutions, and the buildings and sites they inhabit, have lost their relative significance in the city, changing the account that is given of the orders that do, or ought to, govern the city.

Since the beginning of cities, they have manifested a spatial order, which not only reflected the social order of the time, but also the way that this order was presented to citizens. Therefore, the domination of the centre by the spiritual and temporal powers, the use of geometry to order street patterns and to locate different functions and social groups were all becoming clear to those in power and the citizens they ruled. Early accounts of the social and spatial organization of the city show a degree of self-awareness of the city-dwellers about these orders. If reason is the ability to provide an account, and to show connected thought,[65] should we see these cities as cities of reason? Should account-giving for social relations and spatial organizations be taken as signs of rationality of the city?

A major point in the study of reason is that the changing focal point from spiritual to temporal did not alter the underlying need for certainty. From an anchor in the spiritual world, which would give meaning to the temporal orders, it changed to an anchor in the human world. From a supreme reason, it changed to human reason, which was then used as a basis for beliefs and action, including the design and management of cities.

Chapter 3

City of mechanical clocks

Rational foundations

A city of reason is somehow expected to be organized on the basis of some spatial order, which some have found in geometrical regularity. A long-standing tool of city design since the ancient times has been the use of regular geometrical forms to give some spatial and functional order to the city. In particular, after the Renaissance in Europe, a specific rationalist tendency emerged that put geometry at the top of its agenda, and was able to transform cities across the world. This paralleled a new definition of reason based on human intuition, and the development of modern science and technology that has inspired people to imagine the world as a machine. In this chapter, we explore the approach adopted by Renaissance and Baroque thinkers and designers, with the urban geometry that it created, followed in the next chapter by the new form of rationalist design in the twentieth century and its faith in technology.

The modern science was a search for an underlying order for the world, a search for causes.[1] Nature was considered an integrated system with a complete causal order that was not visible by the senses and needed to be discovered. For Bernard de Fontenelle writing in 1686, the nature resembled an opera stage: all its movements and wheels were hidden from the view of the spectators, who could only marvel at the spectacle, unable to see how it was being made possible. The role of philosophy and science was to discover what lay behind the scene.[2] In a fashionable analogy of the time, the appearance of the world was like the face of the clock, and its underlying order of wheels and springs was what lay behind this face. However, unlike the medieval past, when any such underlying order had an inherent spiritual dimension and meaning, the modern order was gradually becoming a merely mechanical one. Wheels and springs of the clock were needed for it to work, but it no longer needed to be directed towards a metaphysical destination. It was just a machine at work: 'why the world exists', therefore, was increasingly treated as a separate question from 'how it works'.[3]

The city was a model of this cosmology, where appearances were a clue to underlying orders. The rising power of the absolute monarchs enabled

them to impose an order on the appearance of the city as well, to make its face as orderly as its wheels and springs. As the best manifestation of order was expressed in geometry, it was geometrical regularity that was employed to create a consistent order both in appearance and behind the scenes. The space of the city was thus treated as the stage of the opera, as a place of display for the grandeur of the monarch and a reflection of the natural order, of which the city was an example. The city was set as a mechanical organization to mimic a mechanical universe, with layers of order in appearance and behind the scenes. The city of reason was well ordered in how it appeared, how it was organized, and how it worked, as an integrated system that resembled the integrated nature.

Changing the centre of gravity: from supernatural to human reason

After the end of the medieval period, relying on supernatural foundations for belief and action came to be questioned by humanists. To give convincing accounts of beliefs and actions, which is the sign of reason at work, it was no longer sufficient to derive these accounts from the divine scriptures and the teachings of old masters. New scientific discoveries were generating an atmosphere of doubt, in which the usefulness, or even existence, of any such foundations was being questioned. A new source of authority for beliefs and actions was being sought, which was found in human reason. There was a shift from supreme reason to human reason, a shift of foundation from supernatural to intuitive, from what is beyond the world of objects to what is deep inside the human mind.

A commonly held meaning of reason considers it to be a faculty of the mind which is the ground of a priori knowledge, as distinctive from sensation, imagination or memory.[4] The ancient form of rationalism was represented by the work of Plato, who believed in some abstract unchangeable Forms and general principles that governed reality, only accessible by reason, rather than senses. Plato looked down on 'sights and sounds', and preferred to emphasize the abstract notions behind them.[5] In the modern period, rationalism is closely associated with the work of seventeenth-century Continental philosophers Descartes, Spinoza, Leibniz and sometimes Malebranche, who argued that there is a non-empirical and rational access to the truth about the world, rather than the knowledge acquired through senses. They all were attracted to mathematics as a general model for knowledge.[6] As Descartes argued, reason was the only pathway to knowledge, the only foundation which could deal with the problem of doubt. Reason was an inborn faculty which enabled humans to discover the abstract truths of mathematics and apply these to the workings of the universe.[7] According to Descartes, reason was 'the capacity to judge correctly and to distinguish the true from the false, which is properly what

one calls common sense or reason'; this was a capacity that was equally available to all human beings.[8]

Descartes had come to believe that the beliefs of his time were based more on custom and example, rather than on certain knowledge. Sceptics were arguing that our senses can, and often do, deceive us, and so it was not possible to arrive at any firm knowledge of the world. To confront the problem of doubt, therefore, Descartes had to start from denying the validity of all that he was taught at school, to start thinking afresh, to see if he can find a reliable new foundation for belief and action that could overcome the sceptics' argument. His great discovery was that while we can doubt the senses, we cannot doubt the existence of the doubter. Even if everything that entered my mind was no more than illusions of my dreams, there was no doubt that 'I who thought thus must be something ... I think, therefore I am'.[9] This was the first principle of philosophy that he was seeking. Although he used this principle to prove the existence of God, his approach brought the centre of gravity firmly into the human mind.

This was a rational foundation upon which a system of beliefs could be constructed. Descartes described his deductive approach as first trying to arrive at some general principles or first causes of everything, and then examining what were the first and most ordinary effects that could be deduced from these causes.[10] His famous method included four rules: the first is intuition, coming to some principles through the workings of the mind, rather than the evidence of senses or imagination. It is through intuition that humans can know that they exist and that a triangle has three sides. This resulted in 'never to accept anything as true as I did not know to be evidently so'.[11] The second is an analytical stage, which is to divide the phenomena into their constituent parts. The third is a synthetic stage, in which an order is created out of a hierarchical relationship between these parts. As Descartes puts it:

> put my thoughts in an orderly way, beginning with the simplest objects and the easiest to know, in order to climb gradually, as by degrees, as far as the knowledge of the most complex, and even supposing some order among those objects which do not precede each other naturally.[12]

The fourth rule is to conduct general reviews to ensure nothing has been omitted.

The Cartesian method may be detected in many rational and scientific investigations before him and afterwards. It is, however, possible to show how it can be limited when applying to the social world. The intuition of the first rule may be limited, so that what is evident to one person may not be to another, or that it is not pure unaided reason that generates that intuition but a culturally embedded calculation. Furthermore, intuition

was rejected by empiricists as an unreliable source of knowledge. The shift had taken place from supernatural to human reason, but the character of reason was still metaphysical. In the second rule, the way one person subdivides phenomena may be different from another. In the third rule, the way a synthetic order is created reflects a particular perspective and a particular context, which may not be valid for others. In the fourth rule, the possibility of covering all aspects of a phenomenon may not be possible at all, as even our computer age has shown. We will come back to these discussions in later chapters.

It may appear that the work of rationalists was mainly engaged with theoretical reason and less with practical reason, or with the applications of reason in the practical world. However, as we see from the emergence of science as the basis for much of human practice, there was a direct link in the rationalist thought between emphasis on reason as the best source for understanding the world and reason as the best measure with which to (re)organize the world. The new religion of the age was becoming science, engendering optimism about the future of humanity; now the emphasis was 'not on faith but on planning', which would lead to inevitable human progress.[13] The language of science was mathematics, and it is in this language that cities of reason were being articulated. Rather than the speculative philosophy that was taught at school in his time, Descartes was seeking a practical philosophy, which could make humans 'masters and possessors of nature'.[14]

A single designer for the city

Descartes preferred a single, rational source of authority for designing a city. The type of city that he proposed was one based on a synthetic order, whereby a rational synthesis was created by a designer, imposed on all the constituent parts of the city; it was a city of synthetic reason. Any work that is created by a single master, he argued, is better than works composed of several pieces brought together, which had characterized the medieval city. He wrote:

> So it is that one sees that buildings undertaken and completed by a single architect are usually more beautiful and better ordered than those that several architects have tried to put into shape, making use of old walls which were built for other purposes. So it is that these old cities which originally were only villages, have become, through the passage of time, great towns, are usually so badly proportioned in comparison with those orderly towns which an engineer designs at will on some plain that, although the buildings, taken separately, often display as much art as those of the planned towns or even more, nevertheless, seeing how they are placed, with a big one here, a small one there, and how they cause the streets to bend and to be at

> different levels, one has the impression that they are more the product of chance than of a human will operating according to reason.[15]

Descartes was suspicious of custom and example, which were the basis of beliefs, laws and cities.[16] What was needed was relying on reason, which could provide a centre of gravity from which the entire system of knowledge and practice could be transformed. Legal systems, scientific knowledge and urban spaces, were far better organized if designed by a single designer, who used reason as the measure of all things. Descartes was a mathematician, and so he looked to coherence and reliability of mathematics as the basis of rational thinking and doing. This was a rejection of the medieval approach to city building, which was based on gradual increments; instead, it asked for a rational foundation for designing cities. The rationality of this city was based on the use of a systematic coherent organization of its constituent parts, as devised by a rational mind (Figure 3.1).

In seeking to find and rely on a single source of authority for the design and management of cities, Descartes was not alone; it was manifest in other areas of theory and practice. Political reality of the rising absolute state coincided with the political theory of promoting a single source of authority, which was to evolve into the modern state. The humanists of

Figure 3.1 Descartes' ideal of relying on a single designer and use of mathematics was realized by L'Enfant (Washington, DC, USA).

the post-medieval world were changing their reference point from the church to civic institutions, from the divine law to human law. In doing so, even when trying to revive the ancient traditions of democracy, they could not think of the general public as becoming the new source of authority in cities. In developing his theory of government, Machiavelli wrote in his *Discourses* how he believed in the importance of a single source of legal and political design, even for the republics. The masses could not be trusted to coordinate their diverse opinions in order to establish a city-state, whether a republic or a principality. What was needed was a founding father, who could establish a rational design. This, he wrote, 'we must take as a general rule: seldom or never is any republic or kingdom organized well from the beginning, or totally made over' at a later date, 'except when organized by one man'.[17] The coercive force of law was also a possible way forward if a city was to move on the path to glory. The founding fathers who could give their communities good laws from the outset were ensuring that good was promoted and corruption prevented in that city.

Descartes is widely considered to be the father of modern philosophy. His work, which appeared more than two centuries after the emergence of Renaissance in Italy, captured the spirit of an age which was marked by the rise of human reason. The ancient figure of rationalism, Plato, was admired in fifteenth-century Florence, to the extent that philosophers set up an academy on his model and celebrated his supposed birthday as a holiday.[18] Two centuries before Descartes was advocating that a city should be designed by one designer, Filarete had already designed an entire city on the basis of mathematics.[19] Filarete and Descartes shared their search for a new foundation, which they found in human beings. They put human beings at the centre of the universe, and expected human reason to shape the world, which was reflected in their love of mathematics. Mathematics was the language of science, used to explain the world and shape it.

Central composition: humans at the centre of the world

Architects of the early Renaissance were looking for a rational foundation for their designs, which they found in central planning and use of mathematics to arrive at ideal proportions. Central planning, the design of buildings with a central focus, was a Roman type of building and was now taken up as a potent symbol of the new humanism.[20] In a treatise composed between 1461 and 1464 in Milan, Filarete, a Florentine architect,[21] describes the construction of the ideal city of Sforzinda. The starting point of his plan was to think of its basic form and proportions. The overall shape of the city is two squares, one placed on top of the other to create an octagon within a circular perimeter. Within this geometrical regularity, various institutions are located according to their place in society: church

and state dominate the centre stage, flanked by economic institutions. From the city gates, radial streets lined with porticoes converge at the centre of the octagon, where a piazza is surrounded by the church, the princely palace and other subsidiary palaces, with two smaller piazzas at its two corners: one for merchants and the other for daily necessities. A tower is built in the middle of the piazza, which also marks the middle point of the town, high enough to see the countryside.[22] While circular and square-shaped towns had been designed since the Roman times and during the Middle Ages, Sforzinda was the first star-shaped city of Renaissance;[23] it was 'the first wholly symmetrical town plan in Western history'.[24] Alberti also prefers polygonal to circular plans for the city,[25] showing a general Renaissance preference for these shapes, which were thought to provide good defensive walls, but also beautiful and orderly shapes for cities.

Filarete's work is organized around basic geometric forms and simple arithmetic proportions. In designing all his piazzas, he used a 2:1 proportion: so the main piazza was 300 by 150 braccia (175 by 87.5 metres).[26] In this, he is close to Alberti, who mentions the Greek 1:1 and the Roman 2:3 proportions for piazzas, but prefers the 2:1 proportion.[27] The shapes and proportions are derived from the human body, which was becoming the measure of all things in this age of humanism. Filarete starts with the human body in search of finding proportions that can be used in architecture. The head, 'the most noble and most beautiful member', becomes the measure of the body: 'if the arms are opened and the hands extended, [the man] will be nine heads in either direction'.[28] If the navel is the middle point in the human figure, as Vitruvius had suggested, then a circle is derived from a man who has stretched his arms and legs. If his height is equal to his outstretched arms, then he fits within a square. Therefore, all the simple geometric forms are derived from the human body. Like other artists such as Leonardo da Vinci, Ghiberti and Alberti, Filarete is concerned with the relationship between humans and the universe, seeing the human figure as the appropriate basis for all geometric forms and proportions.[29]

Alberti was the connection between the Renaissance and the Middle Ages;[30] and according to some, 'the first theoretician of city planning in the Renaissance' writing a text that begins 'conscious city planning'.[31] In Alberti's treatise on architecture, which he presented to Pope Nicholas V in 1452, he starts by comparing the building to human body. In the same way that the different parts of the body are in harmony with each other, so should be the different parts of buildings and cities, so as to avoid 'making the building appear like a monster with uneven shoulders and side'.[32] Variety is always pleasant, but 'when it causes discord and difference' between objects, 'it is extremely disagreeable'.[33] This is similar to music, where harmony between different sounds is pleasant for the audience.

The effect of this new humanism, and of the discovery of the laws of perspective in around 1425, was designing buildings that focused on a

single centre, where the human body stood. As Pevsner argues, this central planning, which was first manifest in churches, should be understood as the key to Renaissance and Baroque architecture:

> For a central plan is not an other-worldly, but a this-worldly conception. The prime function of the medieval church had been to lead the faithful to the altar. In a completely centralized building no such movement is possible. The building has its full effect only when it is looked at from the one focal point. There the spectator must stand and, by standing there, he becomes himself 'the measure of all things'. Thus the religious meaning of the church is replaced by a human one. Man is in the church no longer pressing forward to reach a transcendental goal, but enjoying the beauty that surrounds him and the glorious sensation of being the centre of this beauty.[34]

This principle found its boldest manifestation in town planning. Alberti's plan for a new Borgo Leonino, the district that runs from St Peter's to the Castel Sant'Angelo in Rome, was one of the earliest Renaissance schemes to use geometry in reshaping cities. It envisaged three broad avenues connecting plazas at both ends of the long rectangular area, centred on a great obelisk to be placed in the middle of one of plazas in front of St Peter's, a concept that was realized in a different form later (Figure 3.2).[35] In Filarete's Sforzinda, this focus on a single centre was evident in the high tower in the middle of the city. Numerous other Renaissance designers were engaged in imagining centralized plans, where a square at the centre was linked with perfectly symmetrical city walls and gates through broad straight avenues. It took a while for a few ideal cities to be built, as was the case with Palma Nuova, designed by Vincenzo Scamozzi, which started to be built in 1593.[36] More widely, however, star-shaped fortifications were added to many existing cities.

It was not easy to find opportunities to design and build a town in its entirety. The financial means, political will and productive capacities were often too limited to engage in comprehensive redevelopment of a town. With few exceptions, therefore, Renaissance urbanism was mainly involved in designing some parts of the city. The first examples of this urbanism were Via Nuova in Genoa (1470) and Piacenza's cathedral square (1460), where 'the conscious arrangement of buildings into a predetermined form' could be practised.[37] This was indeed the beginning of design in the modern sense. Rejecting the picturesque irregularity and informality of the medieval city, Renaissance urbanism emphasized regularity, harmony and order. It changed the emphasis from vertical lines to horizontal ones, relied on symmetry and rules of perspective to shape the space, closed vistas by placing monuments at the end of straight streets, and created coherent compositions from buildings and urban spaces.

Figure 3.2 An obelisk in front of St Peter's provided a single centre on which vistas converged (Rome, Italy).

In turn, the calm harmony of Renaissance urbanism gave way to Baroque's sense of direction. The Renaissance space is a '*limited* space at rest', while the Baroque space is intended to create an 'illusion of *infinite* space', relying on open vistas and grand scales that reflected the power of absolute rulers.[38] In the seventeenth century, when Descartes was developing his philosophy, Baroque was the style of the day, which was adopted to form the French classical architecture of the time. Baroque coincided with counter-reformation in Roman Catholic countries; it was characterized by its rich decoration, optical illusions, curved facades, oval plans, coherence of parts, movement in space and, in a return to Gothic, emphasis on emotion.[39] The seventeenth century was a period of transition in France from a Renaissance state into absolute monarchy, where the Bourbon kings ruled the country with a small bureaucratic elite and a loyal army.[40] The court was engaged in a top-down process of centralization, to subordinate the aristocracy, provincial governors and local institutions; certain groups anxious for tax reform encouraged this intervention,[41] while the king had to purchase the cooperation of the elite,[42] and seek legitimacy through establishing patron–client relations with the urban society.[43] Descartes also lived for 20 years in isolation in Holland to concentrate on

his work, enjoying the anonymity of living among the urban crowds, which gave him the necessary conveniences, as well as the solitude he was seeking.[44] The seventeenth century was the Netherlands' golden age, with unprecedented prosperity that its ships and banks generated for the Dutch empire. This was the time that the city of Amsterdam was extended according to an elegant design, becoming one of the major examples of applying geometry to urban form (Figure 3.3).

The main design components that Renaissance urban designers used to impose geometric regularity on urban space were: the primary straight street, gridiron-based districts, and enclosed spaces of squares.[45] Furthermore, the use of fortifications encased cities within a regular geometry, of the sort first proposed in Filarete's Sforzinda. The geometrical elements of points, lines and grids enabled city designers to create a series of nodes, axes and networks as the defining elements of the urban space.

Coordinated development: points and nodes

The Renaissance established a new principle that had not existed in the medieval period: creating spatial coherence for a public space by coordinating the buildings around it in some harmony. Before, arcades in

Figure 3.3 A network of canals has shaped the city, a regular geometry as the backbone of the urban infrastructure (Amsterdam, The Netherlands).

public places belonged to single buildings. But in Piazza Annunziata in Florence, it is possible to see the first signs of moving towards coordination between buildings. Brunelleschi is credited as having built the first Renaissance building, the Foundling Hospital (1419–1924), which had an elegant arcade linking the building to the space in front of the Church of Santissima Annunziata (Figure 3.4). These arcades were similarly built by others in later years, eventually enclosing the piazza, unifying disparate buildings into a spatial unity. In harmony with Brunelleschi's arcade, Michelozzo designed a one-bay entrance porch to the church in 1454, which was later enlarged (by Giovanni Caccini between 1601 to 1604) to run the length of the northwestern side of the square. The next coordinated intervention was in 1516, when the architects Antonio da San Gallo the Elder and Baccio d'Agnola designed an arcade on the third side of the square facing the Foundling Hospital. This design followed closely that of Brunelleschi's, creating a pattern for coordination and harmony that was to be a significant principle of city design in Renaissance.[46] Rather than individual self-expression that was to characterize designers in later centuries, it was the harmony of connected action that marked the humanist urban design.

Another manifestation of central planning was the monumental use of sculpture in public places, by placing a statue or an obelisk at the centre of a square, a tradition that was adopted widely after the sixteenth century. The idea was introduced by Michelangelo in Capitol Piazza (Campidoglio) (Figure 3.5), on Capitol Hill in Rome, which he was commissioned to design in 1537. Before this square, sculpture was placed next to buildings, working closely with, or as part of, buildings, leaving the centre of public spaces open for public use.[47] Michelangelo, who was predominantly a sculptor himself, gave the centre of the square to a statue of Marcus Aurelius, the only equestrian statue to have survived from ancient Rome. This central place was emphasized by placing the statue at the centre of an oval pattern on the floor, and on the main axis of the square, which was marked by the stairs leading from the bottom of the hill to the square. This was the first monumental square of its kind, paving the way for the Baroque squares that were created afterwards.[48] In Baroque streets and squares, fixed points, such as statues, fountains, obelisks or buildings were used to manage vistas, as distinctive from the ever-changing vistas that characterized medieval cities.[49] These fixed points were the reference points of central composition of the time, which were connected to one another through axes and gridiron patterns, to create harmony and unity in urban space. Even though religious beliefs still dominated the urban structure, and the urban nodes and points of reference were still churches and other religious symbols, the idea of creating an interconnected urban space now made these nodes part of a larger structure.

Although with some delay and at slow speeds, other European countries eventually adopted these fifteenth- and sixteenth-century Italian ideas and

Figure 3.4 Piazza Annunziata, in front of Brunelleschi's Foundling Hospital, shows the first signs of connected action through generations to create spatial harmony (Florence, Italy).

Figure 3.5 In Compidoglio, Michelangelo introduced a monumental use of sculpture in public spaces, changing the morphology of urban squares through central planning (Rome, Italy).

practices. The sixteenth century is the time when artists and architects in Britain, France, the Netherlands, Spain and Germany turned their back on their Gothic past and embraced Italian Renaissance styles. In designing Renaissance cities, such as Vitry-le-François in mid-sixteenth-century France, the relationship between the square and the streets changed. In medieval squares, streets entered the space at its corners, leaving the centre free for commercial or other activities. But the streets now entered the square at the middle of its sides, which accommodated traffic and put a visual emphasis on the central point, where a statue or monument could be placed.[50] The design of the square thus was changing according to the principle of central composition, whereby the entire composition revolved around a central point, which now often marked the glory of the absolute rulers. At the scale of the city, the square was now beginning to play the role of a central node, connecting a set of geometrically regular streets into a network of transportation and communication. This was part of seeing the entire town as a single composition, rather than a collection of separate parts. Nevertheless, this approach was still only possible in new small towns; large cities such as Paris could only see isolated developments on

undeveloped land inside the city or on its outskirts, or as redevelopment of parts of the urban fabric. Some connections between parts were made, such as new bridges, Champs Elysées and Grands Boulevards, as we shall see later in this chapter. But in Paris and provincial French cities, urban design essentially focused on the creation of squares. Five royal 'statue' squares in Paris, where placing an equestrian statue of the king in the middle was either a precondition for their development or the intention of their promotion, were Place Dauphine, Place Royale (now Place des Vosges), Place des Victoire, Place Vendôme and Place Louis XV (now Place de la Concorde).

Place des Vosges is considered to be the prototype of residential squares in Europe (Figure 3.6). On a site near the city walls and the Bastille, it had gone through several phases of development and decline, before it was planned to become a factory. However, the king decided that a square should be built there; first the three sides of the square were built in front of the factory and, after the closure of the factory, the fourth side was also built on its site. It was completed in 1612 and was named Place Royale. Rather than fronting houses onto the busy and crowded streets, which was a feature of medieval towns, this was a space that excluded and discouraged traffic, creating an enclosed and exclusive residential environment. To emphasize the unity of composition, the 38 houses that surrounded the square were ordered to have uniform facades: a row of dormer windows in

Figure 3.6 Place des Vosges (originally Place Royale) was completed in 1612 and is considered the prototype of residential squares in Europe (Paris, France).

steep slate-finished individual roofs that covered two-storey houses above a continuous ground-floor arcade. Two arched entrances from the north and the south provided access to the space, although a new access was added to the square later.[51] The houses were to bring the aristocracy together, near the king, who intended to live in the entrance building on the southern side, thus ensuring the integration of the aristocracy into monarchy. Rather than living across the city in their mansions or in their country chateaux, these powerful figures would live within the sight of the absolute monarch.[52] The central open space was gravelled and used as a tournament ground, before in 1639 a royal equestrian statue was placed in its centre by Cardinal Richelieu, who lived at house number 21 for a while.[53]

In England, architects such as Inigo Jones were learning from Palladio and the Roman architects of the early sixteenth century the notion that the building should be regarded as a whole, using rational rules to organize it throughout, in plan and elevation.[54] Symmetry in plan and elevation started to appear in Elizabethan England; sometimes even using blocked windows to keep the outward symmetry, even if this did not match the internal symmetry of the building. The exterior and the interior, however, were not following the same rules. Inigo Jones, 'the first English architect in the modern sense' and the father of classical architecture in his country, designed simple facades but rich interiors.[55] He wrote, 'Outwardly every wyse man carrieth a graviti in Publicke Places, yet inwardly hath his imaginacy set on fire', which is why in his buildings, 'Ye outward ornaments oft to be solid, proporsionable according to the rulles, masculine and unaffected'.[56] Inigo Jones was commissioned by the Earl of Bedford to design a residential square. The result was Covent Garden (1631–1638), a square surrounded by St Paul's Church and rows of uniform two-storey houses over continuous rusticated arcades on the ground floor. The idea was taken from an Italian piazza in Leghorn[57] and was also likely to have been inspired by Serlio[58] or by Place des Vosges in Paris.[59] Rather than the gradual accumulation of buildings around a square, which characterized medieval cities, Covent Garden's piazza was conceived as one composition, with uniform houses surrounding an open space. This was the first geometrically planned London square, the forerunner of the many squares, crescents and circuses that transformed London and other British cities in the eighteenth century.[60] The unified perspective that shaped the square can also be found in Jones's approach to stage design. In stage design, he introduced and perfected Italian ideas of the sixteenth century, which were revolutionary at the time, using a unified perspective to create an illusion of reality, with painted, changeable scenery created with the help of sliding shutters.[61]

The classical style of architecture that developed in Britain was influenced by the Puritan movement of the time and by the tendency to utilitarian functionalism. As Inigo Jones wrote in 1614, 'Greek architecture is

fytter for ous than the Romain is, for their buildings wear for youse and not so profuse.'[62] This meant preferring only the regularity and proportion that were implicit in the classical orders, rather than the columned orders themselves. It was a preference that became popular with developers after the 1660s, especially as Puritan Minimalism, a watered-down classicism, reduced the building costs and was more functional.[63] Financial and practical considerations of construction coincided with the ideological push for simplicity, creating an aesthetic modesty that differed substantially from the Mannerism that dominated Italy. After the Great Fire of London in 1666, the 1667 Act for the Rebuilding of the City of London formalized this approach of building simple brick buildings with neat and simple facades. Covent Garden's piazza had used giant orders of pilasters and arched portico houses, but this seemed too costly and ornamental. Bloomsbury Square and St James's Square, which were built in the 1660s, were surrounded by single-pile terraces which could be built more cheaply and quickly. This reduced the amount of investment from the landowner by spreading the costs among the lessees, also reducing the level of craftsmanship needed to construct them. These two squares set the pattern of residential London for the next two centuries (Figure 3.7).[64]

Figure 3.7 Bloomsbury Square is one of the famous squares that represent London's main contribution to urban design in the seventeenth and eighteenth centuries (London, UK).

London's main contributions to urban design in the seventeenth and eighteenth centuries are its squares, which were 'isolated, privately owned' areas, where an open space was surrounded by 'houses of, as a rule, similar but not identical design, examples of good manners and not regimentation'.[65] Pevsner compared the sensation of walking from square to square in the West End of London to a be a secular modern version of moving from one isolated compartment to another in a Saxon or Early English church. These were attempts to create harmony and order at small scales, which remained disconnected from each other, rather than being integrated through boulevards and street networks that were developed in Paris.

Comfort and utility, rather than display, seemed to be the driving forces of domestic urban architecture in Britain, while some larger eighteenth-century country houses showed a reverse trend. The qualities of colossal scale and decorative splendour, exemplified in houses such as Blenheim Palace designed by Vanbrugh, were criticized by contemporaries as unreasonable and unnatural, as reflected in the famous quote by Pope, ''tis very fine, But where d'ye sleep, or where d'ye dine?'[66] When an attempt was made to change a standardized London house, Lord Chester suggested to the owner that he should live across the street, so that he can admire his own house without having to live in it.[67]

Coordinated development: axes

At the start of the sixteenth century, the centre of innovation moved from Florence to Rome, with Early Renaissance transition to High Renaissance, and eventually to Mannerism.[68] Rome's streets and monuments were gradually improved under the patronage of subsequent popes. But it is Sixtus V (1585–1590) who is widely known for a radical plan for the city. His programme was based on three objectives. The first objective was to set up a water distribution network that would enable repopulation of the city hills, through building new and repairing ancient viaducts. The second objective was setting up a street network that would connect the main churches of the city and the improvements undertaken by his predecessors. The third objective was to create an aesthetic unity for a city made of disparate parts.[69] Old and new streets were integrated into a network which connected the seven pilgrimage churches of Rome, easing the navigation in the city for pilgrims. The streets were given gentle inclines by flattening hills and filling valleys; their straight lines provided open vistas, which were enhanced by placing obelisks at the main intersections and other important points.

Axes and street networks were the tools of the French urban designers from the seventeenth century onwards, used to change the spatial organization of Paris and provincial cities. The most important axis of all in Paris

was the Seine, which was both the main route through the capital and a major showcase. In Venice, a king of France had admired the Grand Canal as the most beautiful street in the world (Figure 3.8).[70] After Venice, Paris was the first major European city to use the aesthetic possibilities of the river, which were enhanced by the improvement of the quays, development of Pont Neuf, the first uninhabited bridge, the development of Place Dauphine on Île de la Cité, and the building of grand mansions on Île Saint-Louis.[71] The most famous axis that developed to shape the city, however, was Champs Elysées, which resulted from westward expansion of the royal palace at the Louvre, beginning by the construction of the palace and the gardens of Tuileries in the sixteenth century, with its axis which ran parallel to the river. In 1667, Champs Elysées was begun by André Le Nôtre, the great landscape designer, providing dramatic views for the Tuileries palace by extending the axis of a tree-lined avenue up the hills to the Place de l'Etoile and down to the bridge at Neuilly, and beyond.[72] Later centuries witnessed new emphases on the axis: a circle of emanating eight radial streets on the top of the hill in the eighteenth century, a *rond-point* which was the hallmark of Baroque in France.[73] Then came the Arc de Triomphe in the middle of the circle in the nineteenth century, and extending the axis beyond the Seine to the new

Figure 3.8 The Grand Canal was considered by a French king to be the most beautiful street in the world (Venice, Italy).

business district of La Défense, with its skyscrapers and a new Grand Arche, in the twentieth century (Figure 3.9).

The creation of this avenue gave Paris an axis and a sense of direction, which were among the notable features of Baroque architecture. It was similar to the opening of vistas for smaller palaces in the countryside,

Figure 3.9 Champs Elysées exemplifies how a major axis can form the backbone of urban space (Paris, France).

though here it provided a backbone for the city as it grew westward. It aimed at conquering and controlling the nature for the enjoyment of the royalty, along the same principles that Le Nôtre used in his designs for the gardens of Versaille.

Colbert, Louis XIV's powerful treasurer who changed the face of Paris, was credited as being, second to Baron Haussmann, Paris's 'greatest urbanist', who was able to accomplish his improvements 'without ruthless demolitions'.[74] Colbert was dreaming of 'a new Rome' that was decorated with obelisks, a pyramid, a new royal palace and triumphal arches'.[75] The city was transformed, not only its buildings and streets, but also its management, with the establishment of what was the best police force in Europe at the time. The streets were paved and residents ordered to keep them clean and lit at night, and the water supply was improved. Some streets were widened, in some cases in stages, to create a cross-town artery, as was the case in the north–south axis which ran along rue Saint-Denis.[76] The origin of the grand boulevards was a 120-foot-wide tree-lined street that was built on the route of the demolished city walls, with a promenade and a road wide enough to let four carriages pass through, and planned to be punctuated with triumphal arches. The boulevard and the widened streets served both aesthetic and functional needs, providing showcases to the glory of the king and easier movement across the city. The 3.5 miles of boulevards provided a precedent that became widely adopted by other towns and cities in Europe, as the use of firearms made their fortifications redundant.

The British examples of urban design in the Renaissance and Baroque period are isolated developments, as exemplified in squares, rather than integrated development, as exemplified in boulevards and street networks that characterize the French urban design of the same and later periods. The only major plan that was proposed by Wren, to create a geometrical network of streets for the rebuilding of London after the Great Fire of 1666, was not implemented. Wren was a scientist, a professor of astronomy at Oxford University, and his involvement in architecture brought with it 'a geometrician's feel for shapes'.[77] In his work, he was assisted by Robert Hooke, himself a professor of geometry at Oxford.[78] He had travelled to France, witnessing the system of avenues and *rond-points*, and was aware of the Sixtus V's streets in Rome through printed sources and travellers' accounts.[79]

Thirty years after Descartes had advocated a single designer for the city, the destruction of the city of London gave the Surveyor-General, Sir Christopher Wren, the opportunity to design a new city on the ashes of the old. Wren's plan was proposing a network of streets, varying from 30 to 90 feet, connecting a number of fixed points, and generating a system of urban blocks. The fixed points were the two most important landmark buildings of St Paul's Cathedral and the Royal Exchange, as well the entry points to the city from north, west and east, and the only road from the

south across London Bridge. The backbone of the city was formed of two broad avenues which connected the Royal Exchange and the Tower of London to St Paul's, intersecting in front of the cathedral to form a V shape, and continued as one avenue westwards. Along these avenues, and the other two avenues that one ran along the river and the other westward from the Royal Exchange, there were several piazzas from which radial streets emanated. Other than the main landmarks, the parish churches were also to be, in Wren's words, 'conspicuous and insular', which would have the highest monumental effect. The city was to be reshaped on the basis of urban blocks, a legacy of the Roman city building, which was later widely adopted in building the new world across the Atlantic.

The main problem of the plan was how to rehouse the thousands of people who had lost their homes. Wren undertook a survey of the ruins, but his plan involved changing the property lines and relocating the freeholders to new sites. This required months of negotiation with the large number of freeholders who needed to be given compensation. Very few, however, could be persuaded to exchange their old plots with new ones elsewhere. Wren was only able to design the cathedral and the parish churches, but the latter could not find the 'insular' positions that he had wished for (Figure 2.10).[80] Wren was disappointed that he could not apply the laws of reason to the urban space, creating a new framework for the entire city. However, this could have only been possible with the support of a strong government to implement this plan against the wishes of the freeholders, the sort of strength that only absolute rulers were able to provide. The result was that the plan was abandoned and the city was rebuilt along the existing property lines, houses rising on the old foundations. As has been the case with most other historic cities of the world, the street lines have been the most resilient elements of urban structure, which is why it is still possible today to find London streets that have remained more or less the same for the past 2,000 years.

Wren was a scientist, and it is interesting to see how mathematicians and scientists were trying to reshape the cities, only to be confronted by the reality of the urban context, which was formed of a patchwork of material and symbolic interests. This is the central theme of the modern period, which started from the Renaissance and has continued ever since: the weight of scientific reason constantly being imposed onto the complexities of urban life and urban space, a science that made possible new ways of thinking and new productive capacities to implement them. When these ideas were taken up by the state, often the most powerful actor in urban development, they have reshaped cities in dramatic ways. However, a tension has constantly been present between these abstract visions of the city and the people who live in the city, with their mosaic of attachments, which can be either instrumental, as in economic and political sense, or symbolic, as expressed in cultural and social sense.

In eighteenth-century France, many intellectuals were expressing interest in, and providing suggestions for, urban improvement, so that a general sense of anticipation prevailed for improving the physical fabric for functional and symbolic reasons.[81] This characterized the French ideal of *embellissement*, which was addressing much more than the mere appearance of the city, as the English word embellishment suggests, so that an English equivalent might be 'improvement', as the title of a publication by John Gwynn in 1766 shows: *London and Westminster Improved*.[82] The French notion also covered cultural aspirations and functional amenities. It was this ideal and the schemes proposed at this time that led to the nineteenth-century transformation of Paris by Baron Haussmann. One of these ideas was the development of two principal axes that would cross the city and be embellished with magnificent monuments and beautiful squares. The main axis was the east–west axis along Champs Elysées, which has continued ever since as the dominant line running along the middle of urban space. The intention was that, 'one would be able to cross Paris along its longest diameter on a straight line, passing all the while its most beautiful monuments and public promenades'.[83] Other schemes included new squares, decorated bridges, triumphal arches and monumental buildings.

For the transformation of Paris in the nineteenth century, large sums of money were raised through banks and selling city bonds to middle-class investors. The rise to the throne of Napoleon III provided the necessary power and will for urban transformation. The unfinished grandiose designs of Napoleon I were made possible at the time of his nephew's Second Empire.[84] Louis Napoleon declared his wishes to be 'a second Augustus', as it was he who had turned Rome into 'a city of marble'.[85] His coup d'état established an authoritarian regime at a time of rapid urban growth, industrialization and financial prosperity, which provided the economic basis for transforming Paris. The streets of the city were congested: by 1868, in less than 20 years, the number of horses passing through the Boulevard des Capucines had risen from 9,000 to 23,000. While the national space was being opened up by railways, the city of Paris was opened up to the movement of people as well as goods and services. Haussmann was appointed the prefect of the Seine, which gave him power over Paris and its surroundings, supported by Louis Napoleon's dictatorial decrees that would enable him to expropriate properties at will. He described himself as 'a demolition artist', undertaking a very expensive redevelopment programme that demolished 20,000 houses and built 40,000 new ones and a network of wider streets and boulevards such as Rue La Fayette, Boulevard Sébastopol and Boulevard Saint-Germain.[86] From 1848 to 1870, the size of urban parks in Paris grew from 19 to 1,800 hectares.

The result was the radical transformation of the medieval heart of the city, relocating and pricing out the poor to the outskirts, and

occupation of the centre by the bourgeoisie, who supported the coup and the urban redevelopment that followed. The key reasons for redevelopment were aesthetics and hygiene, but also security for the state in a city that had seen a century of social upheaval. As Haussmann wrote in his memoirs:

> We ripped open the belly of old Paris, the neighbourhood of revolt and barricades, and cut a large opening through the almost impenetrable maze of alleys, piece by piece, and put in cross-streets whose continuation terminated the work. Completion of the Rue de Turbigo finally helped eliminate the Rue Transnonain [scene of the unforgotten massacre of 1832] from the map of Paris.[87]

France was going through industrialization, and this process shaped some of the key features of Haussmann's work, such as the large blocks of apartments that have characterized Paris ever since. However, it was still too early that this process would have its full impact on urban development image and ideals; hence the French continued to develop their cities with concepts that had been in the making since the Renaissance. What was different now was that the authorities had the financial muscle that could allow them to realize some of these dreams, and that these were now the dreams of the middle class, rather than those of the *ancien regime*. In their massive task of reshaping Paris, both Louis Napoleon and Baron Haussmann preferred a revival of the classical style, rather than of Gothic which had become fashionable in Victorian Britain. The Renaissance drive for harmony was prevalent and, therefore, architectural unity was achieved by a common cornice and continuous wrought-iron balconies on the *piano nobile*. The magnitude and the political nature of the redevelopment caused constant controversy. Paris was thought now to be 'some American Babylon of the future', and that 'This is Philadelphia; it is Paris no longer'.[88] Mixed reactions have continued to this day: whereas much of the character and popular appeal of Paris are due to these radical changes, their political and social impacts have not yet been forgotten. Others reject the harmonious facades as oppressive and monotonous, contrasting them with the vibrant diversity of cities such as New York.

Coordinated development: networks and blocks

The conflict between old and new was not a problem, however, with new cities or the extension of existing cities, as exemplified by Washington, DC and Edinburgh New Town. Washington was the federal capital of a democracy, but in its design Pierre L'Enfant used the idea of points, axes and networks that he had grown up with in Versaille. The core of his plan of 1791 was a right-angled triangle, linking the Capitol Hill, the president's

house, and the Washington Memorial. The east–west axis, the mall, is a very broad avenue connecting the Capitol Hill, the congregation of the congress and the senate, to the symbolic monument of Washington Memorial (Figure 3.1). At the right angle along the north–south axis from the monument lies the White House. These two axes form the basis of the city's gridiron network of streets. Cutting across this pattern and becoming the third side of the triangle is Pennsylvania Avenue, connecting the legislative and executive branches of government, hence being the most important street in the country.[89] Pennsylvania Avenue was a diagonal street, the basis on which a network of diagonal streets was developed. Washington's plan, therefore, shows the superimposition of two geometries one on top of the other: a gridiron network that was used to subdivide land, and a diagonal network that linked the major points together, emphasizing their monumentality, as well as improving accessibility. These were ideas that had been used before in the planning of Rome, Paris, and in Wren's plan for London.

After its independence, the United States started its westward expansion, which was managed through the establishment of a giant grid. The land was to be subdivided into rectangular townships of six miles square, each subdivided into 36 square sections of one square mile. In each township, the section 16 was reserved for the support of schools. This 'Great American grid' disregarded the topography, but proved an effective means of establishing property lines and avoiding disputes. Other than New England towns that grew on an organic pattern, the rest of urban America emerged by following the logic of the grid. The grid had been used by the Roman empire to subdivide arable land before the establishment of a colony. It was similarly used in the colonization of the American continent.[90]

Gridiron was an ordering mechanism, which has been used in different forms since ancient civilizations. The Spanish colonizers of Latin America used grids systematically. The first European city in the Americas was Santo Domingo, founded in 1502 on the basis of regular gridiron blocks with a plaza at its centre, which was surrounded by major public buildings.[91] In 1515, Ferdinand V instructed an expedition leader to

> let the city be regular from the start, so that once they are marked out the town will appear well ordered as to the place which is left for the plaza, the site for the church and the sequence of the streets; for in places newly established, proper order can be given from the start, and thus they remain ordered with no extra cost: otherwise order will never be introduced.[92]

Other codes and ordinances followed, which were eventually incorporated into the 1681 Laws of the Indies, used across the Spanish empire. The most important part of a new town was its plaza, as it was indeed the case

in the cities in Spain itself. The plaza was to be laid out with a proportion of 3:2, forming the symbolic and functional heart of the town. It was a place of spectacle and power: where religious ceremonies, festivals, bull-fighting (before the development of specialized grounds) and executions were performed; and where the main economic and political functions of the town were conducted. The church was the most important building in the plaza, to stand above the ground level, separate from other buildings. Other civic buildings surrounded the square and the streets connected it to the gates and principal roads. The street system followed a gridiron pattern, which could allow the town to grow symmetrically (Figure 3.10). In inland settlements, the main plaza was at the geographical centre of the town, while in seaside towns it was located on the coast.[93]

A similar pattern of a grid around a central square could also be found in English cities of the United States. Philadelphia, for example, was founded in 1682 by William Penn, who gave detailed instructions on the selection of the city's site and its layout. The backbone of the plan was a 100-foot-wide high street that stretched from one river bank to another, a broad street of the same width intersecting it at right angles in the middle of the city, where a central square was to be surrounded by major civic buildings. The rest of the town was shaped by a gridiron network of

Figure 3.10 For centuries, gridiron networks have provided a structure for urban growth (Barcelona, Spain).

50-foot-wide streets, with four minor squares at the heart of the city's four quarters.[94]

From the Renaissance onwards, Europeans tried to create a civilization in the image of the antiquity, which would be inspired by the Greeks in thought but by the Romans in action. In transforming their cities and establishing new colonial territories in other continents, this stretched from faithfully imitating the ancient orders in the appearance of buildings to recreating the forums, avenues and grids of the Roman city in the organization of cities. These started as shaky imitations of an apprentice and evolved into the confident strokes of a master.

The modern city of reason was shaped in the image of ancient Roman empire. Colbert thought of Paris as a 'new Rome',[95] and Washington's senate, and its location Capitol, were both named after Rome's. The Roman ideas of town planning shaped the emerging cities of Europe and its colonies. The notion of a gridiron network, with a forum at its centre, which was used in Roman garrisons, was extensively used in establishing new towns in European colonies and extending the existing towns at home. The notion of points and axes to create spectacle and to ease movement, which had been used in ancient Rome, was widely used in reshaping the cities after the Renaissance, from Rome itself in the sixteenth century, Paris in the seventeenth and nineteenth, and Washington, DC at the end of the eighteenth.

The age of humanism was followed by the age of reason, the age of enlightenment; and the centre of the British enlightenment, Edinburgh, provided an urban image for the age. Aesthetics, hygiene, economics and urban management all had a role to play in the development of Edinburgh New Town. The old town was congested and lacked fresh air, clean water and covered drainage. Rich and poor lived side by side at high densities, often using the same staircase to get access to their dwellings. These conditions did not meet the needs of the rising middle class. In a 1752 pamphlet, the Town Council complained about the steep, narrow and dark wynds of Edinburgh, which compared unfavourably with London, which after the unification of England and Scotland was now attracting the wealthy Scots. London's private houses were neat and spacious, its many streets, squares, buildings, bridges, parks and walks were beautiful and convenient. The pamphlet, which was entitled *Proposals for carrying on certain Public Works in the city of Edinburgh*, put forward a framework for transforming the city: 'Let us improve and enlarge this city, and possibly the superior pleasures of London which is at a distance, will be compensated, at least in some measure by the moderate pleasures of Edinburgh, which is at home.'[96] Improvements in the capital of Scotland, it was thought, would spread around the country, and would bring about general prosperity, higher numbers of 'useful people', higher rents and higher public revenues. These are hopes that continue to inspire the regeneration of British cities to this day.

James Craig's 1767 competition-winning plan of the New Town was meant to reflect this sense of optimism and investment in future. Its ordered geometry contrasted the medieval informality of the old town and signified the spirit of the Enlightenment. It was set apart from the old town; it was centred on an axis, George Street, which connected two squares, St Andrew and St George, with two parallel streets on its two sides: Prince's Street and Queen Street. Several Acts, from 1767 to 1785, ensured convenience and uniformity in the speculative development of its houses, limiting storey heights in relation to the streets, limiting the pitch of roofs and forbidding dormer windows. The New Town was extended to the north according to a neoclassical regular plan by Robert Reid and William Sibbald in 1802. It similarly used a language of geometrical regularity of streets and squares bounded by symmetrical buildings, where prominent centrepiece buildings signified the squares, especially where streets ended in squares. Edinburgh New Town was essentially a bounded grid to house the better off, a suburb that provoked the image of progress and prosperity in its sharp contrast with the medieval town.[97]

The Glasgow grid was similarly created to house the rising middle class; in contrast to Edinburgh, however, it was an open-ended grid, which could expand in all directions. Mercantile success led to the development of new, more spacious rectilinear streets in the middle of the eighteenth century, which became the basis for a grid plan, published by James Barry in 1782, for the city's westward expansion, with George Square at its heart.[98] Terraces of single family houses flanked the streets, turning eventually into tenements, hence establishing the grid/tenement pattern which characterizes Glasgow. The grid in Glasgow was 'boundless, without a limit and also without a centre'.[99] Within a uniform abstract framework, the character of the grid's different parts depended on patterns of land use, topography and social geography. It was a neutral framework for expansion, which allowed the transformation of land into compartmentalized units for exchange. The grids in Edinburgh and Glasgow were a means of guiding the growth of these cities, fuelled by economic success, and by the increasing number of the urban middle class; they were also a means of rational subdivision of land into parcels that could be developed by speculators.

Geometry was used as a neutral instrument of establishing a spatial relationship. Building a rectangular room or a rectangular square is an example of using geometry to regulate the relationship between the constituent elements of these places. As such it causes no controversy. However, it can become controversial if this rectangular shape is replacing another shape that stood there and had a different meaning, character and use. It was a socially embedded object that was removed to let a geometrically regular shape take its place. Controversy is created when geometry becomes a vehicle of spatial transformation and social control, of replacing

socially meaningful spaces by abstract shapes and relationships imposed from outside. The neutral geometry turns into an instrument of power, used by some to establish a particular order and shape the conditions of life for themselves and others. For those who use the instrument and identify with it, it is an epitome of reason; for those affected by it in a negative way, it is the sign of rigidity and oppression. It is the socio-spatial order implied by applied geometry, rather than geometry itself that is potentially controversial.

A key question about reason is not that it does not exist or should not be used, but that whose reason should prevail. In the absence of mechanisms to negotiate a commonly agreed solution to a problem, what often happens is that the reasoning of those who are well placed in the social space prevails. This is a form of reasoning that may have valid premises and outcomes. But it might clash with the reasoning of those who have not been involved in the process, those who have had marginal places in the social space. The issue, therefore, is not to question reason and its potential as a whole, as some sceptics tend to do. This appears to make the mistake of confusing the process of reasoning with the social inequalities in power. The issue, then, becomes to open up the process of reasoning to a wider range of people and interests, so that a degree of collective reasoning can be achieved.

Conclusion

The medieval period was one in which a supernatural foundation dominated belief and action. At the end of this period, there was a transition to a human foundation, which drew on intuitive reason. Renaissance signified a turn from the other world to this world, from the predominance of metaphysical concerns to secular ones, from reliance on scriptures to human reason, from superstition to science. The search for a solid rational foundation for belief and action was paralleled in the urban design field with placing the human figure at the centre of the world, shaping the city around this central focus, from which geometrical patterns of buildings, streets and squares emanated.

Relying on supernatural foundations for belief and action marks most of human history. To build cities, however, there was a need for practical knowledge and skills; so these beliefs had to be translated into practical steps to make this possible. Therefore, the links between belief and action remained symbolic, which could be expressed in elaborate geometries, or no link was seen to be possible, hence only remaining in the realm of ideas. With the change of anchor from supernatural to human, the metaphysical belief in a higher source of order remained strong, expecting unaided intuitive reason to form belief and guide action. In city building, the action that followed was performed by the absolute power of the state to impose

a sense of order onto the city. The link between knowledge and action remained symbolic and ideological, a 'top-down' link moving in one direction from the source of authority to the city. The spatial manifestation here was central planning, placing the human beings at the centre of buildings and cities, resulting in an urban architecture that applied mathematics to create orderly, and eventually monumental, spaces. The problem becomes the link between belief and action: how do you form belief? How do you justify action? What does this mean in urban form?

Knowledge and action were coordinated by being traced back to a single source of authority: the human reason. A single source of knowledge, intuitive reason, lay at the heart of understanding, interpreting and changing the world; it used the language of mathematics, which could detect and create an order based on symmetry and harmony. These were the early attempts to rationalize the city, to organize it according to reason: when possible, new towns were imagined or created on the basis of regular geometry; most of the time, however, such orders were imposed onto the existing or new parts of cities. The city was to be designed according to a deductive order, emanated from a single source of authority, the absolute monarch. It was to be designed by a single designer, and imagined as a unit, with the aim of integrating its constituent parts into a unified whole, even though at this stage it was only the seeds of unity that were planted, rather than achieving the coherence that the schemes aimed for. Functional and aesthetic coherence were to be achieved through the connecting frameworks of main axes, bridges and street networks, with squares, statues and monuments acting as the nodes in this new geometry of space. This was a scheme for internal unity and external mastery over nature and society. At this stage, from fifteenth-century Florence to sixteenth-century Rome and seventeenth-century Paris, symbolic coherence and display still prevailed over function and utility as the driving forces of the newly emerging powerful states.

There was a contradiction from the beginning in this way of approaching reason. On the one hand, the source of knowledge had shifted from divine scriptures and old masters' teachings to the human being. This was undoubtedly the most important step that Descartes had taken: finding a secure basis for beliefs in his own act of thinking. Human reason was now the measure of all things. On the other hand, the use of this measure was limited to a few. Descartes was asking for a single designer for the entire city, and cities were shaped by the might of absolute rulers. The result was applying one set of ideas to all, undermining the ability and the desire of others to employ their own intuitive reason, which could easily be at odds with this dominant reason. There was no place for the plurality of individuals to use their own reason, especially if it happened to be different from that of the sole authority. Acknowledging the power of human reason but limiting its use to a single source of authority was a contra-

diction; and the attempts to resolve this tension have shaped some of the key features of the modern world.

There are many similarities between this approach and twentieth-century modernism: searching for harmony, order and geometry, and imagining the ideal world as a machine. Modernism was a more utilitarian urban design, with a different technological base, armed with a different productive capacity, and responding to the need for fast movement, hence with different multiple geometries. Nevertheless, the two shared the notion of imposing a new order on what existed before, which they considered as disordered, created only through the force of custom and tradition, rather than in the light of pure reason.

Chapter 4

City of machines

Technological foundations

The new confidence in human reason turned it into the main foundation for the scientific age. But pure scientific discovery was not the only outcome; application of the new knowledge led to new tools and new ways of dealing with problems, closely related to the development of new technologies. The ability to know, i.e. theoretical reason, was only the first step. If it was not combined with the ability to make, i.e. productive reason, such knowledge would remain at a theoretical level. Soon, therefore, productive reason became an additional foundation for action. Technological ability had always been a key factor in building cities, and it had remained fairly stable through the ages. However, the technological advances of the industrial age gave city designers and builders new, considerably more powerful, productive capacities.

One of the key differences between modern cities and the previous periods in urban history is the way they are built. High-rise buildings, wide and multi-level motorways, extensive suburbs and the huge overall size of urban areas are some of the features of the modern city that are only made possible through new technologies. Without new construction, transportation, information and communication technologies, cities would not be what they are today. For some, this has constituted a new foundation for certainty, a new basis for action. The city is envisaged as a machine, and the ability to make finds a new, easily overstated prominence. The ability to make sometimes takes precedence over the needs, desires and beliefs of individuals and groups.

Productive reason: technological foundations for building cities

'All art', Aristotle wrote, 'is concerned with coming into being', the knowledge of how to bring things into being, things that are not created by nature or necessity, but originated in a maker.[1] Art, therefore was 'a state of capacity to make, involving a true course of reasoning'.[2] This was the knowledge of how to make things, which was different from that of how

to act. In acting, the main task is to select the best course of action in a particular set of circumstances, while in making the main task is bringing something into being. Making and acting, therefore, have completely different natures. The example that Aristotle uses is architecture, which 'is an art and is essentially a reasoned state of capacity to make'.[3] The word he uses for art is *technê*, which is also translated as skill,[4] craft-knowledge,[5] or productive reason,[6] and in general deals with knowing what steps to take to bring things into being. It is the knowledge of how to make things, and is concerned with production as a distinctive form of action.[7]

Rationalists such as Plato, and the twentieth-century modernists, hold function above all other considerations in assessing the process of making. Plato identified three areas of expertise in making any object: 'usage, manufacture, and representation'.[8] To judge the 'goodness, fitness, and rightness of anything (whether it's a piece of equipment or a creature or an activity)', the best standard was 'use for which it was made, by man or by nature'.[9] Representation was only a game not to be taken seriously, and therefore use was the most important of the three.

The use of human reason in shaping cities has always been an underlying, though not always prevalent, factor; what has changed, however, particularly after the Renaissance, is making this presence more explicit, and changing the foundation on which reason is based and the practical and productive tools available. The account given to support a belief or action stands on a presumed foundation, which has changed from a supernatural to a human foundation, whether intuitive or calculative, whether seen as leading or as following emotions, whether benefiting the elite or the society, whether provided individually or socially. The practical tools have included economic and political institutions, which have been gradually altered to allow for larger concentrations of money and power, and therefore more able to deal with the increasing complexity of urban conditions. The productive tools, which are provided by science and technology, have also changed, making ever-larger scales of urban transformation possible. These are the features that distinguish the modern secular cities from the cities of the past, from those parts of the world in which the necessary financial resources, political institutions and technological know-how may be less readily available, and where actions may still be linked to supernatural justifications.

One of the institutionalized forces that shape cities, which determines what can or can't be built, is the productive capacity of a particular urban society to produce its space. This has found a special place in the modern period, as substantial increase in our productive capacity has enabled us to develop entire or large parts of cities in relatively short periods of time. As the modern movement in architecture and the twentieth-century urban development examples have shown, the ability to build drives the shape and the content, whereby industrial technology and complex organization

of production are employed to transform cities. The dynamics of production of space, therefore, are a major foundation for building cities (Figure 4.1).

The logic of technology is one of the key manifestations of productive reason, which lies at the heart of city building. Technology has been defined as 'the use of scientific knowledge to specific ways of doing things in a reproducible manner'.[10] The characteristics of buildings, roads, open spaces and other urban elements reflect at once the social circumstances as well as technological abilities of its inhabitants. Technological change is caused by, and leads to new, social conditions. Technological innovation is famously a result of necessity, and once developed it helps create new circumstances and possibilities for change. No other period in human history has seen more dramatic technological changes than the past two centuries, resulting in urban forms that seem to have had no precedent, although their roots may be traced in the past. Vast cities that have spread horizontally and vertically have been made possible by technological developments that have brought about wealth as well as misery, and a higher quality of living as well as congestion and environmental degradation.

Figure 4.1 The ability to build drives the agenda of urban design and development, pressing to be the most important consideration in the shape of the city (Los Angeles, USA).

Industrial cities and technological change

Technological change transformed cities in the nineteenth century. Nowhere was this more evident than in Manchester, which became the icon of the industrial age. First, like many other European towns with an economy based on textiles, Manchester took a competitive advantage by benefiting from two developments: the steam-powered spinning machinery and looms made production possible at a scale and speed unrivalled elsewhere, and the emergence of North America as a major cotton growing region enabled Manchester to have better and easier access to the raw material for the industry. Steam engines also changed transportation dramatically: six years before London, in 1830, Manchester had its first railway, indeed the first passenger trains in the world, connecting it to Liverpool, and within a decade six railway lines connected it to other major cities. The result of economic boom was fast population growth, from just over 41,000 in 1774 to around 271,000 in 1831 and over 600,000 by the end of the century. The urban and industrial growth was supported by infrastructure development: a piped-water system from 1810 and gas from 1817. Manchester was a market and industrial town, which grew so fast that its skyline soon became dominated by factory chimneys that outnumbered church towers, and large warehouses that dwarfed any other public or private buildings in the city. The city's social and spatial structures were transformed to accommodate the change. The centre of its trade and industry was marked by an exchange, around which a middle zone of warehouses clustered, which was itself embraced by an outer zone of mills. The expansion of warehouses drove the middle classes out to suburban villas. The mill-workers, however, had to stay in the city, living in badly built speculative housing near the mills, in conditions that were still better than those of the casual labourers living in Manchester's notorious cellars.[11]

The technology of rotary steam power and iron frames emerged around the same time towards the end of the eighteenth century, leading to the development of railway networks, cast-iron and wrought-iron suspension bridges, and iron-framed buildings. The first cast-iron bridge was designed and built over the Severn river in 1770, with a span of 30.5 metres. With technological advances, spans grew to 487 metres with New York's Brooklyn Bridge a century later. The railway network grew from George Stephenson's line between Stockton and Darlington in 1825 to the completion of the railway infrastructure around 1860 in Britain and its restless growth elsewhere through the century. The growing specialization of architecture and engineering was reinforced by the establishment of Ecole Polytechnique in Paris in 1795. Wrought-iron suspension construction came to its culmination in Brunel's design for Bristol's Clifton Bridge, which was eventually completed in 1864 (Figure 4.2).[12]

Figure 4.2 Wrought-iron suspension construction came to its culmination in Brunel's design for Clifton Bridge, which was eventually completed in 1864 (Bristol, UK).

The building materials and technology used for railways were applied to industrial buildings such as warehouses, as well as railway stations and eventually to other types of buildings which were needed in the rapidly urbanizing countries. By the mid-century, new urban buildings such as market halls, exchanges and arcades were built by cast-iron columns, wrought-iron rails and modular glazing. The buildings that came to symbolize the triumph of iron were Paxton's 1851 Crystal Palace in London and Eiffel's 1889 tower in Paris. Industrial technology and engineering projects were considered the marvels of the nineteenth century, with architecture gradually waking up to the capabilities that this technology offered. Iron was increasingly used (and promoted to be so by Durand amongst others) in the construction of bridges, and was integrated with the neo-classical style of architecture in the construction of new types of buildings such as libraries and barracks. Hydraulic cement was used in building bridges, canals and harbours in the last quarter of the eighteenth century in England. The combination of steel with concrete was developed in France from 1861 by François Coignet, who used his technique under Haussmann to build six-storey apartment blocks in 1867. The systematic development of reinforced concrete was patented in 1892 by François Hennebique, used in making slabs and prestressed concrete, which soon provided the means for covering wide spans and for flexibility of architectural expression.[13]

Technological development enabled cities to grow in horizontal and vertical directions, as best exemplified by Chicago in the second half of the nineteenth century. Suburban areas that had rural names and winding roads or variations on a grid cropped up around Chicago from the middle of the century. The changing technology of transport allowed for suburban developments to become permanent living spaces of commuters: horse buses, horse trams, cable cars, electric cars and an elevated railway were introduced one after the other between 1850 and 1890. Residential areas, therefore, were spreading out and segregated by the wealth and ethnicity of different waves of immigrants. The office workspaces, however, were concentrated in the vertical expansion of the downtown. The introduction of the lift, as dramatically announced by Otis in 1854 when he cut the cable of his suspended lift while standing on it, removed a major obstacle to the development of tall buildings. Ten-storey masonry buildings had started to develop in Chicago, but from the 1870s and 1880s, steel-framed structures made it possible to build them higher and cheaper, while the invention of telephone made working in them possible. The availability of finance from the East Coast, and the high demand by businessmen who needed to be located within walking distance of the relevant exchange and could afford to pay high rents for this access, made high buildings economically viable.[14]

From the 1880s onwards, the skyline of Chicago, and soon afterwards

New York, started to change from one dominated by church spires and domes, cupolas and towers of public buildings to a concentration of skyscrapers that would go on to characterize the American city and be imitated around the world. Chicago and New York had grown fast as the economic centres of the country, becoming the main nodes in the expanding network of railways that opened up the continent's space to new settlement and economic activities. New York, however, emerged as the larger and richer centre, as the place of headquarters. In 1890, the tallest office building in the world was the 16-storey World Building in Chicago. Soon after, New York took over in the competition for higher buildings, which were less elegant but more cheaply built to meet the growing demand and a faster and higher return on the speculators' investment.[15] The urban land theory can partly explain the high land values in the centre of cities, where high demand for the most accessible places pushed the prices up and led to the development of taller buildings to meet this demand.[16] However, not all development was following this logic: the central office spaces were not necessarily working like the medieval market towns, where physical access by traders for exchange of their goods was essential. In constructing tall buildings, there was always an element of display, advertising and prestige for the companies that developed their headquarters in New York or relocated there. For example, in 1930, the optimum height for an office building opposite Grand Central Station was calculated to be 63 storeys, while the Chrysler building was built to 77 storeys, well above the economic calculation. The contractor for the Woolworth building who was worried about the lack of return on his client's investment was reassured by Mr Woolworth himself that the building 'was going to be like a giant signboard to advertise around the world his spreading chain of five-and-ten-cent stores'.[17]

From mechanical clock to motor car: multiple and disengaged geometries

The Renaissance emerged as a rejection of what was understood as the medieval superstition and disorder. The first examples of Renaissance urban design are those that show a degree of connection between disparate parts, linking the component parts of an urban area as if belonging to a whole. This was a degree of coordination which resulted in a drive for aesthetic harmony as a pathway towards an ideal city. The parallel with the modern movement in the twentieth century is striking. This movement was also a rejection of the haphazard growth of the nineteenth century, which had also revived gothic styles of building. Modern rationalists strove to introduce a sense of order and coordination, to get rid of the unhealthy conditions of the uncoordinated parts of the city. The keywords that link the two include a belief in humans' ability to improve their conditions, a

rejection of disorder, striving to establish a new order, expression of order through use of geometrical regularity, and attempts at mastering space. As Pevsner points out, 'The effort of the fifteenth century to master space is comparable only with that of our own age, although that of Renaissance concerned an ideal world and ours a material.'[18]

The invention of mechanical clocks inspired the Renaissance thinkers to imagine and shape the world in its image. The result was to envisage an orderly city, ruled by the laws of geometry and the logic of mechanics. The mechanical artefacts that inspired the modernists were more developed and complicated, but essentially leading to the same tendency of wishing to understand and shape cities in the image of machines. In his book *Towards a New Architecture*, Le Corbusier described a house as 'a machine to live in',[19] and devoted entire chapters to ocean liners, airplanes and motor cars, to show how the logic of industrial design and production used in them could be employed in building cities. However, while the post-Renaissance city resembled a handmade clock, the modernist city looked like a mass-produced factory, showing differences in methods of production and aesthetic sensibilities.

According to Le Corbusier, while the architects' aesthetic was in retrogression, the engineers' aesthetic was flourishing, 'for they employ a mathematical calculation which derives from natural law, and their works give us the feeling of harmony'.[20] While architects worried about style and ornamentation, engineers produced simple primary forms of universal appeal: cubes, cones, spheres, cylinders or pyramids. The modern rationalists from the Renaissance to Le Corbusier believed in the existence of a natural law ruling the universe, which needed to be uncovered by humans. This law was fixed and eternal, and the means of understanding and expressing it was mathematics. This is why Renaissance architecture was considered to be applied mathematics,[21] and the modernist architecture used the language of pure geometry (Figure 4.3).

Despite being labelled a functionalist, Le Corbusier emphasized the plastic nature of architecture, which went 'beyond utilitarian needs'.[22] Responding to a need for comfort, utility and practical arrangements does not render a thing beautiful. The aim of architecture, he wrote, was to achieve 'a state of platonic grandeur, mathematical order, speculation, the perception of the harmony which lies in emotional relationships'.[23]

Le Corbusier, in the same way as Descartes, found the city and its architecture plagued by custom and tradition. For him it was essential to seek 'freedom from an age-long but contemptible enslavement to the past',[24] and thought that in his proposal for the City of Three Million Inhabitants, he had relied on 'the sure path of reason'.[25] A rational order was to be applied to the city, expressed through geometry. 'For all these things – axes, circles, right angles – are geometrical truths', Le Corbusier wrote, 'and give results that our eye can measure and recognize; whereas

Figure 4.3 The aesthetics of modernist designers followed scientists and engineers, using primary forms of geometry (Paris, France).

otherwise there would be only chance, irregularity and capriciousness.'[26] For him, therefore, 'Geometry is the language of man.'[27] It is 'the means, created by ourselves, whereby we perceive the external world and express the world within us'.[28] Its use is a sign of civilization, as 'Man walks in a straight line because he has a goal and knows where he is going', whereas 'The pack-donkey meanders along'.[29] The modern city, as exemplified by rectilinear American cities, which he admired, 'lives by the straight line', whereas the old cities of Europe represented the ways of the pack donkey.[30] Despite massive growth in their population and size, 'the child-like configuration of their beginnings has persisted'.[31] While curved streets could be picturesque for pedestrians, straight roads were better for the fast movement of buses, trams and motor cars.[32] Cities were, therefore, in need of comprehensive redevelopment which would give them a new geometrical order fit for the age of industry and mobility.

However, this is a different geometry, freed from the laws of perspective and symmetry. The development of the rules of perspective had created the possibility of depicting and creating the post-Renaissance city through a static geometry. For the twentieth-century modernist, however, the Euclidean and Cartesian geometry and concepts of space had been challenged by

non-Euclidean geometry and the theory of relativity. Modernism was inspired by the power and speed of new modes of transport, shattering the rules of perspective and paving the way for the mobile perspectives of the Futurists and the Cubists. Movement became the central theme of modernism, and the breaking of static geometry was reflected in the call for the abolition of streets, which embodied that geometry in the city.[33] The 'corridor-street' had to disappear[34] (Figure 4.4).

The sense of order in the old geometry was achieved through the collective composition of mass and void, i.e. buildings in relationship with streets and other open spaces. Now this order was questioned by the modernists, who introduced the motor car to this composition, smashing it into pieces in order to let the car in. The Renaissance and Baroque notion of the city was based on streets and squares, which related buildings to one another and provided the public spaces of the city for movement and repose. The exterior of the building mattered as part of the street scene, needed for generating harmony with others around it along the axes and nodes of the city. The Corbusian city, however, was based on the primacy of buildings, believing that 'the exterior is the result of an interior'.[35] This released buildings from being related to other buildings, and removed all the previous notions of harmony. Separation of buildings from roads

Figure 4.4 Separation of buildings from roads would abolish corridor streets and create multiple independent geometries (Tokyo, Japan).

created independent geographies. The result was 'an ordered forest of pillars in the midst of which the town would exchange its merchandise, bring its food supplies, and perform all the slow and clumsy tasks which to-day impede the speed of traffic'.[36] This would prepare the city life to speed up, as 'A city made for speed is made for success',[37] and also clear the street level from cafés and places of recreation: 'that fungus which eats up the pavements of Paris'.[38]

The Renaissance and Baroque urban design dealt with parts of the city, mostly its showcases, while modernist design had a commitment to spread its net to all sections of society. Housing was seen as a major problem that needed solving, and it was architecture that provided the answer: 'It is a question of building which is at the root of the social unrest of to-day: architecture or revolution.'[39]

These ideas were formulated for town planning by the Charter of Athens in 1933, and were applied to cities across the world, primarily after the Second World War. But were they successful in building rational cities? They definitely reorganized the urban structures to come to terms with the motor car. In that sense, they reshaped cities in the image of a machine, the parts of which are connected to one another. However, the predominance of the motor car has not solved the city's problems. If anything, the large numbers of cars that are crammed into cities have created traffic jams and polluted air. Different forms of public transport and restrictions on motor cars have come to be associated with better management of movement across the city, quite the opposite of the image that Le Corbusier had in mind.

The modern movement in architecture was essentially characterized by its praise of new transport and building technologies. Le Corbusier praised engineers for being inspired by 'the law of Economy' and for being 'governed by mathematical calculations', which related humans to universal laws and therefore achieved harmony.[40] Architects were encouraged to follow them, to use primary geometrical forms and to focus on the plan. Houses were machines to live in, and so were needed to be mass produced. In the same way that Descartes had dismissed custom and example, Le Corbusier announced that 'Architecture is stifled by custom'.[41] These needed to be dropped, and instead learn from ocean liners, airplanes and automobiles, and other industrial objects, and use industrial methods of production for building cities. He describes how he was overwhelmed by the power of the motor car in Parisian streets, experiencing 'The simple and ingenuous pleasure of being in the centre of so much power, so much speed'.[42]

This fascination with the possibilities that the motor car offered was strong enough to change the shape of cities. The 1933 Charter of Athens saw the 'uncontrolled and disorderly development of the Machine Age' as the cause of the chaos of cities.[43] Residential buildings were overcrowded

and badly located. The traditional streets, with their limited width and their frequent intersections, were generating traffic congestion. To solve these problems, new technologies were to be used systematically, to allow the development of high-rise buildings, large open spaces, and a network of roads. Following this vision, many cities were and continue to be redeveloped, their streets widened and their buildings torn down, so as to allow access by motor cars. The essence of the modern period has been identified as movement and speed.[44] Horizontal and vertical means of movement have created the conditions in which cities have grown in both directions, in the form of high-rise buildings and vast expanses of urban regions. While trains transformed nineteenth-century cities, the twentieth-century city was reshaped by the introduction of the motor car.[45]

New technologies and spread-out cities

The processes of technological change are parts of a broader process of reorganizing the global economy, which includes reshaping the patterns of dispersion and concentration of activities across the world. A new division of labour has led to a process of deindustrialization and industrialization, resulting in changing the role of cities. After an early phase of decline in deindustrializing cities, the global economy has generated new pressures for concentration.[46] In a more open global marketplace, some major cities have become nodes of command and control, and cities overall are the places of innovation and knowledge production and transfer.

The overall trend of urban living, which has characterized the past two centuries, has continued to grow, to the extent that the turn of the millennium has been marked as when the majority of the world population now live in cities. The Industrial Revolution was largely an urban event, causing a phenomenal growth of cities in the nineteenth century. While the nineteenth century was a time of concentration of large populations in cities, the twentieth century was a time of decentralization and suburbanization. Urban regions have continued to be the living and working place of most people, but now spread out with large footprints, rather than dense agglomerations of the past (Figure 4.5).

The local balance within the urban regions has been changing largely in favour of the suburbs, rather than central cities, nowhere more considerable than in the United States. After the Great Depression of 1929, the policies of New Deal lay the foundations for mass suburbanization that followed after the Second World War. Urban renewal, slum clearance and the federal highway system reshaped central cities, while subsidies promoted construction and purchase of new housing in the suburbs.[47] Within two decades from 1950, central cities in the United States grew by ten million, their suburbs by 85 million. In the 1970s, central cities lost 13 million people through out-migration.[48] With the economic crisis of the

Figure 4.5 Transport and communication technologies have enabled the cities to grow and scatter in all directions (Los Angeles, USA).

1970s and the process of deindustrialization, central cities declined further, while jobs, shops and recreation followed housing to the suburbs. Whereas suburban shopping malls, business parks and housing subdivisions grew, the central city's buildings and infrastructure declined, becoming places of poverty and disadvantage. Although downtown has remained a centre of considerable economic and political power,[49] historical connections between the city and periphery have weakened. There has been a flow of immigrants and a return of the middle class to the city, but not yet in a large enough scale to revive its tax base and change the degree of its decline.

This new configuration of urban space is partly made possible by the new transport, information and communication technologies. Different terminologies have been used to describe this new urban reality. Fishman, for example, calls these techno-cities and technoburbs.[50] Technoburbs are the new phase of suburbanization, peripheral zones that function as a viable socio-economic unit, rather than being dependent on the city centre. Highway growth corridors provide access to suburban shopping malls, industrial parks, office parks, hospitals, schools and housing areas. Techno-cities, according to Fishman, are the collections of these technoburbs, polycentric metropolitan regions such as Los Angeles, in which the peripheries no longer depend on the centre, but are collectively making

a vast urban region. Rather than the traditional central city, the technoburb has become the centre of American life and as such the history of suburbia has come to an end.

Whatever the terminology, the new urban configuration is characterized by a larger geographical spread, a number of centres and subcentres, new land use patterns with further specialization and segregation of activities and social groups, and a pattern of spatial relations that is not limited to traditional centre-periphery. In contrast to many predictions, the old centre is far from dead, increasingly strengthened by new urban regeneration and improvement schemes. While information and communication technologies have intensified levels of interaction across space, face-to-face relationships have not disappeared and are, on the contrary, appreciated more than before. While geographical spread has deepened social segregation and exclusion, pressure has increased for social integration, through measures such as public space improvement and mixed-use development. While the larger footprints have intensified the consumption of non-renewable energies, pressure has intensified for environmental care and sustainable development. In short, the use of new technologies has brought about substantial changes in urban configuration, but it has also had consequences that have triggered new responses.

Productive reason as the driving force for action?

Ever since the seventeenth century, there has been a tendency to see the world in the image of machines. From considering the human brain as not more than a computer,[51] to the idea of a house as a machine,[52] the city as a machine, the society and the natural world as a system,[53] the imagery has drawn on science and technology. Even when the subject has not been related to technology, terminologies and ideas from technology have been used to describe and interpret it. For example, cities are considered to be a 'growth machine', a mechanism for increasing aggregate rents and trap related wealth for the elite.[54] In all instances, the attempt has been made to grasp the matter at hand in its totality with the help of a metaphor from the most advanced technologies of the time.

New technologies in many ways resemble other new tools that humans have developed throughout the ages. A new tool is very closely related to the ability to do new things, and consequently can have a major impact on habits and routines. For some, this is sufficient to believe in some form of technological determinism, seeing technology as the most important cause of social and economic changes in society. With every new technology, there are theorists who see that technology as the cornerstone of a new society, a completely new way of living and consciousness. They may even use a technological term to characterize that new society. An example is the term *network society*, which uses a technological term from the

information and communication technology to describe the entire global society with its immense diversity.[55]

Even if without intention, this seems to create a reductive story, in the application of a narrowly defined scientific concept to the way cities and societies are developed. The modernist vision of the city was one that needed to be reorganized around the application of a new transport technology, the motor car, and the methods of the industrial mass production. Now the application of information and communication technologies is taken to be the driving force of reorganizing cities and societies in a new image. This time, however, the implications are still not clear, even if the enthusiasm of technological determinists is as strong as the modernists'. They continue trying to come up with a single cause for most forms of transformations in social life.

Reductivism is the conviction that there is one fundamental form of knowledge, which settles all disputes. It often starts by seeking to 'explain a great range of things as only aspects of a single stuff'.[56] Against reductionism, however, stands a call to pluralism in ways of acquiring and applying knowledge. Mary Midgley calls for 'scientific pluralism', i.e. recognizing that 'there are many independent forms and sources of knowledge'.[57] As she puts it, 'Rationality does not actually demand the most economical account conceivable. It demands the most economical one *that will give us the explanation we need*.'[58]

The primary role given to technology in imagining the future leads to technological utopias, which are perhaps one of the key components of popular imagination. Ever since the rise of the scientific age, there have been stories in which the hopes and horrors of employing new technologies are evaluated. However, it is not limited to science fiction. As we saw from the words of Le Corbusier, it inspired generations of architects and urbanists to imagine the city as a technological utopia, and then try to realize it in that form. Technological utopia is, therefore, in the words of Henri Lefebvre, 'a feature not just of many science-fiction novels, but also of all kinds of projects concerned with space, be they those of architecture, urbanism or social planning'.[59]

The logic and the aesthetics of technology have therefore been so powerful as to reshape the space of cities (Figure 4.6). Technological innovation can occur at low-cost, isolated workshops almost anywhere. It could bring about a new way of utilizing exiting resources or find a way to new resources, be developed as a result of painstaking work or just through accidental discovery. But its adoption and spread across the world often requires concentrated forms of political and economic power. The development of a new road, introduction of a new utility network, and provision of information and communication technologies all depend on large amounts of power and resources at high levels to make their distribution possible. The development and deployment of technology, therefore,

Figure 4.6 The logic and aesthetics of technology are employed to reshape the city (Newcastle, UK).

are closely intertwined with the accumulation and application of political and economic power. Resistance to new technologies, therefore, are forms of resistance to these powers that use new technologies to their advantage, which may be at odds with the interests of others. Such resistance may take both political and cultural forms, such as the arts and crafts movement, as well as many social upheavals in the nineteenth century showed. Resistance to technological determinism in the twentieth century took the form of, among others, environmentalism, anti-global activism, anti-car movements and postmodern disillusion with the idea of modernity and progress.

Much of the time, technological innovation takes place in response to particular needs. Household appliances are good examples of how different housekeeping chores have generated different ideas of how to do them with more ease. So, from refrigerators to washing machines, we can see examples of how need has led to innovation. In an economy driven by competition and consumption, however, some innovations are initiated not in response to needs but to generate new needs, to which they can then respond. The example is the new wave of computers and mobile telephones, each adding new capacities that are not going to be used by most users. Rather than need, it is the ability to produce, and the needs of the producers rather than consumers that seem to drive the agenda. There is no doubt that the quality of products improves in this process, but the driving forces for innovation are economic imperatives.

The problem of relying on the ability to make is that it becomes an excuse for over-optimism in the ability to solve any problem and its unintended consequences, and a barrier to a sober evaluation of the problems at hand. The most substantial manifestation of this view is in relation to environmental problems, which are put to one side with the idea that technological fix will provide a solution.

Many researchers are working hard to understand the implications of new information and communication technologies for our life patterns and socio-spatial environment of cities. In doing so, they help institutionalize the use of technology in the city, weaving our lives into the new technology, to the extent that it becomes impossible to imagine life without them. And yet biology has a logic of its own; it can adapt and work with external objects and environments, but ultimately cannot succumb to them. If an organism feels restrained and stifled, it can reject any technological devices and technology-driven ways of doing things. The logic of technology, therefore, cannot be the determining factor of biology, it can at best be one of its aides.

Building cities has always been considered to be one of the most difficult challenges as well as one of the highest accomplishments of human civilization. In building cities, different cultures have developed spatial and temporal orders for their society and space, trying to overcome their anxi-

eties in a world that seemed completely beyond control. This meant using the best available tools of technology to ensure an instrumental use of resources; a spatial order, which utilized geometry to create a symbolic order; and a location pattern, which created an orderly set of relationships. In addition, the patterns of activities and events in time were ordered, so that routines could be created. Creation of these overlapping and intertwined sets of orders was thought to lead to rational living, which distinguished and protected humans from the chaos of the apparently endless world outside. There were periods of history when these goals were pursued systematically, comprehensively and on a large scale. At other times, these measures were taken in a piecemeal fashion, through many small steps. There have been cities which were subject to wholesale reordering, as well as cities whose scale and size would prevent even imagining any such undertaking. Each time, these orders reflected the hierarchies of power, the inherent structure of society, its ideas, values and practices.

Many have criticized modernist city planning for its attempt to impose a narrow sense of rationality onto the life of its citizens. By using functionalist principles, use of new technologies and limiting or abandoning ornamentation, a strict, rational order was to be created which could solve the problems of modern living. In this sense, the city was to be turned into a functionally efficient machine, which would avoid or tidy up the aesthetic emotions and complex reality of living experience by different groups and individuals. Can it be said, therefore, that the modernist city was a city of reason? Or are there broader definitions of reason? Should we associate a narrow and stifling sense of rigidity with the notion of rationality, and hence condemn the idea of city of reason as dull and sterile? Or should we search to see what other aspects rationality might have, as it is after all a notion that has intrigued humans throughout history?

Some have seen the use of design and technology as the hallmark of a rational undertaking. Therefore, a designed city becomes a rational one and a non-designed one irrational. This is a narrower, more modern definition of a rational undertaking, where all the aspects of the exercise are meant to have been thought through beforehand. It relies more on systematic knowledge, rather than practical experience, to think about a future city, in which all elements are well placed and all relationships are carefully catered for.

Are there particular ways of city building that are not rational at all? We hear constant complaints by the inhabitants of cities that their city is not built rationally and is not functioning properly. The question that needs answering is what do they mean by these complaints? Is it the inadequate functional performance of the city that is the cause of finding it irrational? Or is it the existence of spontaneity and disorder that leads to such complaints? However, what is too much order for some is too little for

others. What is pleasant spontaneity for some is chaos for others. What is reasonable functional performance for some is inadequate and under-organized for others. What is well organized and orderly for some is stifling and too rigid for others. Not only the degree of rationality, but also the meaning of rationality matters in answering the question whether or not a city is functioning rationally.

Production of space

The development and application of new technologies is a complex social process. When it becomes routinely used in building cities, it becomes a tool of producing space, a part of the mainstream urban development. This in turn is a process at the core of the way a society is developed, and its nature and character is closely reflected in, and developed through, its production of space (Figure 4.7).

The production of the city takes on a complex meaning, as it involves different agencies undertaking a variety of tasks. It involves a complicated set of factors, which can be grouped into the agents of production, the skills and ideas they employ, the tools and resources they deploy, and the context in which production takes place.[60] Each of these areas of

Figure 4.7 Production of space lies at the core of the way a society is developed, testifying to its different priorities through the ages (Boston, USA).

production has its own dynamics, which becomes even more complicated when interacting with the dynamics of the other areas. A city of reason seems to be, therefore, a place where productive reason has been at work, where the elements of producing the city have all been based on reason. This would mean appropriate agents have been involved in the making of urban space, armed with the appropriate resources and technologies that are used with skill and creativity and with proper attention to the social and physical context in which development takes place.

And yet we know that most often this can be a controversial course of affairs: different agents may struggle as to what constitutes appropriateness, who is appropriate for what purpose and with what level of control over the process. The amount of resources and the types of technologies may be the subject of debate, the level of skills and creativity of the agents may be doubted by opposing parties, and the context is interpreted and treated differently by different perspectives. Would this mean that productive reason eventually is a manifestation of practical reason, where the main question is how to arrive at the best course of action? If all aspects of the production process can be subject to doubts and challenges from opposing or dissenting views, then the task becomes one of making judgements among competing interpretations and interests, which is the task of practical reasoning. It may appear, then, that if action is completely driven by productive reasoning, it may be limited in scope and cannot claim rationality, as it can be doubted by dissenters. It will need to be subjected to the process of practical reasoning to become sufficiently robust and reliable, to prove that it was the best course of action within the circumstances. Like other institutionalized forces, it is sometimes the case that this force and its particularities shape the urban space in a direction that may even be detrimental to the other aspects of the complex process of building cities.

We can analyse the process of production from the viewpoints of the different groups of agencies involved, and see how they can diverge or converge, with potentially significant results for the outcome. Those who are mainly involved in the production, regulation and use of the built environment may follow completely different logics, and generate a contested space, which only addresses the needs and interests of one group while undermining the others. This conflict has for long been interpreted as the conflict between exchange value and use value.[61] For investors and developers, the built environment may only represent a business opportunity, a possibility to maximize return on an investment. For the inhabitants of these spaces, however, there is a use value beyond the market exchange, as they attach emotional and functional value to their place, which may not be easily bought and sold. Sometimes, the different types of value coincide, creating environments that satisfy investors, developers, regulators and users. But there are many incidences in which these views contradict one another, as best exemplified in the urban renewal schemes.

When large parts of cities are considered to be slums and cleared for redevelopment, public authorities, designers and developers were all in agreement that they are improving the quality of environment for the city. Their vision of urban change matches their interpretation of the overall conditions that the society should have. The inhabitants of these buildings, however, have a completely different view of their conditions, and even a different vision of the future of the city. Even if poor or run down, they tend to consider these neighbourhoods as their homes, some having developed strong bonds and emotional attachments to the people and places of their surroundings. This represents a clash of values, a major tension, which results in the disappointment and suffering of one side or the other.

The production of space, therefore, is a complex process, in terms of the roles, values and interests of the parties involved. Depending on the strength of their positions in the process, each agent plays a part; ideally, this is a process of negotiation and collaboration, but too often it is either imposing their will on others or being forced to submit to the will of others.

Conclusion

In search for solid foundations, science has taken centre stage. Application of scientific knowledge to the city, therefore, has been one of the key tools of modern societies. With the rise of new technologies, which made possible wider spans, taller buildings, faster transport and instant communication across space, cities have been changing accordingly. Machines have continued to inspire this application, by helping designers and others understand and transform cities in the image of machines. While technological determinism and reductivism have always been a threat, the complexity of producing the city has shown that technology is not a sufficient foundation for city building. Productive reason supports the ability to make the city, but it is not enough on its own to cater for the variety of agencies and their diverse needs. What is needed is a more plural understanding of science, and a more considered use of technology, both in explaining and understanding urban phenomena, and in shaping the future of urban form.

Two main sources of uncertainty have constantly faced humans: nature and society. The uncertainty of the natural world could be felt both in the unknown universe and the inner realm of the mind. Large cosmological events were far beyond reach, which could only generate a sense of wonder as well as helplessness. The equally uncontrollable natural forces also ruled the countryside, which was more familiar, but subject to forces beyond control. It also covered the unknown world of feelings, where impulses and reactions to the outside world were constantly generated, as

if without the control of the conscious mind, creating uncertainty and confusion. The other side of the coin was society, which was embedded in this natural world, but was also a source of uncertainty, generated by the behaviour of others, individual strangers, as well as other tribes and communities. Giving an account of the natural forces and taming them where possible, and putting in place frameworks for controlling social forces were the essential concerns of city dwellers. It is to these sources of uncertainty that we now turn.

Chapter 5

City of sights and sounds

Natural foundations

The champions of rationalism, such as Descartes and Le Corbusier, seem to have had a contradictory understanding of nature. On the one hand they believed in a natural order that only needed to be discovered by science, an order so perfect it that could be expressed through mathematical relationships. On the other hand, the nature was wild, and needed to be tamed and suppressed by humans. On the one hand, humans were part of the natural world, which was so orderly that it was imagined as a mechanical clock or a machine. On the other hand, humans stood outside this world, which they saw as unpredictable and unruly, including their own body, hoping to conquer it. The notion of an autonomous and rational individual, which emerged in the modern west through a long historical process,[1] therefore, had an inherent contradictory limitation: it was part of the nature, but sought mastery over it. In relation to aspects of the material world we often call nature, the result has been a series of challenges to the idea of reason. It was manifest in the power of the body's conscious feelings and unconscious impulses; and in the power, as well as fragility, of the local and global environments in which cities have been built. These challenges have pushed for a revision of the conventional notion of rationality and for addressing the precarious position of being at once inside and outside the natural world.

The term nature is used in a wide range of ways, and as such is ambiguous.[2] The way it is used in this chapter is not to refer to the uncommon or unfamiliar. Nor is it used to denote the essence of something, as Plato had done; assigning fixed identities to people and objects. The term nature is used, rather, as a general term to refer to all aspects of the material world that are not under human control. It refers to the non-artificial world, including the physical and biological body of humans with their feelings and impulses. Meanwhile, it should be acknowledged that there are major overlaps and ambiguities in drawing any sharp distinctions between artificial and natural, controlled and beyond control.

The nature within: a new foundation for belief and action: sense and experience

One of the key features of reason is its contrast with feeling: reason has been seen as impersonal and reliable, while feeling as personal and unreliable. We use reason to arrive at judgements that tell us the difference between true or false; with feeling we only become aware of our inner states in response to the outside world. Reason has connected us to our social norms and conventions, many of which aim at taming emotional impulses; it is characterized by this ability to control feelings. Feeling, on the other hand, has been our link with our biological constitution, itself part of a larger concept of nature, which is characterized as uncontrollable, unknowable, and even wild and dangerous. The dichotomy between reason and feeling, therefore, draws on a dichotomy between mind and body, itself reflecting a distinction between humans and the rest of the world. These dichotomies appear to be common sense, and rooted in the preference given to reason, particularly by rationalists such as Plato and Descartes. The normative power of reason has been strong through the ages, to show how some ways of thinking and acting are preferable to the others. Yet some have challenged the rule of reason, inviting others to see the role of feelings, and the significance of nature, in shaping what we think and do. Rationalists have aimed to dominate nature in order to control it, while their critics have defended the nature to be a source of inspiration and challenge to various forms of social control and domination. The result has often been continuous tensions, sometimes leading to a compromise in thinking. Meanwhile, the natural environment has suffered much damage as a result of the human wish to dominate it.

One of the major debates about reason is its role in the acquisition of knowledge. A battle that marked the start of the modern age in Europe was between reason and experience; fought between rationalists and empiricists. The rationalists, who give precedence to reason over other ways of acquiring knowledge, are traditionally contrasted with the empiricists, who believed that senses provide the primary route to knowledge. This was not a debate that was conducted merely within the realm of epistemology. It also addressed, and reflected, social practices in different ways, including the way cities were shaped.

Descartes' version of intuitive reason became a basis against which new ideas and criticisms emerged. Two major responses were the British empiricism and the German idealism. With his naturalism and scepticism, Hume criticized intuition for being metaphysical and therefore an unreliable basis for knowledge. British empiricists argued for a notion of calculative reason based on common-sense empirical investigation. Kant, on the other hand, attempted to reconcile these two positions of intuition and calculation, by focusing on the notion of judgement which was inherent in both.

Ancient philosophers portrayed a dichotomous relationship between reason and feeling, with a firm belief in the primacy of reason. According to Plato, rather than associating pleasure and pain with good and evil, it is upon knowledge, i.e. the correct choice of pleasure and pain, that our life depends.[3] Happiness comes from moral virtues, which are the hallmark of a disciplined, ordered mind, rather than from an undisciplined and self-indulgent one,[4] and from choosing a moderate path, which avoids extremes.[5] Plato presented a tripartite theory of mind.[6] One part, reason, is responsible for the mind's capacity to think rationally; it uses both pure and applied thinking. A second part is irrational, with a capacity to be stirred by desire, i.e. to feel lust, hunger, thirst, etc. A third part is responsible for the mind's capacity for passion, which reflects our brave, passionate, proud and assertive side; it is also responsible for improving our self-image. In the case of a conflict, passion is likely to be an ally of reason.

In a similar way to Plato, Aristotle saw the human psyche as being composed of two parts, a rational part, which is the realm of reason, and an irrational one, which is the realm of emotions.[7] Humans are, however, rational animals; they perform at the peak of their ability when they use their reason in the best way, which is to know the truth. For a successful and happy life, emotions should become subordinate to reason. Emotions, which are mental events and conditions accompanied by pleasure and pain, need to be trained from childhood to develop moral virtues, which are settled habits of character when emotional responses follow the command of reason.[8] This belief in the primacy of human reason was revived after the Middle Ages, as in the work of Descartes, who set out to confront scepticism. Sceptics had argued against the reliability of senses, as potentially deceiving us through false appearances; for rationalists such as Descartes, it was intuition rather than calculation that was needed to establish reliable first principles. Pascal, for example, stressed the limitations of calculative reasoning, and promoted intuitive reasoning, which he called the 'knowledge of the heart'.[9]

The battle between reason and emotion came to a turning point in the eighteenth century with David Hume, who famously announced, 'Reason is, and ought only to be the slave of the passions, and can never pretend to any other office than to serve and obey them.'[10] He starts his argument[11] from the traditional dichotomy between reason and passion, and tries to prove that no such dichotomy exists. He also challenges the widely held view that gave pre-eminence to reason above passion, which considered people as virtuous when they conformed to the dictates of reason. His argument was that what motivates action is passion and not reason, the prospect of pleasure or pain and not abstract reasoning. Hume argued that 'reason alone can never be a motive to any action of the will'.[12] Furthermore, reason was incapable of opposing passion in the direction of the will, as 'Nothing can oppose or retard the impulse of passion, but a con-

trary impulse'.[13] The inferiority of reason to passion came from the fact that reason represented other things, while passion was 'an original existence'.[14]

Hume's definition of reason was 'the discovery of truth or falsehood';[15] it was nothing but the discovery of the connection between objects.[16] As such, it did not address the issues of practical concern, which were driven by passions. Therefore, passions or actions do not fit into this process of discovering truth or falsehood. The results are clear:

> Since a passion can never, in any sense, be called unreasonable, but when founded on a false supposition, or when it chooses means insufficient for the designed end, 'tis impossible, that reason and passion can ever oppose each other, or dispute for the government of the will and action.[17]

Reason, therefore, cannot prevent or produce actions or affections. The only way it could do so is by exciting passions, either by informing us of the existence of something, or by discovering a cause and effect relationship. What follows is that, 'The rules of morality, therefore, are not conclusions of our reason.'[18]

A contemporary of Hume, Rousseau was also a champion of feelings, which he saw as the key to the self.[19] Feelings worked with reason in a guiding capacity: 'Our natural sentiments shall guide reason to know the good, our conscience then to love it.'[20] A key founder of European Romanticism, he argued for a self that was expressive and free from dependence on other people, but one who shared this independence with others to form a General Will. Emphasis on colourful expression of emotions, rather than the colourless calculation of reason, on private passions rather than public orders, and an admiration for the small towns and villages and the medieval period, was a characteristic of the Romantics who came to dominate the nineteenth century (Figure 5.1). Humanism and rationalism of the Renaissance had freed people from the dictates of faith; scepticism and naturalism were now offering them freedom from the tyranny of universal reason.

In addition to Romantics, liberals and utilitarians were also attempting to synthesize reason and emotion in a practical sense. In his influential work, *On Liberty*, John Stewart Mill brought together the Romantic drive for expressive freedom with utilitarian rationalism, a tradition in which he was brought up, providing a philosophical doctrine, which could be used in a political and cultural programme of liberalism. The essence of his message was that society should not attempt to control individuals if they are not harming others: 'the only purpose for which power can be rightfully exercised over any member of a civilized community, against his will, is to prevent harm to others.'[21] Individuals should enjoy 'absolute freedom

Figure 5.1 Admiration for small towns and villages and the medieval period was a characteristic of the Romantics who dominated the nineteenth century (Bruges, Belgium).

of opinion and sentiments on all subjects', freedom of taste and pursuits, and freedom of association with others.[22] Therefore, 'Over himself, over his own body and mind, the individual is sovereign.'[23] The utilitarian idea of calculating pain and pleasure to arrive at the greatest happiness of the greatest number could leave individual lives subject to the tyranny of the majority. Feelings needed to be cultivated to the same extent that reason was. The result in the private realm would lead to the stimulation of individuals' sensibilities and passions, through emphasis on poetry, art, music, nature and so on. In the public realm, the 'ordering of outward circumstances' would be far less important.[24] The eighteenth century had been convinced of its superiority over the ancient times, 'lost in admiration of what is called civilization'.[25] Rousseau's writings exploded these one-sided opinions like a bombshell, challenging 'the enervating and demoralizing effect of the trammels and hypocrisies of artificial society', and praising the 'superior worth of simplicity of life'.[26] For Mill, individual choice, through which individuals could develop according to their capacities and plans, was the only way to a happy society: 'Human nature is not a machine to be built after a model, and set to do exactly the work prescribed for it, but

a tree, which requires to grow and develop itself on all sides, according to the tendency of the inward forces which make it a living thing.'[27] According to one observer, the strength of this concept has been such that liberty has now become 'the only moral principle that commands general assent in the western world', exercising 'that ultimate authority that once belonged to the idea of God, nature, justice, reason, or the ideal polity'.[28]

Intuitive reason puts the anchor point inside the human mind; coordination with others becomes a matter of sharing minds, each rooted in its subjectivity. On the other hand, calculative reason resorts to common sense, putting the emphasis on calculation about the outside world, on the matter that is being dealt with. This makes the possibility of sharing easier, as different minds come together on a particular task. But it makes it more difficult to pay attention to that which lies beyond this focus of interest.

In a wider sense, however, both rationalists and empiricists of the modern period believed in the significance of reason, and as such both belonged to the Age of Reason.[29] Both rationalists and empiricists were trying to find a way of confronting scepticism, which was questioning the possibility of any form of human knowledge altogether. They were both searching for reliable foundations for knowledge: either a rational foundation, which relied on the use of unaided human reason, or a natural foundation, which drew on human senses and experience.[30] This created a confidence in human agency, an optimistic outlook for the future, and a freedom from the past and its superstitions, which were associated with emotions and traditions.

Kant attempted to overcome the controversies of rationalists and empiricists, by reconciling the two camps, showing the limits of pure reason and arguing that reason alone, without experience, can be a source of illusory knowledge. He distinguishes between sense, understanding and reason; the three elements on which knowledge depends:[31]

> All our knowledge begins with the sense, proceeds thence to understanding, and ends with reason, beyond which nothing higher can be discovered in us for elaborating the matter of intuition and subjecting it to the highest unity of thought.[32]

Sense is the power of receiving representations, while understanding is the power of spontaneously knowing by means of these representations.[33] Reason is 'the highest faculty of knowledge' and is divided into two faculties: a logical and a transcendental.[34] The logical use of reason is to 'make abstraction of all content of knowledge'. The transcendental or 'real' use of reason is that it 'generates concepts' and principles. There is no direct relationship between reason and senses. Understanding unites senses and appearances by the use of some rules. Reason unites these rules of

understanding under principles. Reason, therefore, is the faculty of principles, while understanding is the faculty of rules.[35] This is a process of reduction and abstraction: the function of understanding, according to Kant, is to reduce the multiplicity of senses through making connections between them according to rules. The next phase is that of reason, which unites these rules according to some underlying principles that it has generated, to arrive at universally valid knowledge. However, the concepts of pure reason, Kant argues, 'are not obtained by reflection, but by inference'.[36] In this sense, pure reason, unaided by experience, is only able to achieve an illusory knowledge.

Nature in the city: striking a balance between reason and feeling

In eighteenth-century Britain, one of the apparently contradictory compositions was the juxtaposition of formal Palladian country houses with informal English gardens. Following the efforts of Lord Burlington, English country houses became wholly Palladian, while his protégé William Kent was credited as one of the creators of the English garden style, one of its earliest applications being in 1720 in Lord Burlington's own house at Chiswick. Rather than adopting a formal style for their gardens, so that the logic of the building and the landscape are the same, as Le Nôtre had done in Versailles, English designers were developing an 'anti-French' tendency in the arts. Versailles was an expression of the king's absolute rule over the country, and of human rule over nature. Against this, the British were showing faith in nature as 'a revolt of liberalism and tolerance against tyranny … a Whig revolt'.[37] Tampering with nature was not acceptable, as Addison expressed in *The Spectator* in 1712, 'For my own part I would rather look upon a tree in all its luxuriance and diffusion of boughs and branches than when it is cut and trimmed into a mathematical figure.'[38] This was faith in what was thought to be the original state of nature and its inherent harmony, order and proportions, rather than those imposed on it by humans. The juxtaposition of formal Palladian architecture and informal landscape architecture reflected an emerging trend of giving equal significance to both.

The French architecture and landscape architecture in the seventeenth and eighteenth centuries were thoroughly urban, as the dominance of geometry and strict order reveals. The British equivalent, on the contrary, was integrating nature into urban development, as shown in its urban squares, and even in larger urban developments such as Edinburgh New Town. In urban form, the balance between buildings and landscape found its expression in the development of urban squares, which were the main British contribution to contemporary town planning, where Georgian terraces embraced and enclosed an urban park.[39] In the early squares, it was

up to the owner of each house to design it; the result was harmonious as these designs followed the general taste of the time, rather than attempting to stand out as unique buildings. From 1728, John Wood started uniform façades in his squares. By 1767–1775 his son, the younger John Wood, opened the enclosure of the urban square in the Royal Crescent in Bath, which had a uniform frontage of 30 houses with giant Ionic columns. This semi-elliptical palace was placed in front of a large, gently sloping lawn, striking a balance between the town and the country. In this 'extreme opposite of Versailles', as Pevsner put it, 'Nature is no longer the servant of architecture. The two are equals', which heralds the start of the Romantic movement[40] (Figure 5.2).

In a wider sense, this juxtaposition of formal and informal refers to a marriage of reason and feeling that emerged in the eighteenth century in Britain, as reflected in the work of David Hume, who criticized the unquestioned supremacy of reason and asked for the role of feeling in knowledge and action to be acknowledged. The Age of Reason had started by praising pure unaided human reason, but it developed a subtler understanding of human faculties, arguing for a balance between reason and feeling, as Kant famously tried to reconcile rationalists and empiricists in his critiques. For Hume, a major figure in the Scottish Enlightenment and

Figure 5.2 By opening the urban enclosure in the Royal Crescent, town and country were treated as equals (Bath, UK).

considered by some to be the greatest of British philosophers, the progressive evolution that the Age of Reason promised needed small-scale and highly civilizing cities.[41] When he settled in his home town of Edinburgh in 1769, he had his first and only house built on St Andrew's Square in the fashionable New Town.[42]

In the middle of the eighteenth century in Britain, two names represented this combination of formal and informal, which spread and influenced Europe and America. One was Lancelot (Capability) Brown, a key figure in the English garden style, which consisted of 'wide, softly sweeping lawns, artfully scattered clumps of trees, and . . . serpentine lakes'.[43] The other was Robert Adam, the father of Classical Revival in Britain, who expressed what he admired in a building as 'the rise and fall, the advance and recess, and other diversity of form', as well as 'a variety of light mouldings'.[44]

Avoiding the geometrical regularity of the Renaissance cities was not only a sign of naturalist tendencies and taking delight in the picturesque townscapes of the past. It was also a result of a more democratic and liberal political culture, the absence of powers necessary for planning and implementing grand schemes, and the predominance of utilitarian and commercial thinking, which meant the projects had to make commercial sense and be funded by the private sector. In nineteenth-century London impressive buildings abounded, but the absence of an overall authority made it impossible to shape the whole city in a grand manner. Even the Metropolitan Board of Works, which was established in 1855, had very limited powers. The national government had no control over the fate of the capital city, which was the subject of intense competition between autonomous cities of London and Westminster, and about 60 parish councils. As a result, the city was developed in a piecemeal fashion, driven by speculative developers and private finance. The development of Regent Street in London had been talked about earlier in the eighteenth century, but it was only in 1813–1827 that it was made possible by an Act of Parliament and finance from the City of London, marking the success of developing a major street cutting through a congested city centre. Although the property prices in the area were relatively cheap, the architect John Nash had to find a route through existing private properties that would keep the costs down and avoid the property of powerful owners, which resulted in the diversity and variety of a curved street.[45] Curved lines, from the Royal Crescent in Bath to Regent Street in London and Grey Street in Newcastle, became a symbol of trying to combine the rational and the emotional.

In 1753, Marc-Antoine Laugier, a Jesuit priest, published a book in architectural theory that was one of the key steps in introducing neoclassical architecture to France: *An Essay on Architecture*, which was well received at a time that Rococo had run its course.[46] After outlining some general principles of architecture and its different Orders, he devoted a

chapter to 'the embellishment of towns', in which he argued that the widespread interest in embellishment should be extended to towns. His approach was a rationalist one: he condemned those who had studied examples of architecture to deduce its laws, and aimed to introduce 'fixed and unchangeable laws' which reflected the absolute beauty that was inherent in architecture.[47] These principles, which can be traced back to the primitive hut, needed to be learnt and practised, helping artists make judgements and justify their choices not simply based on instinct but on reasoning. In town planning, however, he was prepared to offer 'approximate rules' in search of picturesque effects.[48]

Laugier's starting point was a severe criticism of the conditions of French towns, which were in a state of 'neglect, confusion and disorder', caused by the 'ignorance and boorishness' of previous generations: 'Our towns are still what they were, a mass of houses crowded together haphazardly without system, planning or design.'[49] Paris was particularly criticized as 'a very big, disordered town' which was in great need of embellishment: 'Its avenues are miserable, the streets badly laid out and too narrow, the houses plain and banal, the squares few in number and insignificant and nearly all palaces badly placed.'[50] Three things needed to be addressed to bring beauty and splendour to a town: its entries, streets and buildings. The entries needed to be free and unobstructed to facilitate movement, numerous to allow for easy entry into the town, and sufficiently ornate, which could be achieved by building triumphal arches at city gates. The ideal entrance to the city, therefore, would be a very wide and straight avenue, lined with two or four rows of trees, ending in a well-decorated triumphal arch; beyond the arch, there is a large square, where several streets branch out (in a fanlike pattern that was used in Rome) to lead to the centre and other districts.[51]

City streets needed to be numerous, straight and wide, so as to make movement across the city easy and convenient, as narrow, twisted streets and limited links between different parts of the town caused a great traffic congestion of carriages. In designing streets, however, it was essential to 'avoid excessive regularity and excessive symmetry', so that 'boring accuracy and cold uniformity' did not occur.[52] Laugier argued that the city must be designed like a park, combining order and fantasy, symmetry and variety. Versailles was a national monument, but it was too rigid, too formal and unnatural.[53] In the park, as well as in the city, it was essential to create a natural, picturesque beauty, with 'variety, abundance, contrast and even disorder'. Building exteriors also needed to be regulated:

> If one wants a well-built town, the facades of houses must not be left to the whim of private persons. Every part that faces the street must be determined and governed by public authority according to the design which will be laid out for the whole street.[54]

This regulation included the height of the buildings in proportion to the street width. Simplicity must be maintained, but again 'ugly uniformity' must be avoided by creating variety with the help of building forms and the amount and combination of ornaments used. The overall rule for using ornaments was to use them less often: 'let us apply much that is simple, a little that is casual together with elegance and magnificence.'[55] To embellish the city, much needed to be demolished and rebuilt; but if plans were ready and work could start, it could be completed by future generations.

This manifesto for neo-classicism shows two important trends: the first trend is that it reflects the widening of interest in urban space from the aristocratic elite to include the bourgeoisie. The monuments and great works of architecture, which once represented the glory of the monarch, were now the source of pride for the rising middle classes. While the essentially rational foundations of design and its drive for creating an integrated street network remained the same, its patrons and clients were broadened to include a wider range of social groups. What started by a supernatural foundation to shape the society in the image of the divine, moved to the secular realm of the absolute monarchs, and on to the individual citizens with their wishes and dreams. As we shall see in the next chapters, it was this basis that was to be broadened in the nineteenth and twentieth centuries to embrace an even wider range of social classes by moving the foundation for knowledge and action from the natural to the social. The discourses of reason changed in this process, pressed to become more and more inclusive and democratic in its account of knowledge and action, whether or not materialized in practice.

The second trend is combining reason and feeling: to organize the urban space according to rational rules which make it function better, while applying restrained picturesque and naturalist overtones to avoid soulless formality. It combines preoccupation with display with a degree of functional rationality, arguing, in a way that resonates closely with city marketing exercises of today, that embellishment is eventually useful for a city.

> I know that everything which aims at something useful has preference over that which simply intends to please. However, one can pursue the useful without neglecting the agreeable and must remember that a project which tends to give strangers a grand idea of our nation and attracts them in great numbers is a project that is not without usefulness.[56]

The two leading neo-classical architects of eighteenth-century France, Boullée and Ledoux, combined simple geometric regularity with expressiveness. Etienne-Louis Boullée's treatise pleaded for character, grandeur and magic in an architecture that combined reason and feeling.[57] In the work of Claude-Nicolas Ledoux, this combination can be seen through

simple geometrical building forms set within informal gardens in the English style.[58]

Concern for magnificence in embellishment was combined with a concern for hygiene. Paris was overcrowded, and slaughterhouses, prisons, burial grounds and trades and crafts were all considered to produce a polluted atmosphere for those living in the city. Doctors and others thought that the solution was to relocate some of these activities out of the city, and to remove all physical barriers to the free flow of air. If only air could be easily and freely circulated in and around the city, disease could be avoided. What was needed for making large cities such as Paris healthier, Dr Jacques Dehorne argued, was 'to favour the free circulation of air that we breathe, by destroying . . . all obstacles that would intercept it . . . [and] by removing from the midst of our habitations, all foyers of uncleanliness and of corruption'.[59] Much of the old physical fabric of the city, its narrow streets flanked by tall buildings, small courtyards and inhabited bridges were blocking this breathing. In their place, there should be wide straight streets, low-rise buildings, large public squares and gardens. It was essential to ensure fresh air for people on the lower floors and on the streets, so a Royal Declaration in 1783 proposed uniform facades and uniform building heights, so that air could not be trapped in any pockets of space. Opening the urban space for better air circulation was one of the reasons given for both Haussmann's straight boulevards and Le Corbusier's towers in the park.

A magnificent and hygienic city needed also to be clearly understood. For neo-classical architects, it was important that the appearance of buildings reflected their purpose, a concern that became a central theme of modernist design in the twentieth century. According to Boullée, each building must have a particular character, a concept that combined expressive, metaphorical and symbolic aspects of a building. This was once again an attempt to combine reason and feeling by following general principles but making each building unique; rather than only following universal rules, each building also followed a particular logic, which shaped its character. Ledoux and Boullée were using simple geometric forms, as early Renaissance designers had done, but wrapping them now in several layers of signification that would endow buildings with distinctive aesthetic and functional qualities. A consequence of the symbolic character of a building was the idea of emulation,[60] whereby admirable deeds were encouraged by public monuments and by setting up memorials to illustrious people and lofty ideas. This was a dramatic shift from the time when glorification only belonged to religion or court.

The mixture of town and country and integration of nature in British cities inspired other cities around Europe, which developed their own versions of *jardin d'anglais*. In Paris, new parks were developed and wide tree-lined boulevards that transformed the atmosphere of the city (Figure 5.3).

Figure 5.3 In an effort to integrate nature into the city, tree-lined boulevards transformed the city's atmosphere (Paris, France).

Here, however, the old Renaissance ideals of axes and networks and adaptation to the rules of perspective remained at the core of the project. In the laissez-faire conditions of British cities the freedom of architectural expression of the rising businessmen, who no longer shared the coherent taste of the aristocratic elite, caused a diversity of styles. The Parisian transformation maintained a firm grip on the shape of the city, establishing a new spatial order onto a rebellious city. Freedom, however, was available in using the new spaces as sites of pleasure and spectacle for Parisians and visitors from around the world. The English cities were under other forms of control, which reduced this element of pleasure. One of the main differences between the urban parks in England and France was the presence of restaurants and cafés in Paris parks, where refreshment and entertainment were integral parts of Haussmann's programme, whereas in England the nonconformist and evangelical lobbies campaigned to ban drinking and betting from the new parks. The Bourse in Paris had the grandest exchange building in Europe, and the new parks, boulevards, arcades and galleries ensured the city's position as the European capital of leisure as well as business.[61]

A continuous dialogue

Rationality and sensuality are loosely defined stations on a continuum. However, they are generally understood to be opposing one another; and this is why the predominance of one attitude, rational or sensual, often prompts the need to strike a balance by promoting the other. Whenever the city is predominantly conditioned by the austerity of instrumental rationality, trends have emerged to promote sensuality and expressive freedom, and vice versa. This trend is particularly visible in the nineteenth century, when a strong current of scientific discoveries and the Industrial Revolution were extending the realm of reason to new areas of life. It was against this strong process that the Romantic attitude emerged, to strike a balance against the rigidity of such rationalism in the political and economic fields, by introducing sensual components in the field of culture. In any case, it is too simplistic to characterize historic periods as being driven by reason or emotion alone: at all times both have been intertwined in ever complex combinations and historical conditions are shaped by many different factors. However, it is possible to see how particular trends can be associated with particular attitudes that prevailed at any one time.

Baroque introduced elements of sensuality into the plain geometries of Renaissance, which is perhaps why some connections can be found between baroque and Romanticism. The roots of Romantic revivalism can be traced in a memorandum written by the English baroque architect John Vanburgh, who defends the preservation of genuine ruins on two grounds of association and picturesque: that they provide pleasant and lively reflections of those who lived in them and the events they witnessed, and that in the right setting they are beautiful objects for landscape painting.[62]

To create a contrast with the Age of Reason, the nineteenth century saw an emphasis on the emotional, rather than verbal and mathematical, relationships to the world. For John Ruskin, 'The greatest a human soul ever does in this world is to *see* something, and tell what it *saw* in a plain way. Hundreds of people can talk for one who can think, but thousands can think for one who can see. To see clearly is poetry, prophecy, and religion – all in one.'[63] This was searching for a more direct way of grasping the world, a city of sights and sounds, rather than a city of reason and order. Attempts at creating an ordered city, however, continued with force throughout the nineteenth century. The result was a lasting tension between the public and the private, between urban order and individual freedom of expression and action. Whereas the neo-classical period had tried to reconcile the two, the nineteenth century witnessed a complete break between them. On the one hand, more freedom for individuals in action was gained by widening participation and democratization of urban and national governments. On the other hand, more freedom for

individuals in expression meant ability to use a variety of aesthetic styles and creation of a diverse urban landscape.

John Ruskin opposed the Renaissance, which he thought had established aristocratic and elitist values. He wrote about Renaissance architecture:

> Whatever excellence it has is refined, high-trained, and deeply erudite; a kind which the architect well knows no common mind can taste. He proclaims it to us aloud. 'You cannot feel my work unless you study Vitruius. I will give you no gay colour, no pleasant sculpture, nothing to make you happy; for I am a learned man. All the pleasure you can have in anything I do is in its proud breeding, its rigid formalism, its perfect finish, its cold tranquillity. I do not work for the vulgar, only for the men of the academy and the court . . .'[64]

Ruskin had no regard for symmetry and proportion, which characterized Renaissance architecture, and was delighted to discover the irregularities in Venice's St Mark, as well as the rich colours of its façade (Figure 5.4). He found the Renaissance, in which he included baroque, soulless and cold, and associated its formalism with Catholicism, in contrast with the natural

Figure 5.4 Ruskin found irregularity and colour in St Mark a delightful contrast with the Renaissance drive for harmony and proportion (Venice, Italy).

shapes that he associated with Protestantism. For him the Gothic period showed a more noble architecture, when craftsmen were free to express imagination and life, in contrast to the machine-made artefacts of the nineteenth century, soulless objects produced for profit by workers who were alienated from their work. His work on Venice allowed him to go back into the past, exploring the warmth and picturesque appearances of the city and making it known to others.

As the modern history is a story of continuous bids to control society and nature, it is also full of peaceful or violent reactions to this ever-expanding bid to control. The social and aesthetic reaction to this constant current of rationalization has been cyclical; now accepting reason's edicts and adjusting to it, now revolting against it and running away to some imaginary natural condition. Regarding the use of reason, the modern history is a story of a pendulum swinging between adjustment and revolt. In architecture and urban design, this swinging between reason and feeling is reflected in the sequence of styles that show cycles of straight lines and curved ones, geometrical regularity and informal irregularity, simplicity and complexity, austerity and colourfulness, harmony and contrast, symmetry and asymmetry, town and country.

The processes that we can detect from the Renaissance period onwards are parallel trends of the rise of human reason as the main foundation for knowledge and action, and the challenges of the individual, the natural and the social against the potential rigidities that such a rise would bring about. At every stage, the challenge has been how to define reason so that it could address a wider set of concerns. The epistemological basis of this approach has been a reliance on human reason, pure or aided, as the best foundation for knowledge and action, the best vehicle of setting targets and achieving ends. The political philosophy of this approach has been the establishment of a strong state aided by an efficient bureaucracy, which could realize these targets. Resistance to this approach has been in the form of demanding individual freedoms, whether functional or emotional, within the overall orders that new systems introduced. Functional freedoms meant that the individual can claim a degree of flexibility and freedom of thought and action that is necessary to live a happy life. Emotional freedom was what created a balance with the rigid demands of reason and its potentially soulless results.

In political philosophy this tension has developed into one between democracy and liberalism.[65] As the notion of self-rule took hold, there was a transition from absolute monarchy to constitutional monarchy and republic, from the rule of a monarch and an aristocratic elite to the rule of parliaments and wider sections of the bourgeoisie. This could ensure a strong state that was needed to shape the cities of reason. However, the demand for individual freedoms, as reflected in liberalism, meant there should be a limit to the strength that a democratic state could exert.

A reflection of the tension between reason and emotion was the tension between democracy and liberalism, a mixture of which characterizes the modern western liberal democracies. In social philosophy, this is the tension between society and individual, which is manifested in various arenas of social life, including the shaping and managing of the city.

The sequence of reason and emotion can be found in the way architectural periods have emerged since the end of the Middle Ages: the Renaissance in the fifteenth and sixteenth centuries was an attempt to use human reason as the measure of all things; the baroque in the seventeenth century coincided with the counter-reformation, made a partial return to Gothic and embraced a sensual decorative approach. A new cycle of promoting reason occurred in the eighteenth century, the Age of Enlightenment, which witnessed a return to classicism.

In urban design, these sequences were slightly different. There seems to be a progression towards the use of reason in the organization of street patterns, as reflected in the application of geometrical regularity. It started by small-scale harmonies in the development of open spaces and squares, then leading on to the establishment of monumental nodes, axes that connected them together, and networks of streets, grids and diagonal avenues, that shaped the entire urban space, turning it into a unified whole. Some cities such as Paris embraced all these stages of progression, while others such as London stopped at an early stage of this process, or went through them partially.

Nevertheless, the period from the rise of the Renaissance to the end of the nineteenth century was a period dominated by the antiquity, as all cities were built in the image of ancient Greco-Roman cities. As Ruskin wrote:

> All European architecture, bad and good, old and new, is derived from Greece through Rome, and coloured and perfected from the East. The history of architecture is nothing but the tracing of the various modes and directions of this derivation. Understand this, once and for all: if you hold fast this great connecting clue, you may string all the types of successive architectural invention upon it like so many beads.[66]

The postmodern episode in the approach to cities can be seen to be part of this overall dialogue between reason and emotion. Postmodern sensibilities emerged as a reaction to modernist rationalism, which had imposed a rigid framework on the functional and aesthetic aspects of urban development. What the postmodernists wanted was almost completely defined as the opposite of what the modernists wanted. The postmodernists wanted more ornament, colour and playfulness, rather than the plainness and seriousness of the modernists. They preferred multiple identities, ambiguity and overlap, in contrast to the clarity and distinctiveness of the rationalists. They preferred to hide their structures under an eclectic collection of

different shapes and forms, rather than to integrate the inside and outside as the modernists had promoted. But after the postmodern generation made their impact, a new generation of modernists have returned with a new vigour. By now, it can be seen that postmodernism was an episode that performed a successful challenge to the assumptions and approaches of rationalist modernists, but it was challenged in return by them. It was one of the periodical challenges to reason by emotions, following the tradition of baroque and the Romantic revivals; challenges that have shaped the modern history of city building. Theses challenges, and the responses that have followed them, have formed dialogues that are not just between artists and intellectuals, but ones that are embedded in the material conditions of evolving societies. The undercurrent that connects them all together, however, is the predominance of scientific reason and technological foundations since the Renaissance.

Escape from the city: critique of here and now

The dramatic example of how the naturalist and liberal tendencies came together was the growth of suburbs, which from the beginning were meant to combine the benefits of the town and the country. In Britain from the seventeenth century onwards, merchants and shopkeepers started to abandon the tradition of living above or close to their work. A tradition had developed among the gentry of using villas or cottages in the countryside for rest or retirement, in addition to their residences in the city. From the eighteenth century, however, merchants and businessmen started to live in villas and cottages within easy reach of London, which suited their lifestyles but attracted snobbery and ridicule for showing social pretension. The city and the country were still different places used for different purposes of work and rest. From the middle of the eighteenth century, however, living in country villas or in nearby villages and commuting to work in London started to spread among the city workers. The scale of suburbanization grew when speculative developers stepped in. The first suburban neighbourhood in England was St John's Wood that by 1821 had its own chapel, inn, assembly rooms and pleasure garden serving several hundred detached and semi-detached cottages and villas. A grander scheme nearby was the Regent's Park, which was designed by John Nash to have substantial villas around a very large landscaped park, an urban equivalent of a country park. It was inspired by Bath, where a mixture of town and country was used in a holiday or health resort; but it was now applied in a major city. As James Elmes wrote in 1829:

> A house, situated like one of these, possesses the double advantage of town and country. By its contiguity to the fashionable and business part of the metropolis, it forms a complete town residence; and by the

> romantic beauty of the decorated landscape by which it is surrounded, it is equal to any part of the country for health and domestic retirement for men of business.[67]

From about 1820, the London examples of St John's Wood and Regent's Park inspired many variations around the country. Development of parks was considered to be an amenity for the houses around them, rather than a more general contribution to the town. The Regent's Park was opened to the public only in 1840. Being attached to a park became so popular that many new developments used the term without actually having a park. Winding roads also became popular to reflect a country atmosphere in the town. In London, the elite continued to live mainly in terraced houses in the centre, which had become the norm since the Georgian period. In the new industrial towns, however, the middle class left the centre for the winding roads and villas of the suburbs.

The dramatic expansion of suburbs was facilitated by improvements in the modes of transport, from horse-driven omnibuses of the 1820s to railway lines, horse and then electric trams. In the twentieth century, suburbanization became the main form of urban development in the English-speaking countries and a widespread model elsewhere.[68] Mixing the town and the country in the suburbs remained a target in building the cities to this day (Figure 5.5). By the end of the nineteenth century, the Garden City movement aimed at

Figure 5.5 Escape from the city and mixing town and country have remained key themes of suburban development (Los Angeles, USA).

creating a mixture that had the advantages of both, but the problems of neither.[69] This was an attempt to manage suburbanization, widely used in the middle of the twentieth century in building new towns,[70] and was revitalized towards the end of the twentieth century by New Urbanism.[71]

The city has been contrasted with the countryside. The city has been portrayed as a place of achievement 'of learning, communication, light', as well as 'a place of noise, worldliness and ambition'; in contrast, the country has been characterized by 'peace, innocence, and simple virtue', as well as 'backwardness, ignorance, limitation'.[72] As urbanization has gathered pace in the modern period, whereby now most people in the world live in urban areas, a nostalgic view of the countryside has become widespread. The country has found an image of the past, pulling towards 'old ways, human ways, natural ways'; while the city presents an image of the future, showing the direction of 'progress, modernization, development'.[73]

Part of the nostalgic romanticization of the countryside is a desire to escape from the city, from the space that we inhabit but are not content with. This has taken people out of the towns into the countryside, small villages and, if not possible, to suburbs. Another part of this romanticization is to escape from the present, to imagine a past that was somehow better than now (Figure 5.6). This in the nineteenth century was

Figure 5.6 Escape into the past has created a brand new medieval village, popular with the market but not so with the architects (Lund, Sweden).

a nostalgic return to the Middle Ages, as reflected in arts and crafts movement and Gothic revival, triggered by the poor conditions of cities at the time. Both are trips to escape from here and now, to times and spaces past, where emotional security could be imagined a possibility. The utopian's escape is to the future, imagining a future that is somehow perfect. Marx and Engels, for example, rather than working with the challenges of nature and society, decided to abolish their differences. So, they wanted to abolish the distinction between town and country, and the principles of social organization such as the family and private ownership. This is why the nineteenth century had both Romantics and revolutionaries, as both these groups wished to escape from their undesirable present, and had the necessary optimism to search for possible alternatives.

The origins of the Romantic movement are traced in England, where the Gothic style never died. In literature, it reflected, 'the reaction of sentiment against reason, of nature against artificiality, of simplicity against pompous display, of faith against scepticism'.[74] There was 'a new enthusiasm for nature and a self-abandoning veneration of the whole, elemental, undoubting life of early or distant civilizations', which were expressed in Romantic poetry.[75] The Romantic attitude was characterized by 'longing, that is, antagonism to the present, a present which some saw predominantly as Rococo flippancy, others as unimaginative rationalism, and others again as ugly industrialism and commercialism'.[76]

At the beginning of the modern urbanization process, cities were emerging as agglomerations of large numbers of people, at an extent and scale of which the western world had no previous memory. Cities were attracting people from towns and villages, uprooted from the emotional certainty of their stable lives and throwing them into the cold and impersonal space of the city. This rapid and dramatic transition inspired many writers to look upon villages and small towns as the place of feelings and the city as the place of reason. The city and village echoed opposite ends of reason and emotion, society and community, and depending on the observers' standpoint, from Rousseau to Ferguson, Simmel and Tönnies, each reflected a place of virtue or vice.[77] Those like the Chicago School of Ecology, who were rooted in naturalism and liberalism but analysed it from a holistic perspective, envisaged the city as a natural organism, in which the events can resemble the natural processes of adjustment to context, competition for survival, growth and decline.[78] The shape of the city could resemble the shape of a leaf, formed through natural evolutionary processes,[79] without paying attention to the completely different nature and timescale of evolutionary and social processes. For those who were looking at this process from an individualist perspective, this was a laissez-faire city, in which individuals acted as natural organisms, maximizing their utility and pleasure, ultimately creating a suburbanized and segregated city.

Now this transition has been extended to large parts of the world,

where urbanization and modernization are occurring at fast rates. The opposition between feeling and reason is now extended to these dualisms: between the village and the city in the fast-changing countries, and, at least in the west, between developing and developed countries. Whereas the western cultures are seen as rational, these other cultures are found to be irrational, lacking in the ability to make rational judgements in running their own affairs. The poorer countries are seen to be more community-based societies, where strength of emotional and blood ties takes precedence over the calm calculation that appears to dominate in the west. Their rites and rituals are seen as interesting relics from the past, good to be visited by tourists, but not good enough to be embraced and accepted. By making a distinction between the 'civilized world' and the others, an implicit reference is made to the distinction between the city and the countryside, even if the developing countries have some of the largest cities in the world.

The distinction between the city and the countryside in the west has diminished sharply. Technological innovations, from means of transport to the print and news media, to the Internet, have made it possible to live an urban life in the countryside, while suburbanization has been an attempt to live a rural life in the city.

Anxiety for nature: the challenge of the earth

It is possible to trace, throughout history, human society's desire to find a reliable account of their social and natural world and to develop tools with which this world could be tamed and controlled. The latest dramatic turn in this process started at the end of the Middle Ages; since then there has been a constant current of scientific discoveries and their application has influenced every aspect of life in western societies, and eventually elsewhere. From exploring the oceans to the outer space, each step has been towards dominating nature and controlling societies, local or in far away places. In this sense, attempts at taming nature and society have partly relied on giving publicly acceptable accounts of these attempts and developing the necessary tools and mechanisms to shape the process. Whatever these rules were as understood at the time, every step has been towards applying the rules of reason to what seemed uncontrollable and unpredictable.

Humans have always found themselves at the mercy of natural forces that control their environment and their own bodies. Searching for security has, therefore, been a key feature of human existence. For most of history, humans were living as hunters and gatherers, engaged in a daily challenge for finding food and shelter, and finding security from the wide range of threats from the surrounding environment. They had no option but to live with these threats, and find ways of living that made their survival possible. This often meant living as part of the natural world, respecting the

power of unknown natural forces, and living in some harmony with these forces.

With the advent of agriculture and the possibility of utilizing land for food, there was a new spirit of optimism, which encouraged humans to get to know nature better and to control it to their benefit. As we saw in Chapter 2, this was the basis for the development of reasoning, by imagining associations between natural forces and social events. The desire for controlling the physical world has remained strong ever since, and with each step in the development of science and technology, it has grown more confident. Imagining tentative explanations for natural events and limited management of natural resources have given way to a much more sophisticated scientific knowledge and substantial productive and transformative powers.

The development of capitalist industrialization established a relationship of dominance by the city over the countryside. One of the aims of science and technology has been taming nature, i.e. extending human control over the material world. The examples in city building abound, from transforming topography, as in razing the hills to extend Champs Elysées in Paris, to building the city streets without paying regard to topography, as in San Francisco, city builders have been absorbed in the logic of their own processes and wishing to impose it on the natural environment. Even the critics of capitalism, such as Marx and Engels, believed this had rescued the countryside from its backward ways. With the imperial expansions of Europeans, this relation of dominance was established over the rest of the world. The earth and its resources became the global countryside serving the needs of the metropolitan west.[80]

Now, however, we know that this was a false confidence, as the unintended consequences of nature's conquest are beginning to be known.[81] Katrina, the hurricane that hit the Gulf Coast of the United States in the summer of 2005 and ruined New Orleans, showed how human societies are still at the mercy of natural forces, even in the most technologically advanced countries. The rising number of natural disasters shows how our mismanagement of natural resources has unleashed forces that are far beyond our control, and can even threaten the survival of the species.

These consequences directly challenge our notions of rationality, both theoretical and practical forms of our reason, both our knowledge and action. When we are making decisions about the best course of action, which is the way practical reasoning works, we can only include elements that we know about. We try to come up with a rational response by assessing risks and environmental impacts of our actions. But when we are confronted with elements that we do not know enough about, such as the consequences of genetic engineering in humans and plants, making informed calculations becomes increasingly difficult. The relations of cause and effect that we include in our calculations are proving to be inadequate,

as the number of unknown and as yet unknowable factors rises. The notion of reason, which relied on human ability to know and to act with confidence, has been severely questioned by the challenges that natural forces have put in front of us.

Cities have played a crucial role in environmental degradation, including the removal of natural vegetation, destruction of wildlife, generation of hazardous substances and waste, contamination of land, poor air quality, and transformation of water tables and rivers.[82] Urban areas have grown to house more than half of the world's population at the turn of the millennium.

Responses to these threats are varied. On the one hand, there is an anti-development movement that campaigns against large-scale developments such as roads and airports, invites people to shrink their sphere of activities, to curb their ambitions for growth, and to embrace a new lifestyle, which may even mean abandoning cities and living in small rural communities. On the other hand, there are those who deny the existence of environmental problems, or deny that we can do anything about them, or invest their confidence in future technologies, which would solve all environmental problems. In between, there are many strands of activities that aim to protect the environment while maintaining growth, to strike a balance between development and environmental care.

In city building, the latter attitude has taken the shape of one major strategy: reducing the use of fossil fuels. This has meant pressure on private motor cars, promotion of public transport, and management of land use so as to reduce the need to travel (Figure 5.7). Two major urban forms have been the subject of discussion: managing suburbs, and enhancing the city. In managing suburbs, the main argument has been the development of new settlements that make a more effective use of land and would reduce the need for travel. From the British Town and Country Planning Association that promotes Garden Cities to the American New Urbanism that promotes managed suburbs, this trend shows continuity for over a century.[83] For inspiration, this trend, which can be called micro-urbanism, often draws on villages and small towns.[84] Enhancing cities has taken the form of compact city development, increasing densities in cities so that the urban space is more intensively used. From the British urban renaissance agenda to the European urban liveability agenda, this trend has also made important impacts on shaping cities.[85] The first trend criticizes the second trend that it jeopardizes the quality of urban life by increasing densities, while the second trend criticizes the first for being merely suburban, overtly banal and without imagination. Both, however, need to be taken into account in designing cities, as each contains positive and negative aspects.

Figure 5.7 Reducing the impact of cars on urban space is one of the major challenges for the global environment (Sendai, Japan).

The enchanted city

The dichotomy between reason and feeling is much emphasized in popular belief as well as in academic writing. Reason is seen as grey, cold and calculating, while feeling is colourful, warm and humane. Reason is dissecting objects and people all the time and looks at them only with a detached utilitarian eye, while feeling can contact them directly and deeply and understand them holistically. It appears, then, that the city created on the basis of reason is cold, colourless, abstract and at best utilitarian, while a city of feeling is full of colour and excitement and can respond to the emotional needs and everyday life's call.

It is safe to call these exaggerated formulations caricatures. Most feelings and passions, when they find an external expression, are mediated through our cognitive system. In other words, expressing a feeling in human societies often requires a mastery of skills that seem to be habitual, but are acquired through reflection and training. This is not only the case for the arts, but also in everyday life, which is based on routines and habits, as well as spontaneous exchange and unforeseen events, supported by social norms and conventions.

What is contrasted with everyday life is often scientific, theoretical reason, rather than practical reason. In a way, most everyday life events are manifestations of practical reason, of deliberations that have recurred and shaped into habits and traditions. The contrast between reason and feeling, therefore, also seems to refer to the distinction between theoretical and practical reason, between scientific knowledge and deliberative action, between knowing and acting.

So if feelings are at odds with reason, as the common sense seems to suggest, what would a city of feeling be like, as distinctive from a city of reason? It is likely that what we mean by such a place is not one in which reason is absent, but one in which pleasure and pain, colour and excitement are present. But all cities are made by calculating humans. The basis of their calculation and the degree of their success in achieving efficiency and functionality may vary widely. Yet it is not easy to find an entire city built on feeling, if feeling is understood to be the opposite of reason. Feeling may be at work in all stages of the development of the city; but it cannot drive it alone. Nor can we find a city entirely built on reason. Feeling can be expressed in a personal response to an outside stimulus, as a spontaneous group action, or as a calculated action to address the feelings of those affected. When it comes to the coordinated action that is required to build a city, therefore, it is obvious that feeling can only be present in tandem with reason.

Expression of feelings in the city appears to be creating openings in a closed system that is overall shaped by rationality. This may be attractive particularly when subjectivity can be expressed and communicated freely.

However, this expression is made possible through relying on a series of public frameworks. These frameworks include social norms and laws and spatial orders, which support the free expression of subjectivity without becoming threatening to others. When these infrastructures do not work or are not in place, such as in some poor cities around the world, the expression of feeling can accumulate to create instability to the urban life, where no one can enjoy such freedom. Where the basic infrastructures, such as security of citizens or collection of refuse are not working, any expression of individuality and emotion can lead to collective discomfort and even misery.

Much has been said about how rationality has disenchanted the world, emptying it of its spiritual and emotional contents.[86] So what would an enchanted city look like? Would emphasis on natural elements, such as rivers and trees, or on colour and decoration, or on public events and festivals be a route to re-enchantment? (Figure 5.8). The key problem is that after the dispersal of spirits and suppression of emotions, re-enchantment becomes an almost impossible task. Any new spiritual and emotional meaning would take a long time to root, while the speed of urban living has been faster than ever before. The result is partial, personal and

Figure 5.8 Would emphasis on natural elements, such as rivers and trees, or on colour and decoration, or on public events and festivals be a route to re-enchantment? (Newcastle, UK).

temporary enchantment, rather than collective and continuous enchantments of the past. It resorts to partially believed mythologies which can be replaced at will, and can become lifestyle choices rather than deeply held thoughts and practices. Therefore, the partially enchanted city needs to reinvent itself all the time, to keep pace with the changing seasons of these mythologies. Even so, its inhabitants remain constantly dissatisfied with their own mythologies, looking nostalgically to a time in which these stories were handed down the generations to them, relieving them of the burden of painful choice.

The body's challenge

The conflict between reason and emotion is rooted in the mind–body dualism, which we have already referred to in Chapter 2. The body was associated with nature and feeling, while the mind was representing reason and speech, which were distinctively human. The notion of rationality was overall based on seeing the disembodied mind fighting to control the body with its conscious and unconscious impulses and desires (Figure 5.9). New interpretations of the body by neuroscientists as well as psychoanalysts,

Figure 5.9 The challenge of reason by nature can be traced in the mind–body dualism and the overall negative interpretation of the body's impulses and desires (The Hague, The Netherlands).

however, have challenged this clear division, and have posed a threat to Cartesian dualism.

Some have associated feeling and reason with the right and left halves of the brain. Scans of the brain, however, have shown both sides to be active in instances of emotional and cognitive stimulation. For neuroscientist Susan Greenfield, emotions and the mind are not stark polar opposites, but the two ends of a continuum. She defines emotions as 'the most basic form of consciousness',[87] and, in evolutionary terms, as 'processes where one is highly interactive with the environment'.[88] This causes a focus on the senses, and as it intensifies, it leads to letting go of the self, the construct that an individual carefully develops through a lifetime. Greenfield does not distinguish mind from self, both seen as the personalization of brain through experience.[89] Self-consciousness, therefore, is in an inverse relation to emotions.[90] At any one moment, the more intense the emotions, the less the hold of self-consciousness, and the less the grip of reason or logic. With higher levels of emotion, these layers of meaning and memory are dropped temporarily.[91]

The significance of this account for a definition of reason is to see how closely it is related to the sense of the self, the understanding that the individual develops of what is right and what is not, what is rewarded and what is punished, reflecting the expectations of the society and culture from the individual. It takes us back to Hume, to see feeling as an unmediated state of consciousness, which can be controlled and mooted, while reason is a mediated representation, a layer that is inevitably embedded in a particular society and history, a layer which may be relaxed or abandoned at times.[92] We might then see reason as a normative and socially constructed narrative in contrast to feelings as an original state of nature. Yet this is not the full story, as emotions are complex sequences of actions, events, thoughts and feelings towards the world, which have a narrative structure told from a particular perspective. There is no need to over-intellectualize them, but they are possible to be educated and transformed.[93] Emotions, however, are distinguishable from feelings, which include bodily appetites like hunger and thirst, or moods such as irritation.[94] Emotions, such as fear, anger, shame, disgust or love, typically have an object (we are afraid of something), and they involve beliefs (we believe that something is threatening us, based on some interpretation).[95] Emotional states and rational accounts can, therefore, be both embedded in a particular context, both mediated through the personal viewpoint of the narrator, and both the results of engaging with the world around them. While the Cartesian dualism may tend to separate them from each other as belonging to the body and the mind, an integrated understanding of human beings could only result in seeing the reason and feeling to be both embodied functions of the same organism.

A major challenge that emerged at the beginning of the twentieth

century was from psychoanalysis, pointing to a hidden part of human nature that was not being taken into account. The realm of unconsciousness was beyond rational control, beyond social conventions and acceptability, where bodily desires and wishes competed for immediate satisfaction. In the conscious world, the subject would engage in rational calculations and would avoid dangers and unnecessary risks. The inner impulses, however, would urge the individual to take these risks, even at the cost of being damaged, as immediate gratification was their only objective.[96] Many thoughts and actions, therefore, may be rooted in the unconscious realm, a notion that showed the limits of the traditional notion of reason.[97]

Conclusion

The Middle Ages had followed the millennia-old path of believing in supernatural foundations for knowledge and action. This was challenged from the Renaissance onwards, whereby a rational foundation for belief and action was promoted, starting an age dominated by science and technology, which has continued ever since. Reason became a tool with which nature and society were to be tamed. Both nature and society, however, have posed challenges to this bid for the dominance of human reason. In this chapter, we explored the contradiction inherent in the position of humans as simultaneously part of the natural world as well as standing outside it and trying to control it. As a result of nature's challenge, the foundations for human knowledge and action have been constantly adjusted and the cities been transformed.

During the last three centuries, at least three major trends can be identified. First, the pressure to take into account the nature within: the realm of conscious feelings and unconscious desires. This has led to a search for emotional freedom from the constraints of public rationality and social conventions, which has found expression first in trying to strike a balance between emotion and reason, and then to search for a more radical freedom of expression. This has been manifested in the exploration of diversity and variety in appearances and relationships. Second, the drive to be nearer to nature without: living in harmony with the natural environment, which has found expression in the creation of parks and boulevards inside cities, but also in escape from cities and eventually suburbanization. Third, anxiety about nature: the problem of global environmental degradation, which is an unintended consequence of the desire to tame nature, finding expression in trying to reshape cities with smaller footprints and less wasteful attitudes to natural resources. While the first two show reactions to the rigid confines of a narrow notion of rationality, the third trend is concerned with the impact of this narrow notion on the world.

Reason came to be defined in contradistinction to faith or emotion. However, when emphasizing reason was becoming a norm, it was realized that reason could not be divorced from human senses, and that attention to feelings and emotions was also needed. By the eighteenth century, therefore, a new challenge emerged in favour of natural foundations for knowledge and action so as to achieve a balance. This challenge introduced a degree of scepticism and naturalism,[98] signifying arguments in favour of the importance of emotions and, eventually by the nineteenth and twentieth centuries, more liberty for individuals in cultural expression as well as political and economic action. This has had profound implications for the notion of reason in the city. Is it at the service of the urban society as a whole or individuals; is collective reason which takes into account the needs and desires of many different from the individual reason which does the same for one person? When the two contradict each other, which one is the more rational one? Can always the good of a group be more rational than the good of an individual? Reasoning, therefore, coincides with the questions of politics and ethics, as reasoning is not only a process of calculating and judging what is true and what is false; it is also a normative process of establishing what ought to take place.

The rising tides of reason and emotion seem to have followed one another. Each time reason became the dominant means of shaping the city, a challenge emerged in favour of taking emotions into account. The love of geometry, plain forms and harmonious proportion has been challenged by praise for decoration, colour and curved lines. Each tide peaked with a tendency to overemphasize its main theme, and thus engendered criticism from the new generations who found it limiting.[99] The rigidities of geometry were replaced by the extravagance of decoration, the plainness of one period with the playfulness of the next. Since the eighteenth century, a constant theme has been striving towards a balance between reason and emotion, between town and country, which are part of a broader tension between the desire for individual autonomy and the constraints that society and nature impose on this desire.

Chapter 6

City of people

Social foundations

The challenge of the material world has reasserted, as discussed in the last chapter, that human beings are part of this world, rather than standing outside it, and as such they need to treat their natural context with care. Similarly, the social challenge reaffirms that the individual is part of society, rather than being detached from a social context. These challenges of nature and society, therefore, reveal how the individual is both embodied and embedded, rather than enjoying an exaggerated autonomy or a mythical complete freedom. As a result, individual autonomy becomes a normative goal rather than an empirical reality; it describes where we aspire to go rather than where we actually are. The Renaissance aimed at freeing humans from the ties of tradition and custom, so that they could reconstruct the world in a rational fashion. The challenge of society has shown the limitation of this freedom, that individuals are ultimately part of a social context. By challenging other foundations, society provides a new foundation for belief and action, requiring new ways that individuals can relate to one another, searching for new keywords that should accompany individual freedom and environmental care. We discuss some of the challenges of society in this chapter and return to them in Part II.

Autonomous agencies in a social world

The critique of reason in the twentieth century was closely related to the critique of the notion of self (Figure 6.1). The transcendental self of the Enlightenment unified all its perceptions of the world under an overall umbrella.[1] It was placed at the centre of the universe, able to understand the world and act in it by reliance on an inner strength, i.e. reason.[2] This marked the culmination of the development of the modern notions of individual and the state in the post-medieval world, enabling a battle to be waged against traditions and customs, freeing the individual from the ties of kin and clan.[3] An epochal turning point, signalled by Descartes, was a move towards establishing subjectivity and the self as a solid basis for human beliefs and action. Despite all challenges, this theme of emphasizing

Figure 6.1 The notion of individual autonomy has been challenged to be mythological and in need of being placed within a social context (The Hague, The Netherlands).

a first-person perspective into the world, of the observer's own point of view for validating and confirming an objective foundation for experience and knowledge, has been a major driving force for European philosophy.[4] The notion of the autonomous self, however, started to be questioned from the nineteenth century under pressure from two critical evaluations, which showed the self to be closely tied to society and nature rather than standing outside them.

On the one hand, as we saw in the previous chapter, it was challenged by showing how through their physical body humans were embedded in nature. Scientific investigations, for example, showed how the brain is in a two-way traffic with the rest of the body, and how its working is affected by drugs and wounds.[5] Psychoanalysis, with its roots in German idealism and Nietzsche, posed a major challenge to the classical notion of the human subject.[6] It saw the individual human as a complex being at the mercy of its biological impulses, driven by its primary physical instincts, a being that is extended inwards into a dark interior without any sharp delimitation.[7] The contents of the mind are not necessarily coordinated: they are diverse, conflicting and not transparent to the individual. This

questioned the rationality of the individual's relationship to the world, as it could be pre-linguistic and conflictual.[8] At the same time, psychoanalysis argued, reason could liberate people by making their unconscious world transparent to them, providing an account of what was beyond reach. Reason, as the inherent faculty of knowing and acting, which could enable humans to be in charge of their life, as humanists had argued, was thus being adjusted to occupy a more nuanced position.

On the other hand, a radical critique of the notion of autonomous self was developed from a social standpoint. Socialist and communitarian movements tried to show how individuals are, or should be, embedded in a social context. Meanwhile a philosophy of language critique emerged which questioned the autonomy of the subject,[9] in extreme cases even bidding for its complete elimination.[10] Wittgenstein argued for the primacy of the public language over individual users,[11] which emphasized that human knowledge only operates within social and linguistic frameworks.[12] Saussure's thought led to a critique which decentred the subject, and reduced the individual to a cog in the linguistic wheel. By turning the subject into 'a position in language',[13] the classical notion of the self was being challenged, showing how it was under the influence of social forces, as represented by language. The methods of science, meanwhile, argued for the objectivity of a third-person viewpoint of the world, questioning the validity of the Cartesian and phenomenological, subjective, first-person accounts, which were so closely associated with the classical idea of the self.[14]

The Renaissance humanism and the Enlightenment promoted freedom for individuals; the industrial age radicalized this individualism, uprooting individuals from their social and historical contexts in towns and villages and gathering them in overcrowded large cities. Such agglomeration caused energy and dynamism in the economy, as well as anxiety and fear in the society. Living together in large numbers brought about new forms of social relations among atomized individuals. A tension between individualism and holism emerged that has signified the modern city ever since. The conditions of life in these cities led to the development of a critique of individualism: the post-medieval notion of a triumphant male in charge of his destiny was no longer sufficient to explain the conditions of the industrial cities. Here it appeared possible to live in complete independence from the others; but in practice most aspects of life depended on others, an interdependent world which needed to be managed to make life possible. Rather than putting the individual at the centre of the world, it was the collective that now needed attention, hence the rise of holism, which became manifest in socialism and religious revival of the Victorian age. While individualism continued to be further radicalized (by the Romantics, by Mill and Nietzsche among others), holism found its philosophical standpoint (as developed by Hegel), its political theory and institutional frameworks to support action (as represented and mobilized by Marx and

others). Holists argued for the importance of society in framing meaning and action, while individualists promoted liberation from such bonds. The cities of the nineteenth and twentieth century have been the scenes of the continued radicalization of individualism and the waves of holist attempts to curb this process.

The rise and fall of the self has been the central theme in the modern European philosophy.[15] The history of the Continental philosophy is a dramatic story of the evolution of the European self-image, which combined science and knowledge with romantic imagination. This first invented the image of a self-confident individual at the centre of the universe, a transcendental self which was timeless and universal. The nature and ambitions of this transcendental ego, as one critic has put it, were 'unprecedentedly arrogant, presumptuously cosmic, and consequently mysterious', to the extent that, it was raised to be no less than God, the Absolute Self, the World Soul.[16]

These notions were clearly embedded in a particular historical experience, and the success of European civilization made it seem natural that this was the criterion with which to measure the world:

> In its application the transcendental pretence becomes the a priori assertion that the structures of one's own mind, culture, and personality are in some sense necessary and universal for all humankind, perhaps even 'for all rational creatures'. In the realms of morality, politics and religion it is the effort to prove that there is but one legitimate set of morals (the middle-class morals of Europe), one legitimate form of government (the form of parliamentary monarchy that ruled most of Western Europe), and one true religion, to be defended not just by faith and with force of arms, but by rational arguments, by 'reason alone'.[17]

However, as it became clear that history did not end there, as empires were established and collapsed, and these forms of politics, morality and religion were questioned or transformed, the transformation of the notion of self logically followed, as it was no longer embedded in a secure environment. The result is, from Heidegger to Derrida, a denial of the existence of self, showing a historical shift from one extreme to another, from transcendental self to no self at all. The main casualties appeared to be, at least to some, not only the false pretensions, but also the belief in the existence and necessity of reason and the autonomy of individuals in using it.

These critiques reveal the mythological dimensions of the classical self, showing that a complete break from nature and society was not possible. Rather than ruling over or standing outside society and nature, the human subject is an active part of them. However, such embeddedness cannot deny the existence and the relative autonomy of human agency. From a

position of biological individuality, the human subject makes connections between, and creative interventions in the flow of, ideas and practices. This places the human subject at the intersection of the biological and social, enjoying a degree of authority that enables humans to interact with the social and natural world around them. It shows the embedded and embodied human agency in interdependent relationships with others but without losing its own distinctiveness and authority, limited and conditional as these may be. This interdependence, and the revelation of the limits of independent agency, show how collaboration as well as competition constitute the norms in human relations.

Cities of masses

Historically, cities were designed and developed in accordance with the representations of gods and kings as the sources of spiritual and temporal power. Major landmarks, nodes and axes were developed to enhance the position of these sources of power in the daily life of the citizens. As the modern democratic societies emerged, however, the source of power shifted to a wider base, and now the city needed to be designed for people (Figure 6.2). Rather than gods or kings, it was now the people who were

Figure 6.2 In the modern democratic societies, the source of power has shifted to a wider base, and now the city needed to be designed for people (Montreal, Canada).

the source of inspiration and legitimation for city design. The reference to people first only included the elite; but under democratic pressure it was gradually opened up to include larger sections of society. The geometric design of the ancient or Renaissance and baroque cities, therefore, was challenged as being too rigid, merely addressing a world order that no longer could hold.

The foundations for reason once again changed. Rational belief and action had once been based on supernatural foundations, then on rational foundations of disembodied human reason, and later on the natural foundations of the material body. The latest challenge shifted the foundation to society, or in other words, spread the foundations across the social world. Thinking and doing now only made sense in the context of language and society, rather than in a timeless and disembodied way, as it once had been thought. In this move, the notion of foundation has come under attack, as it is considered no longer necessary to rely on a single foundation for belief and action. In rejection of foundationalism, alternative epistemologies have included coherentism, which holds that knowledge is acquired by comparing beliefs with one another, rather than relying on a basis outside them. Another is pragmatism, which argues that beliefs can be justified by their relation to practice, enabling us to predict and manage our conduct towards a particular end.[18]

Explosive pressure for social and political change is a hallmark of the modern era, as indicated by the American and French revolutions at the end of the eighteenth century, and continued throughout the nineteenth century in many smaller revolutions and upheavals. This was a period of industrialization and urbanization in western Europe and North America, in which almost every aspect of social life was undergoing significant change. This was a time of rising empires conquering the globe, but also coexistence of extremes of poverty and wealth in cities.[19] It was the age of improvement, but not going far enough, so that Disraeli characterized Britain as being formed of two nations living side by side.[20] New social and political institutions were introduced to manage the fluid conditions of the emerging industrial societies. These, however, were often inadequate to address the needs of the poor, who were constantly on the verge of explosion, to the extent that Marx and Engels wrote of the spectre of communism hanging over Europe.[21] Much was done to improve the hygienic conditions in cities, but in terms of urban design and development, much more was needed to be done. Many schemes benefited the rising middle classes, who were the driving force for social and economic change, but leaving the poor on the margins. Urban development programmes such as Baron Haussmann's transformation of Paris aimed at removing the poor from the urban scene, rather than improving their conditions. Model towns and by-law streets in Britain aimed to improve the conditions of the working classes, but they were still limited endeavours. It was primarily in

the twentieth century that the social challenge found significant manifestation in city planning and development, based on ideas that had been developed and nurtured in the nineteenth century. The Bolshevik revolution in 1917 toppled the Russian tsar and rang the alarm bells louder than ever before. The British Prime Minister Lloyd George spoke of building a future fit for heroes who were coming back from the war.

The threat of revolution, and the need for reform to avoid revolutions, was felt throughout the nineteenth century. It is not accidental that the two key texts that symbolize the twentieth century's approach to urban design and development addressed this problem in their own way. The original title of Ebenezer Howard's seminal 1898 book on Garden Cities was *To-morrow: A Peaceful Path to Real Reform*.[22] Le Corbusier, in his book *Towards a New Architecture* offers a choice: 'architecture or revolution', campaigning that socially concerned architecture would prevent a social revolution.[23]

Both these writers, and more generally the urban planning and design movement, were rooted in the utopian traditions that had started in the Renaissance period.[24] Utopian ideas and practices were developed further in the nineteenth century, when the social diseases of early capitalism caused serious concern and created a strong impetus for imagining alternative conditions.[25] Thinkers such as Godwin, Fourier and Saint-Simon developed their utopian ideals, based on the belief that a perfect society could be built, seeing society as 'a human artefact open to rational improvement'.[26] In developing their ideas of communism, Marx and Engels were displaying a belief that it was possible to create a new utopian society based on completely new principles.[27] Meanwhile, some philanthropic industrialists started to experiment with building new model settlements for workers, thinking that if their workers were well fed, well clothed and well educated, they would work better.[28] The first model town was New Lanark in Scotland, which was built by Robert Owen at the beginning of the nineteenth century, and followed by a number of other prominent examples, but only to turn into a systematic endeavour in the tradition of Garden Cities and new towns in the twentieth century.[29]

Garden Cities, new towns and the new urbanist movements represent a continuous trend of micro-urbanism, which campaigns for the development of small settlements, both as a means of managing the growth of suburbs and as an alternative to the large metropolis.[30] The key idea that they all share is the idea of a small town, to be developed as it has always been throughout the ages: a limited physical size and population, and a cluster of services at its core to meet the essential needs of residents. The key idea of modernism, in contrast, was a vision of the large city, albeit one that was radically transformed by the logic of industrial production.

Howard's Garden Cities attempted to respond to both challenges of nature and society in the form of a half-way compromise, while Le Corbusier's modernism was only a response to the social challenge via the use of technology and the application of geometry, still aiming at the conquest of nature. Howard's diagram for the Garden City and the cluster of such cities to make a 'social city' followed strict geometrical regularity, even though he warned his readers that this was only a diagram. Indeed, when it came to the design of Garden Cities, it appeared more akin to village vernacular rather than a rational modern arrangement. Le Corbusier's geometry was now at the service of society, but society was being imagined as a homogeneous mass, rather than a collection of diverse individuals. This created a backlash, as it once again had repeated the narrow assumptions of earlier rationalists, leading to a defence of diversity in the face of abstract notions of space.

These theories were followed by action, particularly after the Second World War, whereby large public housing schemes were built to improve the conditions of life for urban masses. In both socialist and capitalist economies, the modernist notion of applying industrial mass production techniques to solve urban problems was adopted. The result was large-scale redevelopment of urban areas, and the imposition of a new order that made sense on paper. In practice, however, there were many discrepancies: emphasis on quantity was often at the expense of quality, on cars at the expense of pedestrians, on vast open spaces at the expense of intimate places for sociability, on abstract calculations rather than the living households and their needs. Within a generation, the modernist optimism in being able to tackle social problems through design and development of better urban environments had disappeared. Its replacement was a pessimistic outlook that opposed all the tenets of modernism. Indeed, post-modernism, which was a subset of scepticism, can only be understood in the context of its critique of modernism.

The challenge of stratification and difference

On the one hand, the challenge of society was to expect urban design and planning to serve the needs of the many, rather than a few. In response, the welfare state's urban development efforts resorted to mass production of standardized environments. The standards, and the assumptions behind them about households and individuals, however, could not satisfy a society that was increasingly more diverse. It had generated urban environments which were resisted and disliked as too abstract, unable to deal with the demands of different groups and individuals. This was a new challenge, expecting individual and group differences to be recognized and planned for accordingly, demanding 'the right to be different'.[31] How could urban design and development respond to the needs of different income, age, gender, ethnicity, nationality and lifestyle groups? (Figure 6.3).

Figure 6.3 How could urban design and development respond to the needs of different income, age, gender, ethnicity, income and lifestyle groups? (Washington, DC, USA).

Society is stratified in many different ways, as it is formed of diverse individuals. Furthermore, at any one point in time, an individual may belong to a number of different groups. This leads to an enormous range of possibilities in classification. While the number of roles and groups are relatively limited in small towns and villages or in traditional societies, the large cities and modern societies are partly characterized by the complexity of their patterns of diversification. The way we become aware of these diversities, represent them to ourselves and others, and act upon them, depends on society's material and mental conditions. As economic, political and cultural features of a society change, the form of its actual stratification tends to change; while its collective consciousness changes, it becomes more aware of this stratification, represents it in new ways, acts upon it, or just suppresses it.

The major form of stratification in the nineteenth century was economic, resulting in a degree of social polarization which fuelled revolutions and social upheavals. Awareness of different forms of vulnerability, however, was extended in the twentieth century to many social groups, including women, children, the elderly, the disabled, immigrants, racial

and ethnic minorities, people with different lifestyles, sexual orientations, etc. Groups have sometimes benefited from a combination of favourable economic change, which has revealed their significance in the labour market, and a growing sensitivity to their needs. As each group has become aware of its needs and rights, and has found confidence to demand equal rights while being recognized for its difference, the initial assumptions of liberal societies have come under pressure to become more flexible and therefore more complex.

At the heart of any system of stratification, there lies a question of difference, and the tension between universal and particular. As far as social organization is concerned, the universal is constructed on the basis of some explicit and implicit assumptions. However, these assumptions tend to be rather limited, modelled on a narrow section of the elite, rather than wide-ranging characteristics and needs of the society at large. The result is the potential failure of universal frameworks to address the problems of the weak and vulnerable. On this basis, some have challenged the usefulness of universal frameworks altogether. The challenge of diversity, however, is to transform these assumptions, making them more sensitive to the variety of conditions that need addressing. The challenge for any society becomes how to provide services and spaces both in sufficient quantity and in high enough quality, both following a universal standard that would make it a fair society, as well as being flexible enough to meet the needs of a diverse range of individuals and groups. When translated into the urban space, the question becomes: what is the urban form that can respond to these differences?

Many forms of stratification have been known for long periods, and so societies have always been aware of differences in age, gender, race, etc. What is new is the growing ability of these groups or their supporters to argue their case, resulting in deliberations about how to treat these diverse groups and individuals. An example is the role of children as a social group (Figure 6.4). While children have always been valued by their parents and by societies in general, each change of economic base, from agriculture to manufacturing and then services, has brought about different understandings of their role and value in society. While children were part of the productive unit of the household in the medieval period, the bourgeois family gave them a new place, to the extent that the modern nuclear household has been strongly influenced by the rising significance of the role of children in intimate households.[32] As demographic patterns have changed, the nuclear family has undergone a new cycle of transformation, in which the path of individual household members does not necessarily coincide with the path of the traditional household, or where households can be defined by new forms of intimate relationships, the role of children has become even more important than before. The question for the planning and design of the city is: what is a child-friendly city like? How can we design cities that cater for the needs of children as significant

Figure 6.4 How can we design cities that cater for the needs of children as significant members of society? (Budapest, Hungary).

members of society, rather than unimportant minors who have to wait until they are adults to assume their place in the city?

Important innovations to address the needs of children included the idea of neighbourhood units, superblocks and Radburn layout.[33] The primary school and its catchment area of 400 to 800 metres (a quarter to half a mile) defined the unit of the city. The idea of a neighbourhood unit, which was developed in the United States in the 1920s, placed the school at the heart of a residential area, so that children did not have to cross the major streets to get to school. The superblocks and culs-de-sac of Radburn design were meant to protect children from cars, creating safe areas for them to play and walk to school. Playgrounds were new additions to the set of functions in cities, to cater for the needs of children. These were some of the earlier measures that were adopted with potentially far-reaching impact on the urban form. However, not all forms of diversity have generated this level of response.

In most other cases, it appears that the response has been in the form of many small steps, rather than comprehensive visions in the style of Howard and Le Corbusier. For example, writers have pondered about what a non-sexist city may be like,[34] or how to be responsive enough to

the needs of women in cities.[35] Designing for the disabled has generated new norms for access to buildings and transforming the public environment, through introduction of ramps, better access points and other measures. Design for multicultural cities has included creation of public art and public spaces with multiple and multi-layered meaning, which can be used by different groups. Social exclusion has been analysed through its spatial implications, and how to address the marginal groups and neighbourhoods with urban design measures.[36]

A strong emphasis has been placed on the process of design and planning, so that local communities and diverse urban groups can be a party to the way the city is being shaped. Through public participation, it has been hoped, the process of urban development would become more democratic, more responsive to the needs of urban inhabitants. The bureaucratic process of urban planning has been criticized for being too detached from the everyday concerns of people. Furthermore, its structures and mode of operation are organized in a way that many people find it difficult to engage with this process. Public participation, it has been argued, should involve people in this process and should ensure that their expectations are taken into account. For some, this process is called placemaking.

Placemaking

What do we mean by placemaking, and how do we 'make' places? To find out we need to understand the modernist attitude to space. Modernists followed Euclid and Descartes in conceptualizing space as an existing abstract entity; they advocated applying science and technology to transform it according to clear functional criteria. This was an instrumental use of reason, resulting in a radical break from the past through intervention from above, disregarding society and nature. The idea was embraced by public authorities of all political shades, who were able to change the face of many cities and societies across the world through the development of a new physical infrastructure.

This scenario got into trouble through two setbacks. First, the ability and willingness of public authorities to transform the physical environment was dented through economic crises. The total transformation of cities and countries through universal principles and standards was no longer possible due to lack of resources. Ambitions therefore were adjusted accordingly, leading to a project-based, place-specific process of urban intervention. Placemaking was, therefore, a way of drawing a boundary around a particular location and focus scarce resources on particular targets. Second, there was pressure by democratic forces that the top-down transformation was too authoritarian. It had imposed a will on people without their consent, disrupting emotional and cultural linkages, undermining existing life patterns, dismantling many communities, and risking

failure in addressing the needs of people it claimed to serve. Place was now meant to provide a vehicle for hermeneutic understanding of situations from within; people were embedded in particular sets of social and spatial relationships, and any change needed to involve them, rather than being imposed on them (Figure 6.5). Universal space, then, was fragmented into many particular places both through economic pressure, as well as cultural and political demand.

These are two different reactions, and they may or may not coincide in some circumstances. Area-based regeneration, for example, may claim to be making places, without involving people, as is evident in too many schemes. The result may make economic sense, but not political and cultural sense. External interventions, whether public or private, cannot 'make' places. At best, they can provide the conditions in which people make their own place. The problem is that, wherever economic constraints have been relaxed or democratic demands suppressed, there has been a return to top-down transformation of space.[37]

There are at least at two levels that we can see attention to place-making: local and regional. At the local neighbourhood level, place is a clearly demarcated framework for outside intervention. At this level, the approach of targeting resources would focus on areas of industrial decline

Figure 6.5 People are embedded in particular sets of social and spatial relationships, and any change needs to involve them, rather than being imposed on them (Newcastle, UK).

and poor neighbourhoods, the casualties of economic restructuring. Therefore, placemaking becomes targeted action for particular vulnerable areas, for bringing land and labour back to the marketplace, with or without the participation of the people who are affected.

At the regional level, place is a unit of the global economy. The response to economic pressure was globalization, which includes the relocation of some labour-intensive economic activities from high-cost to low-cost parts of the world, in search of higher returns. This has changed the spatial division of labour across the world: some places have become stronger as the centres of command and control, some have lost function and are searching for new roles, some have emerged as the new centres of production, while others have been completely bypassed. Technological developments have allowed capital to move around the globe at some ease, and to capture it, there is emphasis on places. Making places, therefore, becomes developing the capacity of localities to attract the floating resources and use them for the economic prosperity of the locality. Places then compete with one another for recognition by investors; but there are many places in the competition, and so, like items on supermarket shelves, they need to rely on product differentiation, through better quality, better advertising and better packaging. Investment in human capital and the physical infrastructure, improvement of environmental quality and image, are all parts of this attempt at standing out, generating a specific identity for a place in a crowded market.

Governance of places

The idea of universal space, ever since Descartes, has been associated with the idea of an all-powerful source of authority. But this notion of the state has been subject to economic and political challenge. The fragmentation of universal space into particular places has been associated with the fragmentation of the political and economic authority of the state, transforming its role from providing to enabling and regulating (Figure 6.6). Some have called this a transition from government to governance, but we need to be clear that governance is not an opposite term to government. Furthermore, focus on place has helped some governments to restructure some of their functions, crossing the departmental silos for new forms of collaboration, moving from functional to spatial division of labour. It has enabled the establishment of horizontal links between different agencies, as distinctive from vertical functional organizations.

Government is not the only institution that has gone through considerable change. Investors have become more and more detached from localities and from their assets. While at some point they may have invested in their area for status and pride, now they may search for better rewards anywhere in the world, becoming more interested in the exchange value,

Figure 6.6 Fragmentation of the government has changed its role in urban development. After the abolition of the London government, its building has been used as a hotel, an aquarium, an exhibition hall and art gallery (London, UK).

rather than the symbolic or use value of their assets.[38] Local people, particularly the poor, on the other hand, are expected to be more involved in their own affairs, changing their role from consumers and recipients of services to participants in their provision. Meanwhile, the nature of expertise has changed, so that the experts are advisers, rather than the all-knowing professionals who knew what was good for people, as they once were thought to be. What emerges is a more complicated picture of power relations within a locality.

Governance is the institutional framework within which economic pressures and political and cultural demands meet. Governance is the set of 'actions and institutions' within an area that 'regulate or impose conditions for its political economy'.[39] We can therefore talk of urban governance, or neighbourhood governance, depending on the level of our investigation. UN Habitat defines urban governance as 'the sum of the many ways individuals and institutions, public and private, plan and manage the common affairs of the city'.[40] Governance is the morphology of power, a map of where power lies and how it is distributed within an organization or a place. It shows that power lies not only in the realm of

the state and large private companies, but also in civil society groups and individuals. Democratic governance presents a normative agenda: that these other sources of power should be taken seriously. To do so, power should be distributed in new ways, and mobilized to achieve local objectives. It involves discovering new sources of power, and going beyond a zero-sum game. An optimistic reading of this transformation is that beyond global economics and national politics, there are local sources of power, and that an active and well-coordinated local population can take charge of its own destiny. However, this has failed to materialize for many places, either for the poor neighbourhoods in rich western cities, or for many parts of the developing world, showing the limits of localism.

In addition to economic resources, there are at least two sets of resources that are necessary for effective governance: ideas and capacities. Ideas cover knowledge and skills, as well as imagination as to what can be done. Do people know what might be possible? Do they have access to information? This is hardly the case in many developing countries, where low levels of education and absence of communication limit the possibility of even knowing what might be done. The first step in solving a problem is defining it, which in many cases can be improved by a better knowledge of the world. Another question is: do people know what their own capacities are? The impact of community development work has sometimes been very significant in showing to people that they can change things by working together. It has mobilized new sources of power that were not recognized before. A further question is: do they know what external resources are available? The individuals and agencies involved need to be well supported.

Capacities refer to institutional frameworks in which actions take place. Is there the rule of law in place? Is there sufficient freedom for people to work together? As Amartya Sen has argued, democracy is an important precondition for development.[41] What is the shape of forums, networks and institutions that enable people to work together? Are there leaders and network builders in place? The strength of local networks and institutions that make up civil society is a necessary condition for a place to mobilize and use resources effectively. Where resources are scarce, populations fragmented and transient, and democratic institutions weak, conflict dominates the lives of people, making every incident a major battle to overcome.[42] Forums and institutions in which people can negotiate their differences and solve their problems are often missing. Even when such forums are available, long-established or new, their success depends on the existence of a number of other channels of communication, which are available in a functioning public sphere.

The UN Habitat's Urban Governance Index identifies 26 indicators for good urban governance, which are grouped under the themes of effectiveness, equity, participation, accountability and security. Under participation

it enlists both representative democracy (measured by the presence of elected council, elected mayor and voter turnout), as well as participatory democracy (measured by the presence of public forums and civic associations).

We need, however, to be careful about our assumptions. The diversity of the place should be understood and taken into account. A place is not a homogeneous environment; it is formed of different people with different degrees of power and different identities. Focus on place does not necessarily provide equality of access to decision making for people within that place. There will be differences of power and influence, and those who are politically and economically powerful are more likely to drive the agenda. Many other voices may remain on the margins.

In addition to differential access to resources, there is a diversity of identity. There is a general tendency by people outside an area to consider it as a homogeneous place, which could stigmatize people there en masse. The impact of trying to understand the conditions from within should give us a more nuanced sense of this diversity. There is much emphasis in the literature on the phenomenological value of place, without developing it any further to explore its implications for action. We need to distinguish the notion of place as held by individuals and households, from groups and communities. There are different dynamics involved at these different levels of analysis and intervention. Some localities have a more established sense of identity, especially if people have lived together long enough, while other places are formed of transient populations, and their place can easily become a site of tension and conflict.

Economic resources and political capacities are necessary for good governance, but not sufficient on their own. The experience of participatory budgeting in Porto Allegre, for example, has been innovative, whereby a part of the city's revenues has been allocated to the priorities set by citizen assemblies in districts.[43] This is a format that brings politics and economics together, and people can see that participation can lead to tangible results. Political and economic arenas, however, are often kept apart. People have been mobilized in networks and organizations, but they are not given control over resources, due to concerns about legitimacy; or resources are poured in, as in European urban regeneration schemes, but participatory networks are not in place. In both cases, the results can be ineffective, lack of ability to attract or absorb resources. Also important are cultural resources, whereby individuals and groups can share experiences and express themselves, as part of the process of shaping their places. To succeed, placemaking needs to be both purposeful and meaningful.

Public services and neighbourhood governance

Emphasis on local participation, however, has sometimes led to a degree of localism that would even become more fragmentary than before. The spatial form of this localism has been emphasis on urban development and governance through neighbourhoods. One of the key features of focusing on neighbourhoods has been a pressure for engaging citizens in decision making and service delivery. A recent joint report by the British Office of the Deputy Prime Minister and the Home Office, aimed to link citizen participation with public service delivery through neighbourhood arrangements.[44] It outlined the challenges facing governments across Europe to be 'to secure sustainable improvements in our public services', and 'to re-engage our citizens with the institutions of government'.[45] An important part of the answer, it argued, lies at the neighbourhood level by promoting and developing activities that can harness people's interests in these local issues. The quality of services would improve by making them more responsive, enabling residents to be involved in making decisions that would affect their lives, enabling public service providers to work with community and voluntary groups to deliver better services, and building social capital and promoting social capacity and cohesion.[46] The report proposed neighbourhood charters that would enable neighbourhoods to develop their own institutional arrangements, in which different stakeholders can work together to improve public services and to enjoy a better quality of environment.

Focus on the neighbourhood is important, especially in deprived areas. These are places where many social problems come together due to a concentration of vulnerable populations, a phenomenon that is common across Europe (Figure 6.7).[47] It is essential that these neighbourhoods can benefit from some governance arrangements that would allow their residents to negotiate their differences and develop their capacities. Therefore, it is appropriate that some solutions be neighbourhood-based, integrating different activities and services. However, these problems are not all generated in these neighbourhoods; neighbourhoods are only spatial manifestations of these problems, which themselves lead to new problems for vulnerable populations. Furthermore, too much focus on the neighbourhood level would go against strategic thinking and equality of treatment across the city.

The method of representation in British democracy is geographical, and so there is already an institutional focus on neighbourhoods in the form of ward councillors. To improve citizen engagement, a theme-based, rather than space-based approach may also be needed to ensure a more complete coverage of issues. Would creation of a multi-level governance hierarchy be a better solution than a cross-cutting matrix of geographies and themes? The problem remains institutional design: do we need particular

Figure 6.7 The concentration of vulnerable populations leads to a cluster of social problems; in this case putting pressure on gypsies' use of public space by other residents in a suburban neighbourhood (Athens, Greece).

organizations associated with particular areas? Research evidence suggests a forum is useful to negotiate different and competing needs, but that also it can turn into a bureaucratic and undemocratic exercise. Or do we need to reorganize the existing services on a spatial basis and encourage them to network and collaborate? Experience in Denmark and the UK suggests moving away from local arrangements such as area committees, what some Danish politicians called 'little kingdoms'.

Focus on the neighbourhood could make joined-up work possible; but it should take into account the diversity of a neighbourhood, rather than expecting it to be one homogeneous group to have one voice. Therefore, the institutional design of a forum at the neighbourhood level needs to be sophisticated and flexible. The experience of European countries shows that even where democratic institutional arrangements have been in place at the neighbourhood level, they have not necessarily worked well with new immigrant populations, who may not share the norms and practices embedded in these institutions.

A major point is the distinction between deprived neighbourhoods and other urban areas, as their conditions, problems, and therefore solutions

would be different. The key challenge is how to provide new neighbourhood arrangements that are universal enough to be fair, while helping those who need it most. By their nature, the arrangements in deprived neighbourhoods will be different from the affluent ones. Even if legal and institutional provisions are the same, problems and solutions in these different neighbourhoods will be different. At the same time, in the interest of fairness and equality, when dealing with deprived neighbourhoods, we need to ask: would we approach things in the same way for middle-class neighbourhoods? All discussions of participation seem to focus on deprived neighbourhoods, to ensure better delivery of services. Do we expect middle-class neighbourhoods to participate in community affairs and take pride in their 'neighbourhood charter'? Overall, they enjoy the freedom of getting involved if they want to; and they do so when they feel there are problems that are not being attended to by the authorities.

A key question is whether it is appropriate to relate citizen engagement to public services. This may reduce the relationship between citizens and the government to a narrow utilitarian one. However, if democracy is collective self-rule, then the relationship should be multi-dimensional. Middle-class citizens feel they are entitled to the services they pay for through their taxes, and do not want to have to be involved in matters that they consider to be in the domain of the relevant service providers. Should the residents of deprived neighbourhoods not be entitled to the same level of services without having to be involved? Maybe the link between active citizenry and good services lies in improving the mechanisms of accountability in local governance, as well as providing better resources for local service providers. While a degree of control over resources would encourage more participation, it should be remembered that the capacity for using these resources effectively depends on the area's strength of civil society, as evidence from Latin American cases shows. Evidence from the UK shows that without such capacities, local committees were unable even to spend their resources.

Some neighbourhood arrangements are potentially positive in enhancement of civil society. However, by definition, civil society falls outside the sphere of the state. The question is how far should (or could) the state intervene in the development of what lies outside its sphere of activity. Would it not lead to a degree of institutionalization and bureaucratization of civil society? By connecting civil society to state activities, there is a danger of making it dependent on, rather than independent of, the state. The emphasis surely should be on investing in people's capacity to grow their own arrangements. The experience of Newcastle showed that investment in community empowerment can lead to a more active citizenry. However, local politicians are at times afraid of this challenging source of power, and are slow to learn how to work with it, rather than expecting it to be dragged into a long bureaucratic process.[48]

The challenge of globalization

The process of globalization has posed challenges to the notions of state and society. Like the idea of the self, the nation state was based on the idea of autonomy. However, as the flows of ideas and resources have intensified through globalization, the state has become undermined in its ability to deal with its remit, which includes urban design and development. Rather than direct involvement, the role of the state has become regulation, monitoring and control. Rather than autonomous entities in full charge of their territories, the local and national governments are now more entrepreneurial, inviting international actors to invest in their territories, resulting in inevitable loss of control on some aspects of their territories.

From the early Renaissance utopians to the modernists of our time, the search for new urban orders has used geometry as a tool to shape the new and redevelop the old urban fabrics. During the past two centuries, however, the geometric order of the city and its rationalist assumptions have come under attack from a natural and a social perspective. The social critique of the rationalist city argued that it was too rigid, not paying enough attention to individual liberties, which needed to be expressed in a variety of ways, including the urban space and its composition. The result was the laissez-faire city, with its liberal attitude towards individuals, its free market economy, its social inequality, segregated urban population, and fragmented spatial structure, and its eclectic mix of styles, which characterized much of the nineteenth century as well as the final quarter of the twentieth century.

These two periods, Victorian and postmodern, resembled one another in many ways. Both emerged as critiques of the prevalent rationalism of the time. Both liberalized the economy while polarizing the society. Both rejected the geometric order of the urban space that prevailed before them, whether neoclassical or modernist. Both challenged the aesthetic consensus and promoted eclectic tastes and playful appearances in the name of freedom and innovation (Figure 6.8). One was at the beginning of the explosive period of urbanization, the other at the beginning of an intensified period of globalization, each marking the anxiety and fear of an unknown future lying ahead, each characterized by the rising religious and secular concerns for social cohesion.

These dynamics transformed the ordered city of rationalists by injecting a degree of liberalism and individualism. With the new waves of globalization, this liberalization and its associated features have intensified at a wider level. These have generated a major challenge: maintaining individual freedoms without suffering from the consequences of social fragmentation and polarization. The new forms of social stratification, and the degree of consciousness of these social strata, are more complex than even before, making it necessary to seek new, more complex forms of social and spatial organization, which can strike a balance between

Figure 6.8 Postmodern designs challenged the modernist aesthetic consensus and promoted eclectic tastes and playful appearances (Birmingham, UK).

individual liberty and social cohesion. As globalization enables a faster and freer movement of ideas and practices across the globe, local distinctions are under pressure. As it mobilizes people and makes it possible for large numbers to move from one city to another, one country to another, it generates increased levels of diversity in cities around the world. The question that emerges, then, is: what could design for a multicultural city be like?

Multicultural urban design?

Spatial configuration of a city is often closely intertwined with its social composition: through time, people have shaped their environment to suit their needs. However, society and space change at different speeds. For most of human history, the speed of change has been very slow, giving the city dwellers enough time to adjust their built environments to their changing circumstances. In the modern era, however, the speed of technological innovation has continuously transformed society and space, pressing for faster changes in the built environment. Yet the built environment is relatively fixed and not easy to change. Within a generation, the size and lifestyle of households may change, whereas the built environment may

remain the same. Many urban areas in Europe and elsewhere were formed centuries ago, when people used to live completely different patterns of life.

Many discussions about culture take it to be a static, unchanging set of characteristics. Designing for a particular culture, therefore, becomes creating fixed forms for unchanging cultures. However, the reality of any culture is that it constantly changes, both through its internal dynamics and through its contacts with other cultures. This is especially the case in multicultural cities, where contacts between different cultures is more intense than monocultural cities.

The cultural composition of the city also changes, as populations change through historical and social transformation. The speed of this change depends on the speed of growth and change in the urban population. In mature cities, while space may remain the same, cultural characteristics and composition change. In Britain, people may now continue to live in Georgian and Victorian houses, but they do not live according to the norms of Georgian or Victorian societies, as British culture has changed from one century to the next. The land uses and inhabitants of an area may change from one decade to another. We can observe in almost all cities how the character of an area has changed, going up or down the social scale. Cities that have experienced waves of migration, such as London or New York, have a track record of ethnic and cultural change in some districts. The cycles of immigration, consolidation and dispersion that the Chicago School of Ecology had studied show how the cultural map of a city is in constant change. For more than two centuries, Boston's South End, the largest preserved Victorian neighbourhood in the United States, has been home to consecutive generations of migrants from different countries, showing the robustness of the built environment to cope with constant and tremendous social change.

The urban space also changes, as cities are subject to the process of decay and renewal, and urban design is closely involved in this process of spatial transformation. But the connection between culture and space is not guaranteed. In some London boroughs, the speed of population change is so high that local authorities find it difficult to engage with the transient population, to find out about their needs and problems, or encourage them to engage in local affairs.

Throughout history, cultures have developed through being rooted in a particular place. When a culture remains in one place for long enough, it establishes a strong relationship with its natural environment, and its urban design becomes influenced by this environment. But when we separate culture from climate, as it happens to migrants, then designing for a particular culture becomes more difficult, as many traits that we know about that culture's use of space are direct responses to the climate and environment. In multicultural cities of the west today, this connection has been broken, and the diversity of culture and the short history of multiculturalism have not yet

led to a new dialogue with climate. If we design with the original features of a culture in mind, we are risking making proposals that may appear culturally sound, but environmentally flawed. For example, the use of courtyard housing in the Mediterranean and Middle Eastern areas has both cultural and climatic reasons; using it in other places, or even in these places with their changed cultures, may not lead to the consistency that it once had. While a migrating culture may keep some of its social habits and routines, its spatial habits may have to be adjusted with change of place.

Many cities are subject to modernization and transformation, a process in which they tend to lose their culturally specific features. If we look at cities around the world, we may see variety in their older parts, but similarity in their newer areas. What would a culturally specific new road be becomes a difficult, if not impossible, question, as roads have become subject to the logic of cars, rather than cultures. Differences of behaviour are of course still present in different cities, but not all differences are attributable to culture.

Therefore, a most important aspect of the city that urban designers need to consider is change. We do not design for a moment, but for a period of time that may be stretched for decades. At the same time, we have to take into account the needs of the present, rather than guessing about the future. The result is that we need urban environments that are responsive to our current needs, but are also flexible for the future. Rather than designing places with rigid and very specific features, which can soon become outdated, we should design places that can last for some time and adjust to changing circumstances. Therefore, culturally informed design is not, and should not be, static.

A trend in urban design is the idea of splitting the city into neighbourhoods, an idea that has been around for a long time, and despite criticisms and setbacks, continues to inspire urban designers and planners. It seems they are imagining a city of neighbourhoods, each with a different character or culture, all living happily side by side, offering their residents the possibility of life in a cohesive community, and offering visitors visual pleasure with a mosaic of exotic displays.

But the reality is quite different. Culturally diverse neighbourhoods are often the poorest in cities, with conditions that are far from these imaginations. Cities are often fragmented along income levels, and property market conditions keep the rich and poor apart.[49] If this social fragmentation coincides with cultural and ethnic fragmentation, the problems of social segregation and polarization tend to exacerbate, as can be seen in many cities in Europe and America. Rather than places in which ethnic and cultural minorities feel secure, they become places in which they are trapped.

Many larger cities have Chinatowns, which have been enhanced by their residents and local authorities with gates, lanterns and signs (Figure 6.9). Supporting a Chinatown may be seen as harmless commercial branding, or adding an aesthetic experience to the city, or acknowledging the process of

clustering that cities go through. It is an area that is seen as peaceful, open for visitors to go to restaurants and enjoy Chinese New Year celebrations. This is a form of territorial claim to a part of the city. But sometimes these claims, which follow the process of clustering and branding, become more controversial, or even conflictual. The example of the Jewish *eruv* in London can be mentioned, where marking a territory to make religious rituals possible was considered a cultural territorial claim and caused a long process of controversy. When adjacent territories are claimed by rival cultural groups, their conflict may become inevitable, as exemplified by Catholics and Protestants in Belfast. While a designer may think of a juxtaposition of interesting areas, the reality may become a scene of conflict and strife. While the designer may think of visual legibility through harmless distinction between neighbourhoods, the cultural landscape may become fragmented and explosive. Rather than a managed aesthetic experience, the city of neighbourhoods may become a battleground of differences of value and perspective, engrained in its spatial structure. If neighbourhood distinctions are superficial, the danger is creating a Disneyland effect; if they go deep, the danger is that they generate feuds and conflicts.

How do we design a multicultural city? It largely depends on how we envisage a multicultural city. Is it a city in which ethnic and cultural

Figure 6.9 Many larger cities have Chinatowns, which have been enhanced by their residents and local authorities with gates, lanterns and signs (Newcastle, UK).

groups live in separate enclaves, or one in which members of these groups are spread evenly across the city? Is it a city fragmented along ethnic and cultural lines, where each community has internal cohesion but limited exchange with other communities, or one in which different peoples mingle with one another and the city as a whole works towards social integration? Is it a city in which access to resources is distributed according to the membership of one of these enclaves, or where all have equal access to all resources, places and activities? One version of this multicultural city is a pluralist city, the other a socially fragmented one.[50]

If we accept the right to be culturally different, then the question is whether this difference remains a private matter or becomes a public issue. When the working classes got organized in unions, they wanted to address issues of concern for their members. When race and gender issues are used as mobilizing forces, the hope is that they can address the concerns of a class of people. A cluster of similarity, therefore, is a support mechanism, to create a collective effort to address mutual concerns. But when these concerns are addressed, or when individuals and households have felt strong enough, they have moved on to new areas and new circumstances. In the large metropolises across the world, which have absorbed many immigrants in a short period of time, some immigrants have lived near others from the same country, town or village, just to be on the safe side. But many have moved on when their economic conditions have changed.

Clusters of similar people and similar functions take shape in cities. So there is no question of opposing a process that frequently occurs in urban change. The question is whether it is a good idea to institutionalize it in spatial form, and give it new meanings and place in urban governance. Surely, we might wonder, if business owners in an area can get together to improve the conditions of their area, or residents of an area can generate collective agreements, then clusters of similarity may be seen as an effective way of arranging action in the city. As in other questions of urban governance, the question is whether it is democratic, and whether it complements or competes with democratic institutions.

The unspoken assumption or hope of multiculturalism is that culture provides a cushion for the new arrivals for their eventual integration into their new society. But when these cultures take dynamics of their own, and challenge the social majority, they are no longer a cushion or a collaborator, but a competitor. In a neoliberal atmosphere, in which economic revitalization takes centre stage, thereby promoting competition and individual achievement, the idea of using culture as a vehicle of social integration appears attractive. But when individuals and groups cannot find a role in the economic competition, and find themselves behind, they tend to ignore the rules of the game, and utilize the cultural means at their disposal to identify their social disposition and claim recognition.

People should be free enough to make choices. If they wish to live near

their kin, or be protected by a local network, then this choice in a democratic country should be open to them. If they wish to express themselves in any language, or wear clothes or display signs that they identify with, a pluralist society should be stable enough to allow this to happen. But these are essentially private freedoms and they should remain so. They are subject to public restrictions, which need to be collectively negotiated. And only democratic consensus, as expressed in the rule of law, should be the basis for these restrictions.

Individuals and groups should be able to display signs and symbols of their identity, should be able to shape their environments in the way they want to meet their needs. Sometimes this may be seen as a claim to territory, and hence causing concern to others. The way to do this is through a democratic process, in which individuals and households, as well as groups and organizations, participate in shaping their future, while allowing others to have their say, object to these ideas, and block them if necessary. So designing a multicultural city is the same as designing a democratic city, in which the residents are able to exercise collective self-rule and shape their future through working together, whoever they are and from whatever background. To ensure that this is an inclusive process, it needs to make these democratic processes available to all citizens, through various means, rather than keeping them under the control of the more powerful and articulate citizens.

For social groups to be able to live with others, they need to be open to change. Rather than defining the cultures as rigid and unchanging, the members of these cultures deserve the opportunity of defining their own life trajectory, rather than being subjected to a set of rules that treats them as similar to others, makes assumptions about their identity and intentions, and gives privilege to unelected community leaders. One of the achievements of the modern world was to develop the ability of shaping the future through collective self-rule, rather than following the rule of tradition, custom and kin.

At the same time, there is need for revisiting the liberal society's assumptions about who these individuals are, and allowing a wider, more flexible definition to be used, but keep the essential framework that respects the rights and freedoms of individuals to develop and flourish. The assumption that the society is made of a homogeneous majority and a number of marginal minorities needs revision. What appears to be homogeneous is itself made of a large number of sub-groups and multiple identities. In this case, we cannot think of an urban design for a culturally homogeneous majority that needs to be adjusted to incorporate the needs of cultural minorities. We have to talk about a sensitive urban design that tries to understand who it is working for and what needs it is addressing.

In a pluralist city, cultural identity can be carried around and expressed in public and private. It can generate social interaction and membership of

groups, and be expressed in the public realm, but it should not replace the formal political process, as this membership is not democratic or open to scrutiny. It becomes comparable to the state of religion in the secular democratic countries. In the UK, it can influence politics, but it is not often spatialized. When this happens, as in Northern Ireland, there is the possibility of conflict. This takes us to the nature of social groups: are they *gemeinschafts*, formed of links of blood and history, or *gesellschafts*, formed of contractual relationships? If the latter, then urban design becomes an expression of those ties; but in reality such ties are created in the post-industrial city, rather than inherited. The question is: are they open for scrutiny or are they formed by uncritical acceptance of a particular way of thinking and acting?

The positive aspect of a culturalist approach is that it questions the assumptions used in the definition of good society. Its shortcomings, however, are that it ignores economic and political considerations, it undermines the rights and freedoms of individuals, uses a static interpretation of culture and space, resorts to undemocratic means, and risks exacerbating social fragmentation. This is why a purely culturalist approach can be more limited than an approach that takes cultural, as well as economic and political considerations into account.

Conclusion

The early assumptions about the autonomous self have been qualified by acknowledging that it is embodied and embedded, while it enjoys a degree of autonomy at the intersection of the biological and social forces. Therefore, the use of human reason to shape cities has been exposed to the challenges of nature and society, expecting an urban design that addresses the material and social vulnerabilities and contexts. Stratification and individualization have been challenged by holists, who have promoted togetherness in society and space, either in standardized mass-produced environments or in fragmented small new towns and neighbourhoods. While one suppresses difference, the other exaggerates it, both struggling to meet the challenges of diversity. Meanwhile, socially conscious design can only take place through a democratic process, which, through extra support, helps the vulnerable groups engage in the process of city building. Rather than a sweeping vision of the future, the result has so far been many small steps to address particular needs of particular groups. Rather than a static understanding of cultural diversity and promotion of socio-spatial enclaves, the possibility of change and exchange needs to be appreciated. The vision of the shape of the good city needs to be constantly under development, rather than being finalized.

Part II

Frameworks

Chapter 7

Keeping time

Descartes' famous method consisted of four stages. In the first stage, he searched for a solid foundation, which he found in human intuition. In Part I, we investigated some of the key foundations that have shaped our beliefs and actions through the ages; actions which include the design and development of cities. The second stage of the Cartesian method was to subdivide phenomena into their constituent parts: 'to divide each of the difficulties that I was examining into as many parts as might be possible and necessary in order best to solve it.'[1] Breaking down phenomena into their constituent parts and regrouping them in new ways is one of the oldest methods of applying reason to human affairs, as exemplified by Plato and Aristotle. Aristotle, for example, used this analytical method extensively: 'We have to analyse other composite things till they can be subdivided no further, because we have reached the smallest parts of the wholes.'[2] The wholes, therefore, could be understood through understanding their parts. After this stage of analysis, the Cartesian method had a third stage for synthesis: 'to conduct my thoughts in an orderly way, beginning with the simplest objects and the easiest to know, in order to climb gradually, as by degrees, as far as the knowledge of the most complex, and even supposing some order among those objects which do not precede each other naturally'.[3] In justifying his method, Descartes spoke of geometers, who were accustomed to using these long chains of reasoning, deducing one thing from what preceded it. Part II deals with these analytical and synthetic stages of reasoning and their implications for urban design and development, focusing on the problems of time, space, meaning, value and action.

One of the characteristics of a city of reason, where everything is organized on a rational basis, would be that everything runs on time. In a place where cars are stuck in traffic jams, trains and aeroplanes are late, events do not start on time, and appointments cannot be kept, people complain that it is not functioning well. To remedy this, individuals are trained to manage their time better and organizations to function more efficiently. As complex organizations, cities are also called to be reorganized for better

time management. This has often led to searching for changes to the organization of the city's physical environment and its routines of social activities so that there are no delays, and nothing could prevent the city from working like a clock. Searching for an ever more efficient use of time seems to characterize this overall approach, which has dramatically changed our cities and societies.

In this chapter, we will investigate the relationship between time and city, and the impact of this relationship on the life of citizens and their environment. Calculative reason segments phenomena to reconstruct them in new ways. The main concern in this chapter will be how time is segmented and recomposed to suit our changing needs. This process has been in the making for thousands of years, which is why we need to have a glance at how it has evolved. This shows us how time has been measured and how this quantification has led to a more abstract notion of time.[4] We will also explore some of the ways in which time is conceptualized and understood. In what ways have these concepts and interpretations affected the organization and life of cities? How is time treated in a city and how does this treatment shape the city? How do we as individuals cope with these abstract notions and public infrastructures?

Ambiguities of time

Dictionaries offer a large number of entries for time. The *Oxford English Dictionary* starts its list by the most general definition: 'the indefinite continued progress of existence, events, etc., in past, present, and future regarded as a whole'.[5] Defining time, however, has been a longstanding, but hard and inconclusive, preoccupation of philosophers since antiquity. As we see from a number of ancient attempts, many appear to be circular definitions, using temporal notions to describe time. These include, 'a moving image of eternity' (Plato); 'the number of movement in respect of the before and after' (Aristotle); 'the Life of the Soul in movement as it passes from one stage of act or experience to another' (Plotinus); 'a present of things past, memory, a present of things present, sight, and a present of things future, expectation' (Augustine).[6] In his *Physics*, Aristotle posed a number of paradoxes or problems about the very existence of time. One problem, for example, is that the present instant cannot be counted as time, for it has no duration, and thus time cannot exist when none of its parts can.[7] As he put it, 'One part of time has been and is not, while the other is going to be and is not yet. Yet time – both infinite time and any time you care to take – is made up of these. One would naturally suppose that what is made up of things which do not exist could have no share in reality.'[8] In other words, if we take away all that does not exist, we are left with 'now', a fleeting moment which cannot be captured, as it vanishes as soon as we try to do so.

The *Oxford Companion to Philosophy* defines time as the dimension of change, a fact that distinguishes it from the three dimensions of space.[9] This relation with space is one of its major features. For the *New Penguin Dictionary of Science* time is one of the four coordinates of space-time that defines events.[10] The relationship between time and change is also significant, as many scholastics, ancient and modern, have believed that time cannot be conceptualized in isolation from movement.[11] The direct relationship between time and measurement is reflected in the definition of time by the *Macmillan Encyclopaedia*: 'a concept that measures the duration of events and the periods that separate them'.[12]

Segmenting and measuring time

Measuring time is the ability to assign numerical value to what is after all not observable or subject of direct experience (Figure 7.1). It is a way of conceptualizing a part of nature and bringing it under a form of order, so that it can be understood and utilized in new ways. Unlike the three dimensions of space, time cannot be seen and therefore measuring it and subdividing it have presented a more difficult challenge to humans.

Segmenting time and space begins with the start of human settlements 10,000 years ago, and within four millennia reaches its first major milestone in ancient Mesopotamia, where reasoning, writing and religion emerged.[13] Some have argued that writing, as a system of markings on bones for keeping time, can be traced back to the last ice age more than 20,000 years ago. Others have interpreted the circular structure of stones in Stonehenge as a way of timekeeping.[14] It is with certainty, however, that we can trace the emergence of timekeeping to Mesopotamia in the fourth millennium BC. The use of words and tools, i.e. language and technology, long preceded the ability to transform land through agriculture and settlement. For thousands of years, hunting and gathering societies used tools to protect and feed themselves and words to communicate and plan for their actions. Tools and words, therefore, were the early manifestations of complex purposeful action. Although there were early systems of timekeeping and spatial understanding, it was the start of the human settlement that witnessed the necessity of reckoning time and space in a more systematic way.

The basic unit of timekeeping for all human history has been the day. The regular pattern of day and night has ordered human biological and social life. The day was naturally subdivided into a light and a dark period. In many languages, there is no word for the 24-hour cycle. In English, day refers both to the period of daylight as well as to the complete cycle of day and night. Further subdivisions of the day were made, using words such as daybreak, sunrise, morning, noon, afternoon, twilight, etc., words which are still being used despite more accurate ways of measuring

Figure 7.1 Measuring time is the ability to assign numerical value to what is after all not observable or the subject of direct experience (Prague, Czech Republic).

time. The ancient Greeks used descriptive phrases for these periods, such as 'when the cock crows' and 'when the market-place is full'.[15] The English word hour originated from the ancient Greek word *hora*, referring to season and time of day.[16]

While the day is a natural phenomenon, subdivision of the day into hours, minutes and seconds has been a human invention, an attempt to impose a rational structure onto time, creating a new concept of time. This was a marriage of numbers and time. The ancient Egyptian and Mesopotamian priests and astronomers were the first to divide the day into hours. By 2500 BC, Egyptian priests were dividing the night into 12 equal parts, followed later by an equal 12 parts for the day, resulting in a 24-hour day. These, however, were 'unequal hours', as periods of daylight and darkness differed throughout the year, although this is minimized near the Equator. The Babylonians' interest in astronomy, and their arithmetic system based on the number 60, led them first to divide the whole (24-hour) day into six equal parts, a forerunner to our system of 24 'equal hours'. Later they subdivided the hours into 60 minutes and the minutes into 60 seconds. According to Aveni, it was the Babylonians' desire for uniformity, rather than accuracy, that affected their rational way of marking time.[17] These very accurate ways of measuring time, however, were only used in astronomy and not in daily life. For their everyday life, the Egyptians and Babylonians used a system of unequal hours, which the Romans also adopted, as shown in sundials found in their towns and cities. Systems of unequal hours have been continuously in use, in Europe until the end of the Middle Ages, and in some countries such as Japan even as late as 1870.[18] For thousands of years, the second was the smallest unit of time. Now, with the help of new technologies, which count the natural oscillation of microscopic matter, seconds are subdivided further into smaller units, though no longer by the multiples of 60. Sports competitions regularly use hundredths of seconds, while in science laboratories seconds have been split into *micro* (millionths), *pico* (billionths) or even *femto* (quadrillionths).[19]

The day was the natural unit of time and its subdivision into exact units has been a longstanding effort. Longer than the day, two other natural cycles were also used to establish a calendar: month and year. The natural month was based on the average time from one new moon to the next, which took about 29.5 days. As a recurring display in the skies, the regularity of the moon's appearances must have been recognized long before the dawn of urban living and used as a basis for rites and rituals. The moon's appearance in the sky could affect the tides, a sure sign that the heavens had magical powers over the earth. Furthermore, monthly body rhythms had an impact on the normal life routines, such as the menstrual period, which takes its name from the Latin *mens*, meaning moon.[20] The lunar month continues to this day to be used in Jewish and Muslim

calendars, while Christians use it to calculate the date of Easter and other festivals. Lunar religious calendars were developed early on in Egypt and Mesopotamia, and the first accurate calculation of the length of the month was by the Babylonians in 300 BC.[21] The emergence of the calendar in ancient Greece was related to the necessity for the regulation of the religious cult, and the god Apollo was the patron of time reckoning in months.[22] The Romans used a lunar calendar, until they abandoned it in the Julian reform in 45 BC,[23] when 12 months of 30 and 31 days were introduced, a system which lasted for 16 centuries. The problem of relating the lunar religious events, especially the timing of Easter, to the solar calendar, led to a new reform ordered by Pope Gregory XIII in 1582. The Gregorian reform was immediately adopted by the Catholic countries, resisted first and adopted later by Protestants (e.g. in 1752 in Britain), and much later by Russia, where it was adopted after the Bolshevik Revolution of 1917.[24] The days of the month were given individual names in ancient Persia, and when the name of the month and of the day coincided, people celebrated. Now, numbers mark the days of the month, which is an indication of a move towards abstraction and use of arithmetic, though some tribal communities continue to name their days.

The other natural unit is the year, the period of time that the earth makes a complete orbit around the sun, nearly 365.25 days. Counting years was developed later than lunar months, as it was not a necessity for hunting societies. They followed the animals they hunted, which in turn made a seasonal migration in search of food. The need for a yearly calendar emerged in close connection with the formation of settled communities 10,000 years ago. The start of human settlements was when life routines began to be more closely tied with seasonal, meteorological events. As agrarian communities developed, their economy became mainly based on management of land, in turn linked to their understanding of weather patterns. Agriculture needed planning, to know when to sow the seeds and when to harvest the crop. Astronomical events and agricultural rhythms were both reflected in religious rituals and festivals. For centuries, different towns had different ways of calculating a year, as to how many months made a year, and it needed a centralization of power to establish a unified system of calendar.[25] The Egyptians introduced a civil calendar of 12 30-day months, with the addition of five extra days to make the year 365 days,[26] a system also used by the ancient Persians and, as we shall see, by the French revolutionaries.

Seasons also form a natural cycle, though they differ in length in different climates, and not all cultures have identified four equal seasons. However, they have been fixed by the calendar, which is an imposition of an order that does not neatly correspond to the natural seasons. Spring and autumn start with an equinox (21 March and 21 September), and summer and winter with a solstice (21 June and 21 December). In the

Persian calendar to this day, the four seasons correspond to the 12 zodiac months, so that the new year starts on the day of spring equinox and each season has three full months.

Even less natural than fixing the seasons was the invention of the week. The agrarian life and the establishment of towns and villages coincided with the division of labour and the rise of artisans and craftsmen, who presented their products in markets for exchange with farmers for food. Trade was then the basis for regular market days, which may have determined the week, as the period between two market days. In religious terms, the week of seven days was based on setting aside one day for rest and prayer. Although ten-day weeks were used in the Egyptian and Greek calendars and four-day weeks in some West African tribes, it was the Mesopotamian seven-day week that won the day. Seven was regarded as a mystical number and four weeks of seven days roughly corresponded to the month.[27] As the names of the weekdays suggest, there was a close connection between the week and astronomy. Their names were those of the celestial bodies that move regularly in the sky and were known before the invention of the telescope: Sun, Moon, Mars, Mercury, Jupiter, Venus and Saturn. Although the formation of the week is mainly explained by social and astronomical factors, there are some biologists who believe in a seven-day biorhythm in the human body, as evident in minor variations in blood pressure and heart beat, as well as responses to infection and organ transplant.[28]

The subdivision of time into the smallest possible units, and the reconstruction of these units in new ways, is one of the major manifestations of the rational method at work. We have subdivided the day into hours, minutes and seconds, and have constructed a calendar based on weeks, months, seasons and years, all relating to each other in a hierarchical way. There is a link to the natural phenomena, as days, months and years relate to the planetary movements. This link, however, has been fixed, so that the time's subdivisions and their application can be made predictable and usable. The subdivisions are all given numbers, so that all hours of the day, all days of the month, all months of the year have numerical values, as do years, decades, centuries and millennia. Although some periods are marked by names or characters, such as the 'Middle Ages', the 'Victorian period' or the 'Swinging Sixties', it is predominantly the numbers that are used to mark the time. The process of measuring time, then, seems a combination of an analytic and a synthetic process, which breaks down a phenomenon into its real or invented constituent parts, and then puts these parts into a clearly defined, vertical relationship with each other. It establishes a number of axioms, such as the existence of minutes and seconds, etc., and then relates these axioms to each other through mathematical relationships, the result of which is the measured time. It then correlates this set of axioms and relationships to the past, present or future events and processes.

Measuring time is closely associated with the desire to impose an order on a phenomenon that is out of reach and invisible, which we can feel but can't capture with our senses, holding it in our hands or seeing it with our eyes. The next best thing, if it cannot be seen, touched or explained, is to frame it, to classify it and to assign numbers to it. In this way, an order has been created out of an invisible flow, described by many poets and writers as the movement of a river, which is potentially wild and unpredictable. The order of the measured time becomes a tool to control the flow of events and the rhythm of our own behaviour. As society has become more urbanized and its organization more complex, measuring time has become more precise, moving away from the natural phenomena and their cycles and into a more abstract realm of numbers. Application of mathematics in this way to dominate nature, the move from concrete to abstract, has for long been considered as a move forward, as a sign of progress, as reflected in this sentence, 'Counting is abstract, the primitive man clings on to the concrete phenomena of the outer world.'[29]

Measured time as a public infrastructure

After the introduction of mechanical clocks in the fourteenth century, the use of equal hours gradually replaced the previous unequal hours of the daylight and of prayer times. It was now possible to keep the time, but major problems included how to relate it to the natural phenomena, and how to set up commonly agreed frameworks.

Agreeing on a common universal framework took a long time to develop. A major problem was when to start counting the equal hours. Astronomers had used noon as the starting point, while some preferred sunrise (called Babylonian hours) and others sunset (called Bohemian or Italian hours) as the starting point for counting the hours. Europeans gradually adopted equal hours counted from noon and midnight, although Italy accepted these as late as the nineteenth century, due to religious practices. The other problem was whether to use two 12-hour cycles or one 24-four-hour one, a variation that still persists today.[30]

The relationship between timekeeping and natural phenomena was also another problem. The length of the day was calculated as between two consecutive noons. However, the true solar noon, as shown by a sundial, could be up to 16 minutes ahead or behind an evenly running clock, due to the tilt of the earth's axis and the elliptical shape of its orbit. To solve the problem, an imaginary 'mean sun' was invented in the seventeenth century, with a perfectly uniform pattern of movement in the sky.[31] In 1956, the basis of time measurement was redefined in terms of the earth's yearly motion around the sun, a system called Ephemeris time. A second was the fraction 1/86,400 of the mean solar day. The exact definition of the mean solar day, however, proved to be unreliable due to irregularities

in the rotation of the earth.[32] Later, atomic clocks were used to replace the astronomical basis of timekeeping, so that in 1964, the definition of second was based on the vibrations of the Caesium atom.[33] This 'atomic second' is the time that an electron takes to pass from one energy state to another.[34] The International System of Units (SI) defined the second as 'the duration of 9,192,631 periods of radiation corresponding to the transition between the two hyperfine levels of ground state of the caesium 133 atom'.[35]

Yet another problem was to find a common framework between different towns within a country or between different countries of the world. By the nineteenth century, different towns in Britain had different local times; for example there was a difference of 20 minutes between London and Cornwall. With the introduction of (especially long-distance) trains, these differences were no longer tenable, as accuracy of train timetables would not be possible. A standard that was already being used for navigation, Greenwich Mean Time, was adopted for all local times in Britain, a time popularly known as 'railway time', legalized in 1880 by parliament (Figure 7.2). There were also differences between different countries (four minutes between France and Britain) and between different parts of large countries,

Figure 7.2 Introduction of trains in the nineteenth century revealed the differences between local times, which were replaced by a standard 'railway time', as displayed in Paddington Station (London, UK).

such as the United States. Greenwich Mean Time (or Universal Time as known by scientists), was adopted as an international standard for time zones, where one hour corresponded to 15 degrees of longitude.[36]

At the end of the eighteenth century, the French Revolution imposed a symmetrical order on time. Years would start at the autumn equinox, divided into 12 months of 30 days (with a five-day extra period at the end of the year), named after seasonal conditions which characterized them, such as mist, frost, snow, germination, harvest. Months were divided into three weeks of ten days, days into ten hours of 100 minutes, and minutes into 100 seconds. This decimal order lasted for 14 years, before being abolished by Napoleon, who returned to the Gregorian calendar.[37]

Standardization can take place through gradual popular acceptance of certain standards, or through the adoption of standards by the authorities. In a world where complex systems of information and transportation rely on extremely precise systems of timekeeping, the power of these points of reference is undeniable. It was the might of the British Navy that in 1884 established Greenwich Meridian as the starting point of time zones in the world, establishing the universal or world time. Now the US Navy's Time Service Department is the official source of time for the Department of Defense and the Global Positioning System, and a standard of time for the country. In one of its recent computations, it used 59 atomic clocks to arrive at its mean time.[38] There seems to be a direct relationship between power and standardization.

The nature of the public infrastructure that is shaped around such standards consists of some widely accepted conventions plus a variety of objects, discourses and practices that grow around those conventions. Altogether, a public infrastructure is a social institution, which is reflected in, and able to influence, social practices and beliefs, as well as physical environments. By timekeeping, individual experiences and behaviour are ordered through an external framework. Measured time then becomes an abstract, commonly shared framework on which we rely to be able to do things together or in relationship with one another. Whereas an individual's sense of time is an internal feeling and experience, the measured time is an external framework for communication and action.

A highly organized society needed public ways of keeping time, from sundials to clock towers and transportation timetables. In ancient civilizations, religious festivals and events were organized by temples and occurred on specific days. In ancient Greek and Roman cities, sundials were displayed in public places. Making sundials and water clocks required particular skills, as exemplified by Vitruvius's instructions.[39] In the Roman forum, the passage of the sun between two most prominent buildings, the Rostrum and the Grecostasis, marked the noon hour, which was shouted out by a timekeeper. In the ancient Aztec capital Tenochtitlan (present-day Mexico City), the announcement, made from a round temple

in the plaza in front of the great Temple Mayor, marked the opening and closing of the market and the times of prayer, as well as the departure of warriors and the beginning of the games.[40] Mayans were so obsessed with time that their calendar was more precise than the Gregorian calendar which is currently used in the west. Each day was divine and every monument and every altar they erected was to mark the passage of time.[41]

In medieval Europe, this public framework was set by the church bell, which reminded people of the canonical hours, the time to perform their seven daily prayers.[42] In the Muslim Middle East, this was done through muezzin who, from the mosque's minaret, called people to their five daily prayers. In both cases, the name of each prayer could also be used to denote a time of the day. The significance of the bell tower and the minaret in the urban landscape, therefore, was not only to offer religious guidance or visual landmarks. They were also putting in place a framework for time, so that the sense of time and the patterns of behaviour in the town were routinized and collectivized, as promotion of new forms of discipline has been one of the main features of highly organized religions. In their heyday, bell towers had both spatial and temporal significance, being essential means of establishing a temporal order, as well as being landmarks for navigation in the city and giving it a visual, spatial order. With the transformation of their temporal significance, the bell towers and minarets have only kept their spatial and visual role, which may not always be close to its original cultural meaning. Many of them now function as aesthetic landmarks, rather than pillars of a public infrastructure for timekeeping and controlling social behaviour.

In medieval Europe, as in ancient Mesopotamia, the rise of towns coincided with the rising significance of timekeeping. The medieval town in Europe was a place of commerce, and its public and private spaces used for exchange and trade.[43] The need for an effective operation of the markets and the growing complexity of town bureaucracies led to the multiplication of clock towers, which marked the beginning and ending of work, opening and closing of the market, the start and end of curfews, and calling people to assemblies.[44]

While for a long time the maintenance of time as a public infrastructure was held by religion, the modern period saw science taking on this role. John Locke wrote in 1690, 'Duration ... is one common measure of all existence whatever.'[45] As time became standardized and secularized, clock towers became the means of setting up this framework. But the nature of timekeeping was now more abstract and it could be used for different purposes. As timekeeping has become a more essential part of social life and as watches enabled individuals to have continuous access to measured time, the significance of clock towers or public clocks has been reduced. All the instruments that we use today are either formatted on the basis of measured time, a public timetable, such as in radio, television, buses, trains

and aeroplanes. Or they operate on the basis of a private timetable of our choosing, such as in microwave ovens. Or they have integrated time as one of their main functions, such as in phones and computers. They all remind us of measured time, and in doing so ensure our everyday life experience is set within a commonly held temporal order. At one point, a city's skyline was a display of the public infrastructure of time; now these symbols of timekeeping have multiplied and integrated into the urban scene in many different forms.

Construction of an order: linear or cyclical time

Searching for an order, and finding solutions to that which appears to be disorderly, have always kept human minds engaged. As a Nobel laureate scientist suggests, the law–event duality lies at the heart of the conflict that has run in the history of western thought:

> Laws were associated to a continuous unfolding, to intelligibility, to deterministic predictions and ultimately to the very negation of time. Events imply an element of arbitrariness as they involve discontinuities, probabilities and irreversible evolution. We have to face the fact that we live in a dual universe, whose description involves both laws and events, certitudes and probabilities.[47]

Our in-built capacity for calculation of time is closely associated with a biological sense of time. This draws on a repetitive regularity that can be observed in the biological rhythms and patterns in which we live: rhythmic breathing, cycles of birth and death, as well as in the external natural rhythms of day and night, cycles of seasons, and astronomical constellations. These natural recurrences and rhythms create a framework that suggests a degree of regularity rules the world, and encourages humans to search for more routines and regularities. At times, it only required imagination to connect several observable patterns to invent abstract, universal regularities that may or may not actually exist.

The ever repeating natural cycles, day and night, tides, seasons, phases of the moon, etc., are the broad frameworks within which all life forms live their lives. In response to these recurring cycles, plants and animals perform some of their basic functions: as leaves grow and fall and animals mate and hibernate. This is 'a continuous sequence of events with neither beginning nor end, the past forever repeating itself'.[47] It is within this cyclical repetition of events that human societies in many parts of the world have developed a cyclical notion of time. This is a commonsense notion that sees human social and historical events repeating themselves in the same sense that the biorhythms of the natural cycles do. If our biological world is ruled by the metronomic beats of natural cycles, it may follow

that short or long cycles are the essential rhythms of the social world: from life and death of individuals to the succession of kings, occurrence of floods and earthquakes, and even the creation and destruction of the universe. The wheels of time may be conceptualized as static (as for ancient Hinduism), progressive (as for Maya and Inca civilizations) or even degenerative (as for pre-classical Greeks). Many modern cosmologists still believe in cyclical time; that there could have been previous universes before the Big Bang and many to follow afterwards.[48] This has led to controversies on whether time had a beginning and an end.[49] Even the theory of the birth of time, i.e. the birth of the universe through the Big Bang, follows the rational methods of analysis and synthesis: a reverse reasoning that goes back to an initial event, and the subsequent regrouping of objects to shape the cosmos, galaxies with their stars and planets, relating to each other in definable orders.

Whereas in the cyclical notion of time, rituals and festivals are associated with the natural cycles, the linear time traces a cause and effect process (Figure 7.3). Inherent in the notion of causality, of causes and consequences, is a linear notion of time. As the proverb has it, one thing leads to another, which is an indication of a sequence of related events,

Figure 7.3 Two interpretations may exist side by side. Natural cycles have historically generated a cyclical sense of time, whereas the chains of cause and effect have created a linear notion of time in the modern life (Tokyo, Japan).

a temporal order through which objects and events are related to one another in a linear fashion. Following the cyclical or linear interpretation of biological and cosmological time, social and historical time has also been seen as cyclical or linear.

One of the key units with which we measure time is our total experience of life, our lifetime. It is about what we have experienced and remember from birth until the present time. A series of events, images, people and places, as they happened to us, or as we remember them, make up our lifetime experience. This is a linear experience, as we remember our lifetime. The memories will not be necessarily recounted in neat sequences; they could be disrupted and patchy, sowing the major events and significant memories together in a line. Some memories may be associated with specific dates, but the main way of remembering them is through experiences, rather than the number of years in which they took place.

Inherent in the notion of linear time is the idea of time flowing in the direction of future, and that this is associated with progress, that the future will be better than the past. In the same sense that an individual human being attempts to improve his/her conditions throughout a lifetime, some have interpreted societies to follow the logic of progress through their histories, improving their conditions. Before Christianity, apart from a few writers such as Seneca, it seems only Zoroastrians, who believed in the final victory of good over evil, and Jews had thought of history as progressive rather than cyclic.[50] The Christian concept of Second Coming, that the timeline ends in the return of Christ and a kingdom of God, lay at the basis of a teleological notion of time in the medieval period, a linear concept of time. The ideas of an end to the world and a day of judgement were also found in other religions, such as in Islam, where the Shiite Muslims believe in the return of a saviour, or in Buddhism, where nirvana ends the cycle of reincarnation. The flow of linear time as a potent and irreversible force has been used in literature by many writers and poets. One striking meditation upon it was elaborated by Omar Khayyam.[51] In Edward Fitzgerald's translation, he wrote:

> The Moving Finger writes; and, having writ,
> Moves on: nor all your Piety nor Wit
> Shall lure it back to cancel half a Line,
> Nor all your Tears wash out a Word of it.[52]

During the Middle Ages, there was a conflict between scientists and scholars, who emphasized the cyclical concept, and the merchants and the bourgeoisie, who preferred the linear concept of time, which was associated with money.[53] With the rise of the money economy, and the reduced influence of astrology on science, the linear time won the battle. It was, there-

fore, the rise of modern economy and science at the end of the medieval period that heralded the now prevalent concept of linear time. The Renaissance discovered time in a new light, as reflected in the visual arts. Representations of time in the classical art were shown as fleeting opportunity or as creative eternity. During the Renaissance, however, time was represented as the destroyer, equipped with hour-glass, scythe or sickle.[54]

The post-Renaissance world, where the western economies and societies have generally enjoyed a dramatic development and continued prosperity, and the belief in human capacity for progress which characterized the Age of Reason, have firmly established an optimistic outlook. Furthermore, understanding the natural evolution processes and investigations into the origin of living species have created a sense of linear development towards more complex biological forms. The development of science and technology and complexity of social functions and organizations have all shown a line of cause and effect, whereby human effort appears able to change human conditions for the better. The result has been looking down on the past and contemporary societies associated strongly with the past, those considered to be 'traditional', regarded to be infested with superstition and limited in their ability. This inability in dealing with time was particularly reflected in fatalism. On the contrary, the ability to impose a linear, abstract notion on time has been regarded as a sign of progress, breaking from a discontinuous perception of time and distinguishing the modern society from its predecessors.

Almost all human civilizations, especially those that have experienced the cyclical rise and fall of their fortunes throughout their long histories, experiencing periods of affluence as well as poverty, have developed a cyclical mentality, expecting each cycle to come to an end before another starts. The linear notion of time has been developed in the segments of these cycles, when overall development has been sustained for a considerable amount of time, as in the modern west. It is for the same reason that some periods of economic decline have brought with them a strong criticism of linear time and equating modernity with progress, as exemplified in the postmodern thought in its ascendancy in the last quarter of the twentieth century.[55]

This applies even to shorter periods of time, such as the economic cycles in the market economies. Some see these cycles of boom and bust (and even longer, 30-year cycles called Kondratieff waves) as inevitable features of the market economy's logic of production and consumption, hence taking an essentially cyclical interpretation of the economic time. Others see these cycles as parts of an overall linear development, whereby the overall economy and society develop and grow stronger. A large-scale version of this view was Marx's theory of history, which believed in cycles of growth and decline for different modes of production within an overall

linear pattern of development and progress. Yet others see the segments of these cycles as linear. Towards the end of the long economic boom in the 1990s, some were starting to believe in a linear progress, where market downturns were no longer expected to happen. This, however, came to an end at the beginning of the twenty-first century with a downturn, where the cyclical nature of the market operation was revealed once again.[56]

The idea of designing a rational city is embedded in the notion of linear time, as by definition the result would be better than before, hence subscribing to the idea of progress that can be achieved through purposeful action. However, the question that emerges is whether these lines are singular or multiple. Is there a single line through which everyone is expected to travel, as some theorists of modernization would hold, whereby modernization equates with following some avant-garde trends or places? Or are there many lines, which can be pursued, so that individuals and groups can evolve, without imitating others? The latter would offer a multiplicity of available paths, rather than the tyranny of a single path.

Selecting the point of reference: relative and absolute time

The influence of mechanical clocks on the conception of time was far-reaching. In Lewis Mumford's view, it 'dissociated time from human events and helped create the belief in an independent world of science'.[57] Kepler rejected the quasi-animated and magical ideas of universe and compared the universe to a clock. A mechanistic conception of nature emerged that dominated natural philosophy from Descartes to Kelvin.[58]

While time was previously considered to be discontinuous, now it was seen as homogeneous and continuous, a view greatly influenced by the arrival of mechanical clocks, which could work continually for years. These characteristics were implicit in the idea of physical time in Galileo's work, published in 1638, which represented time by a geometrical straight line.[59] In 1687, Isaac Newton wrote about the idea of absolute time as an independent entity flowing at a uniform rate. For him, 'Absolute, true and mathematical time, of itself and from its own nature, flows equably without relation to anything external.'[60] Three years later, John Locke wrote, 'Duration is but as it were the length of one straight line *in infinitum*, not capable of multiplicity, variation or figure, but is one common measure of all existence whatever, wherein all things, whilst they exist, equally partake.'[61] Leibniz, however, disagreed with the idea of absolute time. For him, events were more important than moments, which are merely abstract concepts. Time, therefore, was not a thing in itself, but the order in which events happen. Leibniz promoted a relational theory of time, which holds that time is based on the relationship between events and not the other way round. Nevertheless, Newton's theory was domin-

ant throughout the eighteenth and nineteenth centuries. The concept of a universal time that existed in its own right was so deeply held that the introduction of 'daylight saving' (Summer Time) in the United Kingdom in 1916 caused an uproar, as interfering with 'God's Own Time'.[62]

The opposing views of Newton and Leibniz on absolute and relational time were a new version of an ancient controversy between Plato and Aristotle. Plato believed in the absolute notion of time, conceptualizing it as an empty container that exists independently, in which events may be placed. This is called Platonism or absolutism with respect to time. Aristotle, in contrast, believed that time does not exist independently of the events, a view that is called reductionism or relationism with respect to time.[63]

Leibniz agreed with Newton about the non-relative and frame-independent nature of time. With Albert Einstein's general and special theories of relativity, frame-independent notions of simultaneity and duration were abandoned.[64] Time was now completely related to the frames in which it was being experienced. As Einstein put it:

> all judgments in which time plays a part are always judgments of *simultaneous events*. If, for instance, I say that 'that train arrives here at seven o'clock', I mean something like this: 'the pointing of the small hand of my watch to seven and the arrival of the train are simultaneous events . . .'[65]
>
> It might appear possible to overcome all the difficulties attending the definition of 'time' by substituting 'the position of the small hand of my watch' for 'time'. And in fact such a definition is satisfactory when we are concerned with defining a time exclusively for the place where the watch is located; but it is no longer satisfactory when we have to connect in time series of events occurring at different places, or – what comes to the same thing – to evaluate the times of events occurring at places remote from the watch.[66]

It was not possible to accept worldwide simultaneity for all observers. It appeared that, with respect to an observer, a moving clock would run slower than an identical clock at rest. This meant time was relative to the observer, rather than being an absolute entity (Figure 7.4). In this way, Einstein's theory of relativity is not compatible with Newton's absolute time, but in keeping with Leibniz's relational time. Leibniz's linking of time with events corresponds with Einstein's multiplicity of time-systems associated with different observers. According to Whitrow, 'whereas for Newton time was independent of the universe and for Leibniz it was an aspect of the universe, Einstein's theory leads us to regard it as an aspect of the relationship between the universe and the observer'.[67]

It is this rising significance of subjectivity, marking the transition from the universe to the observer, that lies at the core of the changing interpretations

Figure 7.4 The experience of time is relative to the observer, not only at the speed of light, as Einstein had shown, but also in everyday experiences such as being static or mobile, near or far, etc. (Shinjuku train station, Tokyo, Japan).

of time. In a sense, the new scientific interpretations of time get close to the idealist interpretations such as Kant's. He saw time as a subjective condition: 'Time is not something objective. It is neither substance nor accident nor relation, but a subjective condition, necessary owing to the nature of the human mind.'[68]

Newton's theory fails in its application to very large masses, such as blackholes, where gravitational force becomes enormous, and where bodies move at near-light speeds, areas where the theory of relativity seems to be the answer. Newton's mechanics also fail in application to the smallest scales of atomic and sub-atomic particles, where quantum physics seems to provide the explanation. However, while Einstein's relativity is valid for large-scale objects and high speeds, it seems to fail to account for certain conditions, such as the 'singularities', as exemplified in the Big Bang's super-dense fireball, where space, time and matter break down. Furthermore, the connection between relativity and quantum physics remains problematic. Outside these two extremes of very large and very small scales, at a scale that human senses can directly deal with, the discipline known as thermodynamics applies.[69]

Our timekeeping in everyday life is still based on the Newtonian universal and uniform time, as relative time can only apply at higher speeds and in particular circumstances. The way human societies operate is essentially through imposition of an abstract, universal framework of time on multiple experiences of individuals and groups in different places and conditions. The public infrastructure of universal time still rules our lives today.

Selecting the point of reference: A-theories and B-theories of time

A and B theories of time refer to a distinction between the way time is perceived and interpreted with regards to its direction and its relation to the human mind. McTaggart, an Idealist philosopher writing at the turn of the last century, used the term 'A-series' to refer to the ordering of events as past-present-future. He argued that this leads to a contradiction, as being past, present and future are incompatible properties, and yet each event has all the three dimensions.[70] On the other hand, he identified the 'B-series' as an ordering of events as earlier-simultaneous-later, with no reference to their place in the past, present or future.[71] Events are understood as relating to each other, ordered by a 'betweenness' relation, in which each event is fixed and no change takes place in its position.[72]

Our commonsense notion of time divides it into past, present and future; into what has gone and is closed, what is now, and what is yet to happen and therefore relatively open (Figure 7.5). Indeed, some argue that the ability to distinguish between past, present and future is uniquely human, not found in other animals.[73] For A-theorists, this intuitive distinction is an objective one; it exists independently of human experience and consciousness. Time is asymmetrical, flowing in the direction of the future. Even if there were no sentient beings, the present is real, the past has happened and was real, and the future has not yet happened and is unreal. B-theorists, however, find this segmentation of time problematic. The distinction between past, present and future merely reflects our perspective, and therefore is mind-dependent. In the same sense that all spaces are real, i.e. *here* is as real as *there*, they argue that all times are equally real and thus doubt that there is a flow of time. For B-theorists, we occupy a stretch of time in the same way that we occupy a stretch of space, and the advent of birth and death do not alter the reality of this experience.[74] This is a spatialized view of time, seeing symmetry between the past and the future, which removes the need for the metaphor of flow of time. It is a third-person viewpoint that removes the human mind from the centre of representation, to allow for seeing time as a sequence seen from outside, rather than an experience seen from inside. Spatializing time, however, is seen as problematic (by Whitehead and Bergson amongst others), as failing to grasp that we are in time and not located in it.[75]

Figure 7.5 The experience of time is relative to the present, hence the notion of flow of time in a direction from the past to the future (London, UK).

The notion of flow of time, that time has a direction, unlike the three dimensions of space, is sometimes expressed as the arrow of time. The major scientific theories of the modern science, from Newton's mechanics to Einstein's relativity and the quantum mechanics of Heisenberg and Schrödinger, seem to show no difference to the time's direction. For these theorists, it seems, events recorded on a film can be shown either way, forward or backward, and they do not depend on which way it was run; their time seems to be directionless. Nevertheless, there are many who try to prove that there is indeed an 'arrow of time', a term coined by astrophysicist Arthur Eddington in 1927.[76] The direction of time is thought to have five dimensions. According to the second law of thermodynamics, disorder (entropy) increases from past to future. The universe is expanding in time. Causal relationship works only in one direction, i.e. the future cannot cause changes in the past, while it is possible the other way round. We remember past events, but not the future ones. We can alter the future but not the past.[77] Entropy is a property of highly unstable dynamical systems. The second law of thermodynamics is the law that shows that in any process, energy is wasted as heat, that heat can only flow from a hotter body to a cooler one, that snowmen melt and that statues crumble. This shows an irreversible loss of energy through time, which is used to argue for the arrow of time. In thermodynamics, as distinctive from mechanics, relativity or quantum physics, 'moments are distinguished by entropy in a universe that is truly evolving'.[78]

The timekept city

In his *Choruses from the Rock*, T.S. Eliot called London the timekept city, where time ruled the way people lived; how they worked and rested and how they moved between the city and suburbs (Figure 7.6).[79] The significance of timekeeping for complex patterns of life is nowadays taken for granted. If we observe individual life patterns in a city, all activities rely to some degree on timekeeping: from the most essential activities of waking up and going to sleep, which we may undertake not when we are hungry or tired, but when prompted by the clock, to the more leisurely ones of meeting friends or watching a favourite television programme. In these and most other activities, timekeeping structures our time and shapes our daily life patterns.

There is a direct relationship between the accuracy of timekeeping and the complexity of society.[80] For agrarian societies, time is a more flexible, less measured dimension of life, as the pace of life is tuned with the pace of agricultural production. What matters most in daily life are the natural cycles of time, such as day and night and seasons. Despite early development of fairly accurate ways of measuring time, for most of the ten millennia history of living in towns, it was these natural cycles that were used by

Figure 7.6 In the timekept city, according to T.S. Eliot, time ruled the way people lived; how they worked and rested and how they moved between the city and suburbs (London, UK).

most people to think of time. However, the more complex the life patterns became after the rise of the modern industrial era, the more distanced urban life has become from these natural cycles.

The shape of the city has mainly developed on the basis of timekeeping. As new transport technologies of trains and cars have allowed the city to spread in all directions, the daily possible commuting distance has set the functional boundaries of the city. In other words, commuters live within a distance that would allow them to go to work and return within the same day. In some large cities, weekly patterns have also emerged whereby some workers stay inside the city during the week and spend their weekends outside in the countryside or other towns and cities. In spite of this and other long cycle patterns, such as seasonal location change for some occupations, the day remains the predominant pattern of commuting and therefore a major factor in shaping the city. Where the large urban area is dominated by a centre, such as in London or New York, daily commuting from the peripheries to the central areas remains a major pattern of activity and movement. Although the pattern of travel is very complex, allowing many interactions in all directions and making a variety of connections, the overall weight of the centre keeps the pattern an integrated one. However, some dispersed large urban areas, such as Los Angeles, where a single centre does not dominate the urban form, the pattern is one of a multitude of locations interconnected on the basis of possible daily commuting (mainly driving) distance. In other words, even though southern California is an extended, sprawling urban area, it is not an integrated monocentric one; large distances and the inconvenience or impossibility of travelling some distances mean that people would not travel from one corner to the other for work and other functions. The travelling day, therefore, rules the experience of the urban populations and the shape of urban space. The emergence of new information and communication technologies has created new connections, travel patterns and timescales. However, these new technologies have not altered the commuting day as the framework for movement routines that shape the city.

Urban functions are explicitly planned according to a system of time allocation. Some of these systems are so embedded in the way cities work that they are taken for granted as part of the daily life. Movement of cars is regulated by timekeeping of the traffic lights, trains operate with timetables, work is regulated by working hours. With every new scheme, a new time restriction and regulation may be imposed on the way people behave in the city. One such scheme is congestion charging in central London, which was introduced in 2003, whereby at certain times of the day drivers have to pay a fee to be able to enter the central areas.

The movement out of the agrarian era into mercantile and industrial periods was marked by secularization and abstraction of time. Time becomes money, as an abstract interpretation of time is equated with an

abstract interpretation of value. This equation showed a radicalization of the rational method as applied to duration and value: segmenting time and exchange value to some smallest possible units, and constructing a new set of relationships on that basis. Time was turned into a commodity that could be sold and bought, and therefore it was essential that its measurement and use be as precise as possible. At the same time, equating time with exchange value created new perspectives and tensions.

The functional division of the day and night into work and rest time is an ancient phenomenon. The battle to strike a balance between the two, however, is a relatively new one, as workers have campaigned to reduce their working hours, and the demands for higher output have pressed them to work longer. With the change of the economic base from agriculture to manufacturing industry in the west, there was a dramatic change in the nature of this balance, as manufacturing industry was no longer reliant on natural cycles of day and night, or of seasons. Time needed to be rigidly structured to enable large groups and production formats to work effectively. For the nineteenth-century Romantics and revolutionaries, the bid to recapture time was equated with freedom from the constraints of industrial capitalism. With the passage out of the industrial era, the need for this rigidity has been reduced, as flexible patterns of work have emerged. In parallel, however, long hours of work have returned in the more flexible working environments.

Dividing time into small units and allocating to these units numerical and monetary value has been a format for efficiency. It has also been a format for inequality, as differential access to money means differential use of time. More money can buy more leisure time, while people without money have to sell their time to earn a living. The availability of time appears to be equal for all, while the patterns of its use and the value attached to it vary widely. There is a somewhat direct relationship between time and money, so that more time spent efficiently means generating more money. This leads to a pattern of intensity of use of time, as the money-rich may be time-poor due to intensity of their use of time, while the time-rich can be money-poor because they have plenty of time and not much to do.

A functional analysis of time splits the day into a tripartite of time used for physiological needs, work and leisure. A major study in the 1960s compared 12 European and American countries in their use of time.[81] By conducting 30,000 interviews, the patterns of similarity and difference among them were identified. A total of 37 primary activities were monitored, and the aggregate results showed remarkable similarities across countries as different as the United States and USSR. Despite some differences, on average 38 per cent of the 24 hours was used for work and related activities, 44 per cent for physiological needs, such as sleeping (which the authors called 'the principal thief of time') and eating, and 18

per cent for free time.[82] This was a testimony to the impact of industrialization on life patterns of these countries, and how the sexual division of labour, patterns of work and rest, or phases of the life cycle were repeated with great regularity in these different sites. It showed a 'human design' at work which ensured the relative time allocation remained constant across domains of formal work, housework, travel and attention to the outside world through the mass media.[83]

This way of structuring and using time appears to have been dramatically transformed, partly through the reorganization of economic activity, whereby fairly rigid and predictable patterns of industrial work have given way to more flexible patterns of work in the services sector. More women have joined the workforce, and there are more part-time working, more frequent job changes, more freelancing, more working from home, as well as more job insecurity.[84] The number of working hours is high, particularly in the United States with an average of 1,957 hours a year, much higher than its competitors in Asia and Europe, although there are doubts about the accuracy of such figures.[85] The European Working Time Directive limits the week's working time to 48 hours, but complains that Britain is the only European country where the number has increased in the last decade.[86] Despite these pressures, the average working hours have declined over the course of the century.[87]

The age of speed

The public infrastructure of time, including how it is measured, connecting places and the meanings it contains, impose an ever faster pace of life on individuals and societies. In 1830, a first-time passenger wrote, 'We flew on the wings of the wind at the varied speed of fifteen to twenty-five miles an hour, annihilating "time and space".'[88] Ever since fast travel and communication have become a possibility, observers are constantly grappling with making sense of speed and its impact on geographical locations and social relationships.[89] How time and space are converged,[90] compressed,[91] or how social systems are stretched across time and space[92] to produce 'timeless time'[93] are reflections on a key recurring theme. If at one point the city was imagined as a mechanical clock, now it is an atomic clock that stimulates the imagination of urban populations, where we can measure time to incredibly small fractions of seconds, and as such aim to use it more intensely. The more sophisticated technologies of measurement and communication have led to the age of speed (Figure 7.7).

Technological advances have made it possible to accelerate the speed of activities, and produce more flexible patterns of working and living. Industrial mass production demanded large numbers of workers, and hence most urban populations, to follow a similar routine. With the demise of these systems in western cities, a more flexible pattern of activities has

Figure 7.7 Ever faster technologies of transport, information and communication have led to the age of speed (Hong Kong airport, China).

emerged, where different individuals and groups work to different rhythms, reordering the speed and sequence of events. Instant connectivity between cities around the world has encouraged further flexibility, on the one hand, and more simultaneity, on the other hand.

In a sense, this is a new push for standardization of time across the globe, to turn it into an agent of global social organization. In the nineteenth century, the trains connected places within a country and standardized local times. Now the new forms of information, communication and transportation connect places around the world and establish a global public infrastructure.

However, such standardization only works for some people, some places and some activities. This is why there are individual and collective forms of resistance to this public infrastructure, which see it as a vehicle of power for some imposed on the others. There is a public infrastructure of time that covers the globe and regulates the allocation or reallocation of activities in the global economy. There is also an individual (and group) experience that is driven by a local logic, which may or may not conform to this global infrastructure. The power of the infrastructure to shape the individual experience is undeniable. The limitations of the public infrastructure, however, are also set by the individuals' actions, as they show what cannot or should not be done where it matters most.

Despite growth in wealth, time cannot be expanded. Other resources have grown, but time remains constant, as it is finite. This has led to demands for more intense use of time. It is always from the viewpoint of individuals that its availability is judged, and it cannot be accumulated in the same sense that space can be. There is, therefore, pressure to use it more effectively and efficiently, to squeeze into the time available more and more activities, which leads to multi-tasking and the breakneck speed. Expectation of what can be achieved within a unit of time has been constantly growing. A century ago, Frederick Taylor devised a system of management, in which the performance of each task was measured and monitored, so that production could become faster and more efficient. Taylorism, therefore, was 'humans and machines working together, at maximum speed, with clockwork rationality'.[94] It aimed to apply a scientific method to managing production, involving crude measuring and monitoring of the tasks that could be done within an industrial production environment. Now, with the more flexible patterns of production, such monitoring is projected onto the individuals, who feel they are in a rush all the time, without necessarily being monitored by their supervisor.

An example of the sense of rush to get the best use of time is in the remarks by the NBC network's executive vice president of advertising and promotion and event programming. 'We are all bound by the laws of physics. There are only 24 hours in a day and 60 minutes in an hour and 60 seconds in a minute', John Miller says. 'Everybody looks at their time

with a microscope to get the best utilization they can. It is the only real estate we have.'[95]

More intense use of time means emphasis on speed of movement and connectivity. Movement was a key ingredient of modernity, and it was defined as such by its advocates, the modernist movement.[96] The physical manifestation of speed and connectivity in the city have been faster elevators that make taller buildings possible; faster trains and cars that make city-regions spread in all directions. This is not enough, though, as it cannot keep up with new technologies that would allow capturing and measuring events at fractions of seconds, such as cameras that capture sporting events. It also cannot keep up with new methods of organizing production, such as just-in-time production or real-time transmission of information.

Critique of segmentation: lived time and permanence

Technological change has transformed social behaviour, creating a fast pace of life, faster than ever before. However, there are objects around us that constantly remind us of the longer scales of time, a sense of permanence that defies the speed of social life. Astronomical and geological times are extremely long range, measured in millions and billions of years, even light years, which are beyond our grasp and even imagination. And yet these long spans can be observed in humble pieces of stone that we see around us everywhere. A sense of permanence can be detected in the building materials that we use to build our cities.

The historical scale is much faster than astronomical and geological scales, and yet slower than technological, social and biological changes. Much of the city, particularly its old parts and historical monuments, remains the same even after decades of rapid change in social habits and technological innovation. We may use computers in medieval buildings, without feeling uneasy about the juxtaposition. These old objects, places and buildings are signs of a relative permanence, defying the speed that dominates social life (Figure 7.8). In this capacity, they can reassure the citizens that there are some focal points that remain constant, even if everything else changes. Even at the social scale of daily life, speed is being resisted. The Slow Food movement, which boasts over 80,000 members in 100 countries, came into being in 1986 with the aim of protecting 'the pleasures of the table from the homogenization of modern fast food and life'.[97] According to an American expert in food marketing, 'For most, food is a word we love. Slow is a word we despise.'[98]

Some argue that any perception of time is clearly bound to a particular cultural and historical environment. Perceiving and measuring time is one of many ways through which a society understands itself and the world

Figure 7.8 Old buildings and places can accommodate new life and technological innovation, without generating a feeling of unease (Trinity College, Dublin, Ireland).

around it. This is perhaps best captured in the metaphors and images associated with time; for example in the way time is said to flow, to be spent, wasted, killed, kept or lost. Whereas this perspective may be found in humanities, the scientists tend to think that there is already an order in the nature, which we seek to discover.[99]

There is a dialectic between an inner sense of time in humans and an external set of regularities in the natural world. Considering that humans are part of this natural world, it is not surprising that some of their temporal regularities coincide with those of the rest of the natural world. Their biological and psychological rhythms have developed both as a part of, and in a dialogue with other, biorhythms of the natural world. These rhythms, however, are at odds with the social rhythms that may be disconnected from them.

Although rooted in biorhythms, timekeeping for humans has become a process of imposing an abstract notion onto a formless, invisible phenomenon. The only way to do this has been by assigning numbers to time, through measuring it with increasingly sophisticated equipments, and associating it with other forms of abstract numbers, such as money. In doing so time comes under control, and through that the activities and functions we

perform are ordered. The Babylonian timekeeping may have started with economic and functional motives of an agrarian society to be more effective in their economic production and social control, in the same way that the modern timekeeping is considered to help efficiency and productivity.

In his cosmological work, *Timaeus*, Plato describes the birth of time as the work of a divine worksmith who imposed order and form on primeval chaos.[100] A distinction is made between that which falls outside time and that which is subject to it, between Being and Becoming. Being is eternally the same and can be 'apprehensible by intelligence with the aid of reasoning', while becoming is 'the object of opinion and irrational sensation, coming to be and ceasing to be, but never fully real'.[101] This is a distinction which may run parallel to theoretical and practical reason, and has continued to be used in various philosophical and scientific theories ever since.

Measuring time and associating it with events is undoubtedly a sign of reason. This is why the Romantics who followed the Age of Reason were so keen to return to a more natural concept of time. Rousseau detested timekeeping so much that he threw away his watch.[102] This was a challenge to the disenchantment that calculative reason had caused by framing time. This was freedom of the individual from the ever tightening reign of social time as a public infrastructure. The new versions of the nineteenth-century Romantics, the postmodernists, have also been sceptical of the order that public time imposes on individuals. An example is Lyotard for whom 'Development imposes the saving of time.'[103] The interplay between the lived time and the public infrastructure of the measured time is, in a sense, the interplay between feeling and reason, as well as between private and public senses of time.

Felt time is embedded in the first person, phenomenological view of the world. The famous distinction that Bergson made between *le temps* and *la durée* was meant to show how the time as measured by physicists is different from the time as lived through the sequence of life's events. Inspired by Bergson, Proust tried to show an order of meaning in the remembered time, which was not there in the physical time. Merleau-Ponty's theory of 'lived present' is also trying to separate lived from measured time. The present moment is *thickened* by memory, which brings the past, and by will, which shapes the future.[104]

The imposition of a temporal order onto social life has always been resisted by some individuals. In 1884, Charles Dudley Warner wrote in *Harper's New Monthly Magazine*, 'The chopping up of time into rigid periods is an invasion of freedom, and makes no allowances for differences in temperament and feeling.'[105] Slicing time into units and its effects on human feeling and practice has been a source of unhappiness for long. 'The gods confound the man who first found out how to distinguish hours!' Plautus said, 'Confound him, too, who in this place set up a sundial to cut and hack my days so wretchedly into small portions!'[106]

One of the consequences of creating a public infrastructure of time is connectivity, and more interdependence among individuals, so that all pieces of the complex organizations of a city can work together. This creates pressure for different systems to connect with one another, developing ever more sophisticated networks of transportation and communication. The faster the speed of life becomes, the more complex social organization can become, and the more interdependent individuals will be. The Enlightenment ideal of free individuals in full control of their lives becomes ever more difficult to achieve, as the complexity and speed of social life expects individuals to be locked into an interdependent world. This is why there is emphasis, more than ever, on the need for freedom, as the spaces in which it can grow appear to be less available. The complex process of segmentation in the city has produced atomized individuals, small time-slots, and space parcels. For this atomized world to work, the only solution appears to be interdependence, connected to one another, though at ever higher speeds.

This is, however, the idea of a machine at work, which has its origins in the mechanical clocks that have inspired much of the history of science and philosophy.[107] The cogs in the machine have no possibility of choosing alternatives; their working mechanism is predetermined. Human beings, however, are multi-dimensional and able and willing to move in different directions. This creates more tension between individual freedoms and public infrastructures, putting undue pressure on individuals, who have to cope or suffer social and psychological pressure. At the same time, it allows the system to breathe and change. Otherwise its constitution becomes rigid and unable to adapt to new challenges.

Designing for time has shaped cities, on the principle that movement across space should be made easier and faster. However, it has also created unintended consequences and contradictions, creating more gridlocks and obstacles to an efficient use of time. Roads and other transport networks have been created and expanded, even reorganizing the entire city space to accommodate them. However, especially in large and growing cities, they seem never able to cope, as the ever rising number of cars fill the space available and lead to further traffic jams.

Conclusion

Time, as a phenomenon that cannot be captured or clearly defined, has been divided into subdivisions. One such subdivision puts individual humans at the centre of representation, to produce a relative notion of time. So the subdivisions in common sense are past-present-future, or in Einstein's relative time, changing according to the location and speed of the observer.

The other form of subdivision is outside individual subjectivity, in the

form of a generalized public infrastructure imposed on time, i.e. the universal time of seconds, minutes, hours, days, months and years. This order has been in the making for thousands of years, and its systematization was particularly associated with the rise of cities in Mesopotamia. This mathematical order is then utilized for further subdivisions of social and economic significance. A functional subdivision of time is into work and rest, or further into socio-economic needs, physiological needs and free time; even though the shape and content of this division is subject to constant change as modes of working and living change. It is based on the significant allocation of monetary value to time, according to which people get paid for the time they spend on particular tasks.

The importance of time as a public infrastructure is that it shapes the space of the city, frames the activities of its inhabitants, and creates an order so internalized and embedded in the city that there appears to be no escape from it. By subdividing time into a hierarchy of subsections and establishing a mathematical relationship between these subsections, which appears sufficiently neutral to be used in different ways, the rule of reason has been extended to the personal and social beats of the city.

While in some cultures and periods of history, these beats were considered as another natural cycle that repeated itself, the measured time of the public infrastructure has created a linear order, in which time flows in a direction associated simultaneously with progress and decay. At all times, there is a tension between, on the one hand, the measurement and rules that consolidate the public infrastructure of time, and, on the other hand, the spontaneity of lived experience, which leads to events, feelings and interactions that tend to go beyond, and challenge, this public infrastructure.

Chapter 8

Measuring space

After time, we now turn to space, a subject that inspired the development of the deductive method of reasoning. In a city of reason, where everything is expected to be organized on a rational basis, time and space are carefully measured and controlled. These are considered to be both finite resources that should be treated with care and attention. In a city of reason, everything is expected to run on time and to have its appropriate place. To do this, space and time have been segmented into units, and assigned functional and monetary values. Focusing on space, in this chapter we briefly chart how this has historically come about, i.e. how space has been measured, and how this measurement standardized, to provide a public framework for communication and exchange. We also look at how space is conceptualized and the impact of this on human reason, followed by debates about the nature of space, whether it is absolute or relative, and its relationship with time. The critical dialogue between measured and lived space takes us out of the field of abstraction and into the segmented space of the city.

Measuring space

As early as the beginning of the third millennium BC, significant mathematical activities were taking place in Mesopotamia, which continued for three millennia. Mesopotamian mathematics used cuneiform symbols and, similar to our current system, positional notations, i.e. the value of a number in a sequence depended on its position. It was, however, based on the number 60 (sexagesimal), as compared to our current system based on ten (decimal). To solve their problems in commerce, agriculture and engineering, Babylonians heavily relied on arithmetic and algebra, which they recorded on clay tablets. To them, geometry was not a separate science, but a part of their arithmetic and algebraic techniques. They could accurately calculate the areas of complex geometrical shapes for use in partitioning of land or in constructing buildings.[1] Mesopotamian geometry probably descended from boundary problems, as clay tablets recorded

economic matters such as inventories, tribute lists and the size of the fields. Its origins could also be in artisans' practices, as the words used to describe designs on textiles and pottery were related to geometrical terminology. Mesopotamians excelled in arithmetic and had a practical approach to geometry, which they used in calculating the volumes of containers and of the earth removed in canal building and maintenance.[2]

The Egyptians (and Romans after them) had a decimal but non-positional mathematical system, and used repeated doubling and adding for performing multiplication. On a somewhat similar principle, today's computers use a binary notation and perform multiplication through repeated duplication and addition.[3] Herodotus, the ancient Greek historian, thought the birthplace of geometry, as the science of measuring land, was Egypt. Sesostris, the Egyptian king, divided all the land of Egypt equally among its inhabitants in return for an annual rent. But the floods changed some land plots every year, and those who had lost their land complained that they could not pay the rent. The king's response was measuring the affected land:

> the king sent persons to examine, and determine by measurement the exact extent of the loss; and thenceforth only such a rent was demanded of him as was proportionate to the reduced size of his land. From this practice, I think, geometry first came to be known in Egypt, whence it passed into Greece.[4]

The Egyptians used geometry for practical purposes, in calculating the areas of rectilinear fields, the volumes of baskets, drums and pyramids. The Babylonians and Egyptians, therefore, saw geometry as applied arithmetic.[5] The ancient Chinese also used geometry for measuring the fields, as well as for military cartography, manoeuvring armies, finding distance to inaccessible objects such as besieged cities, pagoda roofs and mountain peaks.[6] Geometry was also a practical concern for Indians, although its connection with Vedic sacrificial rituals seems to suggest that it originated in religious symbolism, rather than practical matters.[7]

The classical civilizations of Egypt, Mesopotamia, Persia, India and China all had practical geometry, as exemplified by the need for architecture, surveying and land measurement (Figure 8.1). The ancient Greeks learnt geometry from Egyptians and Babylonians and used it for practical purposes. But they also turned it into an abstract science, which was then seen as a mental discipline through the use of abstract deductive reasoning. While the Egyptian and Babylonian geometry was based on induction, on procedure, on methods of trial and error, the Greek geometry employed deduction, the need for proof, and the method of logical demonstration, which started from a few 'self-evident' suppositions and proceeded to necessarily following conclusions.[8]

Figure 8.1 Ancient civilizations all had practical geometry, as exemplified by the need for architecture, surveying and land measurement (Persepolis, Iran).

In the sixth century BC, Thales of Miletus was the first Greek mathematician to consider ideal geometrical shapes, rather than specific material disks, squares and triangles, and to provide abstract logical proofs for geometrical problems. He is largely considered responsible for converting mathematics from an inductive to a deductive discipline.[9] Pythagoras elevated the numbers out of practical concerns and into the abstract level of philosophy. Plato stressed the interplay between mathematics and philosophy, reflected in the inscription on the gates of his Academy in Athens: 'Let no one ignorant of geometry enter herein.'[10] Like Pythagoras before him, Plato believed in the form and number to be at the heart of the secrets of the universe. It was Euclid, based in Alexandria, who codified the subject around 2,300 years ago, transforming it into a structure of abstract propositions and rigorous proofs supported by unchallengeable rules, definitions and axioms.[11] His book, *Elements*, became 'the most influential textbook in the history of civilization' and geometry became, and remained for millennia, the main area for rigorous mathematical pursuit.[12] Numbers and the relationships between them became spatialized and what started as measuring space turned into an abstract way of thinking about the world.

The ancient Greek geometry was translated by Middle Eastern geometers at the height of the Islamic civilization in the Middle Ages. They were also producing new work, for example on algebra, or on the parallel postulate, which precedes the later work by the better known western mathematicians.[13] These works inspired a new interest in geometry during the Renaissance in Europe by passing on elements of Indian, Persian, Arab and Greek heritage. After the Renaissance, one of the major breakthroughs in geometry was the development of analytic, or coordinate, geometry by Descartes in the seventeenth century.[14] He combined geometry and algebra to create a single subject more powerful than either by itself. By placing figures inside a coordinate system (x and y axes), he could translate difficult geometrical problems into numbers and use algebra to solve them.[15]

Euclidean geometry was based on assuming a flat earth, where parallel lines never meet. In the nineteenth century, however, new non-Euclidean geometries emerged that were based on the earth as a sphere, where no parallel lines could exist on the same plane. These non-Euclidean geometries proved that, for example, the sum of the measures of the angles of a triangle can be less than 180 degrees (Lobachevsky) or more than 180 degrees (Riemann), while the Euclidean geometry had proved it to be exactly 180 degrees.[16] The extension of this new geometry in physics by Einstein led to the idea that the physical universe could follow the same logic, and be a finite, though unbounded, space, rather than the infinite space of Euclidean geometry.[17]

Standards as a public infrastructure

The systems of measuring space were originally based on the measurements of the human body, such as the length of a foot or the width of a palm (Figure 8.2). Different bodies, however, have different sizes, and so there would be differences in measurement. As the need for accuracy in daily life was limited, it was possible to rely on these standards, many of which have continued to be used to this day.

There is a continuous line between the standards used in ancient Egypt and later Mediterranean civilizations and the standards used now. By the sixth century BC, the Egyptians widely used the standard of *cubit* for length and *mina* for weight. The Roman measures were foot, the length of a man's foot; inch, the breadth of a thumb and defined as one-twelfth of a foot; and the mile, which was 1,000 paces or double steps. Romans brought those measures to Britain, forming the basis for the imperial system of measurement, which until recently was universally used in the British Commonwealth and the United States.[18]

The standard of length in the imperial system was a yard. According to traditional claims, the definition of the yard in the fifteenth century was based on the distance between a man's nose and the tip of the middle

Figure 8.2 The human body has been used as a basis for measurement standards through the ages (Oslo, Norway).

finger of his extended arm. This distance, however, could shrink or stretch during commercial exchange and needed to be standardized. An exact yard was made and was kept in the Houses of Parliament in London for reference. As a result of a fire in 1834, in which Parliament buildings burnt down, the standard was damaged. Its replacement was a bar of bronze alloy, made and legalized in 1856. This was kept in the National Physical Laboratory, with four replicas in four different places as a precautionary measure.[19]

The metric system, which has become the international system of units, is decimal, i.e. based on the number ten, thought to have developed because human beings have ten fingers. This system helps make different multiples of various physical quantities be expressed in powers of ten of the basic units. Simon Stevin (1548–1620) is credited with the introduction of the decimal system. However, it was two centuries later that it was adopted by a country. After the Revolution, the French National Assembly appointed Talleyrand to standardize weights and measures. In 1793, the French republican government, advised by the French Academy of Sciences, adopted a new unit of length called a metre. It was defined as 10 to the power -7 of the earth's quadrant passing through Paris. By 1798 the survey of this arc was completed and three platinum standards and several

iron copies of the metre were made. As it was discovered that the measurement was not accurate, the metre was redefined as the distance between two marks on a platinum-iridium bar kept at the temperature of melting ice.[20]

Throughout the nineteenth century, the metric system was adopted by a growing number of countries. In Britain, an Act of Parliament in 1897 allowed the metric units to be used in the country. It was, however, a whole century before the metric system became the only legal system in use in the country, through a process which started with the membership in the European Economic Community in the 1970s. In 1875, the Conférence Générale des Poids et Mesures (CGPM) was established as a reference point for international units of measurement. Several forms of metric system emerged, such as one based on millimetre, milligram and second, another on centimetre, gram and second. The standard system that was adopted in 1948 by the International Conference on Weights and Measures was the metre, kilogram, second (MKS units). In 1960, this was adopted as the Système International d'Unités (SI).[21]

The International System of Units (SI) has identified a system of seven physical quantities, and a standard system of measuring them known as base units: length (metre), mass (kilogram), time (second), electric current (ampere), thermodynamic temperature (Kelvin), amount of substance (mole) and luminous intensity (candela).[22]

The first international conference on weights and measures in 1889 established the metre as a standard, and defined it as the length of a bar of platinum-iridium kept in Paris. The accuracy of this standard for twentieth-century needs, however, was later questioned. Furthermore, it was desirable to adopt a natural and indestructible standard. Therefore, in 1960, the metre was redefined on the basis of wavelengths of the radiations of the krypton atom. This definition was once again revised for more precision and reproducibility, moving from atomic radiation to the speed of light. The metre was then defined in 1983 as 'the length of the path travelled by light in vacuum during a time interval of 1/299,792,548 of a second'.[23]

As the adoption of standards shows, the measurement of space is through measuring length, and the measurement of length is through motion and time. In this sense, space appears to be subordinated to time, as it is measured on the basis of time and motion.

In measuring time and space, there has been a move towards standardization across the world. The metric system is the result of a successful attempt to arrive at a commonly accepted system of measurement. Parallel systems of measuring, however, have existed, such as the imperial system of feet and inches. The standard units in time, i.e. to count hours, minutes and seconds, have long existed. The common frameworks for their calculation, i.e. a common calendar, however, have gradually been developed.

Both time and space continue to be measured and conceptualized in various ways across the globe. Relating one system of measurement to another is only possible through conversion, i.e. linking two separate systems of standards. The predominance of the western scientific systems of measuring, and of the western political and economic hegemony in the modern period, however, have contributed towards establishing universal standards. The pressure for universal standards has been associated with the process of the unification of global space, which has started with the modern explorations and empires and has intensified with technological advances and current waves of globalization.

Universal standards of space act as a public infrastructure at the local level, in which exchange of goods and services on a daily basis shapes people's lives. These standards are also frameworks for communication and exchange across the globe, the various parts of which are increasingly interconnected through easier movement of resources, ideas and people.

Conceptualizing space as a method of thought

The development of deductive reasoning and methods of analysis in philosophy and science are closely related to the development of thinking about space in geometry (Figure 8.3). The western science, Albert Einstein noted,

Figure 8.3 Thinking about space has led to new methods of thought (Helsinki, Finland).

is the result of a marriage of two great achievements: the invention of the formal logical systems (in Euclidean geometry) by Greek philosophers, and searching for causal relationships through systematic experiment by Renaissance scientists. The ancient Greeks inherited the arithmetical quantitative methods from the Babylonians, and combined these methods with the logical, geometrical and pictorial way of thinking that they developed themselves. The ancient quantitative logic and the post-medieval systematic experimentation are then combined to create what we call the modern science.[24] In this way, natural phenomena can be explained and their relationships be expressed in the language of mathematics, which is the language of science.

The method used by geometry has been deductive logic. It starts with some definitions, which are some primary concepts and postulates (or axioms), which are taken to be readily acceptable as true without proof. On the basis of these definitions and postulates, and on the basis of rules that are considered sufficient and consistent, other statements called theorems are proved (directly or indirectly).[25] Euclid's *Elements* used 23 primary definitions as the basis of understanding space. These included point ('that which has no part'), line (a 'breadthless length') and surface ('that which has length and breadth only').[26] The relationships between these elements (such as angles), and various shapes they could take (such as triangles, quadrilaterals and circles) made up the alphabet of the science of measuring space.

The attempt by Euclid to define every concept used, however, has been criticized by modern geometers, who prefer to leave some concepts as undefined, to avoid circularity and muddled thinking. At the end of the nineteenth century, for example, Hilbert used points, lines and planes as primary concepts without defining them first. At the same time, Pieri used only two notions of points and motion to present firm foundations for the Euclidean geometry. These concepts were 'not taken from any other deductive science and about which one supposes to know nothing from the beginning'.[27] They lay the foundations for every other concept to be deductively derived from them.

The Greek geometers, soon after Thales, developed a proof system that is not based on looking at the various dispositions of lines and points in geometrical diagrams, but 'on what can be gathered by understanding the meaning of words in a sentence or a set of sentences'.[28] In other words, it was the attempt to give an account, to reason, for the relationship among these idealized representations of space. However, these accounts had to rely on some unproved axioms and definitions, making them appear to be circular. This is why Plato thought that geometry cannot be called a science, as geometers cannot give a reason for the assumptions they take for granted.[29]

The Greek geometry used a system of analysis and synthesis. Invention of the method of analysis is attributed to Plato, and later Aristotle found

the structure of human deliberation comparable to that of analysis. This was a method admired and widely used in the formative stages of modern science from Galileo to Newton. Analysis starts with the desired end and tries to reason in reverse to ways and means of bringing it about.[30] According to Pappus of Alexandria (AD 290–350), the last of the great Greek geometers, the analytical method is 'a solution backwards'.[31] As he explains:

> in analysis we suppose that which is sought to be already done, and we inquire from what it results, and again what is the antecedent of the latter, until we on our backward way light upon something already known and being first in order.[32]

The analysis can be two kinds: theoretical, which 'seeks the truth', and problematical, which 'serves to carry out what was desired to do',[33] a distinction that reminds us of the division of reason into theoretical and practical. In geometry, theoretical analysis looks for proof of theorems, and problematical analysis looks for constructions to solve problems.[34] Synthesis, on the other hand, is the reverse of analysis. In synthesis, Pappus explains:

> we suppose that which was reached last in analysis to be already done, and arranging in their natural order as consequents the former antecedents and connecting them with one another, we in the end arrive at the construction of the thing sought.[35]

Analysis is a process that goes backwards, connecting one thing to another, consequences to causes. In contrast, synthesis goes forward, starting by what is known or admitted to be true, through constructive, progressive reasoning, to arrive at what is required. In a sense, the invention and use of deductive reasoning and the backwards method of analytical thinking can be related to advancement in the use of language, in which giving an account for a desired end becomes possible. What is needed is to start from the desired end and work backwards to find convincing arguments in its defence.

Classical geometry has been considered 'a branch of *applied* mathematics: the mathematical theory of certain properties of space'.[36] Applied mathematics uses mathematical modelling, in which a model is made of concepts and principles that describe certain aspects of the subject, a number of theorems (a theory) is deduced from these principles, and tested against empirical data, to prove or adjust the model. For two millennia, Euclidean geometry was considered to be the only valid model, as tested in a multitude of scientific and engineering tasks. However, after the rise of non-Euclidean geometries, the monopoly of the Euclidean theorems as the only possible model has been challenged and there are competing models

available. This has led to the suggestion that the model be judged not by its correctness but by its accuracy in relating to the task at hand.[37]

The rise of non-Euclidean geometries coincided with a desire by nineteenth-century mathematicians to put geometry to the test of experimentation. All throughout history, geometry had been seen as a non-empirical science, the validity of which did not depend on empirical facts. In the nineteenth century, which saw geometry as the science of space, the Euclidean geometry was seen as a physical theory, which could be highly corroborated by experience, but also liable to be proved inexact.[38] A new view that was expressed by Poincaré, however, saw any such theory as a convention, which cannot be proved true or false, but only adopted when convenient. The possibility of competing interpretations now meant competing geometries.

> ... the axioms of geometry ... are only definitions in disguise. What then are we to think of the question: Is Euclidean Geometry true? It has no meaning. We might as well ask if the metric system is true and if the old weights and measures are false; if Cartesian coordinates are true and polar coordinates are false. One geometry cannot be more true than another: it can only be more convenient.[39]

From the beginning of the twentieth century, a view emerged, and remained dominant, that saw geometry as a branch of pure mathematics, which was studied independently of its concrete applications. The system of ideas started from undefined ideas and was seen as an interpretation of the relationships between them. Geometry was to become a purely deductive and abstract science like arithmetic, freed from any specialized application, and from space, with which it was always associated.[40]

The distinction between geometry as an abstract scientific enterprise and an applied concern for measuring the earth, constructing buildings and other activities continues to be made. The subject matter of geometry has been defined as 'figures in space and the properties of those figures'.[41] The evolution of geometry through history shows a move from practical concerns with measuring and shaping space, to an abstract method of thinking about space, which could be used for logical reasoning as well as being applied in empirical circumstances, and to a purely theoretical endeavour divorced from its practical and spatial applications.

Is space real?

The dynamic between practical and theoretical significance of geometry dominates its history. Meanwhile, its subject matter, space, has been the topic of a sustained debate on whether it exists as an independent substance or it is merely a set of relationships, whether it is real or imaginary

(Figure 8.4). The debate on whether space is real or a mental construct and a way of conceiving the world is one of the classical discussions about the subject matter.[42] The debate continues to this day, between seeing space as no more than relationships among objects and a metaphysical interpretation of space, which sees it as a real thing 'with shape and structure which plays, elegantly and powerfully, an indispensable and fruitful role in our understanding of the world'.[43]

The debate between absolute and relational space mirrors a similar and related debate about time, as we saw in Chapter 7. The post-medieval reliance on rational sciences coincided with a rediscovery of Euclidean space and a belief in a metaphysical notion of absolute space. The invention of mechanical clocks had a profound impact on the notions of time and space.[44] Johannes Kepler wrote in 1605, 'My aim is to show that the fabric of the heavens (*coelestis machina*) is to be likened not to a divine animal but rather to a clock', and he taught how to explain its working 'under the rule of numbers and geometry'.[45] For Kepler, 'God always geometrizes', as geometry is the basis of creation, using characters such as 'triangles, squares, circles, spheres, cones, pyramids' to write nature's book.[46]

Figure 8.4 A key debate about space is whether it exists as an independent substance or it is merely a set of relationships; in other words whether it is real or imagined (The Hague, The Netherlands).

The historical conceptualization of space can be divided into three periods: pre-Euclidean common sense, Euclidean abstraction and post-Euclidean relativity.[47] Pre-Euclidean common sense referred to the notions of place that bodies occupied in the world, and as such was finite and relative. The Euclidean space, on the other hand, was infinite and its development by ancient geometers coincided with the physicists' conceptualization of the space of universe as a limitless void. The most essential property of the Euclidean space was that 'it had no centre and no circumference'.[48] As mathematicians conceived it, in its full abstraction, Cornford wrote, 'it was an immeasurable blank field, on which the mind could describe all the perfect figures of geometry, but which had no inherent shape of its own'.[49] The current mathematical language uses the term 'Euclidean space' to refer to the 'set of all points required by Euclid's postulates, endowed with all the mutual relations implied by Euclid's theorems'.[50] The post-medieval scientists who assumed geometry to be the basis of physics, saw the world as a realization of Euclidean theory and believed in the existence of Euclidean space. However, the abstract diagrams and the relationship between their constituent parts were not expected to exist in the real world. The modern philosophy was thus confronted with a new ontological problem: 'the problem of space', which revolved around the mode of existence of Euclidean space.[51]

A famous example of subscribing to Euclidean space is Descartes,[52] who saw space the subject matter of geometers, as 'a continuous body, or a space extended indefinitely in length, width and height or depth, divisible into various parts, which could have various figures and sizes and be moved or transposed in all sorts of ways'.[53] He was aware that it was hard to prove the existence of this subject matter. Nevertheless, he believed in its existence in the same way that he believed in God.

Euclidean space in geometry found its counterpart in physics in Newtonian space. This space was homogeneous and isotropic, i.e. any of its points resembled any other and it had no preferred direction. As Gray describes this absolute space:

> It can be thought of as an enormous stage, across which pass the events that make up the universe: the enduring stars, the brief particles, ourselves. Inside this box everything has its position, its path, and its time, and the business of the scientist is to give a rational account of it all.[54]

For Newton, geometry had a practical use, for he defined it as 'nothing but that part of universal mechanics which accurately proposes and demonstrates the art of measuring'.[55] The Newtonian mechanics viewed space (as well as time), as an objective substance comprised of points and regions in which things were located. Leibniz held the opposite view,

arguing that space only exists as a relationship between objects. These views, which were called substantivalism and relationalism, were elaborated by Clarke, representing Newton, and Leibniz, in their famous correspondence.[56]

Leibniz rejected the idea that space was an absolute substance and thought it was merely imaginary:

> I hold space to be something merely relative, as time is; that I hold it to be an order of coexistences, as time is an order of successions. For space denotes, in terms of possibility, an order of things which exist at the same time, considered as existing together, without enquiring into their manner of existing. And when many things are seen together, one perceives that order of things among themselves.[57]

This critique defines space and time as perceived orders that suggest a relationship among objects and events. Space and time, therefore, do not exist as such; they are only relationships.

Kant disagreed with Leibniz and generally subscribed to the Euclidean notion of space.[58] But Kant went further in relativizing space and time, by arguing that they did not exist independently, and they were only aspects of our perception. Rather than substances or relationships, space and time were merely representations of appearances, which 'cannot exist in themselves, but only in us'.[59] Space was not an empirical concept, only a pure intuition. Outside the human experience, it is not possible to speak of space. Space and time, therefore, 'as the necessary conditions of all our external and internal experience, are merely subjective conditions of all appearances, and not things in themselves'.[60] Kant and Leibniz, however, agreed on at least one point: that space did not exist in reality.

These challenges, although changing the way space was conceptualized, did not change the way geometry and physics treated space. Between the seventeenth and nineteenth centuries, therefore, mathematicians and philosophers who were interested in finding a solid ground for the truth of mathematical physics, implicitly agreed that space was 'continuous, infinite, three-dimensional, homogeneous and isotropic', as Poincaré described it.[61]

It was the nineteenth-century non-Euclidean geometry and early twentieth-century relativist physics that fundamentally changed the paradigms of space and time. The final blow to the absolute notion of space came from Einstein's theory of relativity, which showed that space was under the influence of mass and its motion. The fast-moving objects can alter the parameters of time and space, and it was not possible to think of these parameters separately anymore. In other words, the general theory of relativity says that gravitation is not a force acting among bodies in space and time. Gravitation is the curvature or non-Euclidean shape of space-time.[62]

According to the special theory of relativity, the velocity of light was a limit for all causal processes and simultaneity, length and duration are relative to the motion of the observer.[63] Some have argued that with the polemic by Leibniz–Huygens against Newton and Clarke, and by Einstein's general theory of relativity, the notion of absolute space has been completely eliminated from modern physics.[64] However, others argue that Einstein has retained the notion of absolute space in his theory and that Einstein himself had admitted that absolute space had not yet been fully supplanted.[65]

A distinction is made between conceptualizing something and believing it to exist. For example, we talk about 'nothing' or 'unicorn', without believing that they exist. They are, however, part of our set of tools to think about the world. In the same sense, space as such may not exist; it may just be void. In other words, rather than a positive definition in which space exists as an independent, three-dimensional substance, it is defined negatively, as the absence of substance. When, however, we conceptualize the void as the locus of relationship between material objects, space finds a more positive existence, albeit only in our thought and discourse rather than in reality. This void separates material objects (including human beings) from each other, and hence can be interpreted as the distance between them. In this void, material objects and human beings may meet or collide, by design or by accident, and hence be interpreted as a forum or an arena.

Following this argument, both the absolute and relational notions of space become mere interpretations of the void. Albert Einstein, while promoting his theory of relativity, accepted this, that both concepts of space are 'free creations of the human imagination, means devised for easier comprehension of our sense experiences'.[66] Void, container, distance or location are all different forms of interpreting space, drawing on the social conventions which we employ to give an account of our understanding of the disposition of objects and their relationships.

The implications of absolute–relational conceptions for designing cities have been immense, as the two ways of thinking about space can lead to different ways of designing and building cities.[67] On the one hand, belief in absolute space means that urban space exists as an entity that needs to be shaped and carved out. Belief in the relational notion of space, however, means that getting the right relationships between people and buildings matters more than imposing abstract ideas on complex realities.

Space and time

Many relate space and time together, time has been spatialized or space temporalized in the language, when we say it took someone 'a long time', or when John Locke wrote 'Duration is fleeting extension.'[68]

The parallels between time and space are limited. In space, we can move back and forth between two points, in time we can't. The distinction between left and right seems trivial in space, in time the distinction between past and future is not so. Space surrounds us, but we experience time bit by bit.[69] In other words, in space we have a potential choice to change our location, in time we don't. We could be anywhere else, but not anytime else. In space, we can't occupy exactly the same spot as someone else; that person has to move elsewhere for another to move in. In time, this is not the case. In other words, 'Nothing in time excludes anything else.'[70] Ownership and control of space can exclude others from using it; in time, this is not possible. Although people sell part of their time to their employers in exchange for money, they are more in control of their sold time than their sold space, over which they no longer have any control.

A consequence of Einstein's special theory of relativity was that space and time should be fused together in the notion of space-time.[71] In a famous lecture in 1908, Minkowski announced the complete integration of space and time into each other, as 'No-one has yet observed a place except at a time, nor yet a time except at a place.'[72] This suggested a four-dimensional world, as, 'three dimensional geometry becomes a chapter in four dimensional physics'.[73] It was no longer possible to separate these dimensions from each other. 'Henceforth space by itself, and time by itself, are doomed to fade away into mere shadows, and only a kind of union of the two will preserve an independent reality.'[74]

A controversy between 3D or 4D interpretations of space and time shows disagreements on whether the two are similar dimensions of the world. According to the 4D view, things exist in time and can only be understood as a whole when time is taken into account. So a person now is not a whole object, but a mere part of the whole, which unfolds over time. This becomes far more complicated when we think about a city which, by definition, can never be a whole, as lives and events continue to unfold continuously. The best we can do is to grasp a snapshot of this continuum, knowing that it is a mere slice of a process, seen from an angle and from a particular vantage point. From there, we can investigate where and when it started, how it developed into what it became, and where it is likely to go in the future. According to the 3D view, however, things are made up of three dimensions and they are complete as they are at any moment. So the relationship between one person at one moment and the same person one year later is the relation of identity, i.e. the person remains essentially the same,[75] despite the changes in circumstances and in the person's material and mental make-up.

As Aristotle suggests, in order to understand things fully, we have to witness their birth and watch them grow.[76] This suggests the need for integrating the time dimension into any investigation. Rather than scrutinizing

a phenomenon only at a specific moment, we need to look at its development and change, to be able to explain the dynamics of any one moment of its existence. In understanding urban space, some have argued, this means focusing on its production.[77] This offers a useful tool to avoid a static understanding of the city, which is an evolving and ever-changing phenomenon. However, we know that time is not merely present in the production process, and that city spaces have many layers of meaning that emerge long after their initial production. Time, in other words, is integral to all processes that go on in the city, which frame and interact with cultural configurations, social institutions, and political and economic organization. Furthermore, meanings of the city and its component parts change and evolve as any city's history can reveal. Places change function, populations change their habits and outlooks, available technologies are transformed, and the overall conditions of life change; while the urban space, with its streets and buildings may remain the same. What they meant at the time of its production may be now hidden or even lost in the mists of time.[78]

This suggests that investigating cities and their component parts should integrate the time dimension by using all scales of time, from daily routines to natural cycles and historical periods. In other words, this suggests embedding any particular moment in natural and biological, as well as social and historical time. It is important to notice, however, that while embedding objects and events in time would give us a better understanding of them, it has a limiting effect. Much of history writing is a projection of the present onto the past, and of an educated elite onto other groups and cultures. We tell the story of others and of the past as we understand and interpret them, observing and reporting change, and in doing so presenting some details and editing others out. In other words, especially in accounting for social and historical time, we are constructing a selective account that reflects our position, which may be a static one, not necessarily doing justice to what is being investigated.

Another way of integrating time and space is through motion (Figure 8.5). The styles in art and architecture that emerged in the early twentieth century reflect this, parallels of the emerging notion of space-time. For Futurists and Cubists, it was important to be able to show objects in motion, or from a moving perspective. For modernist architecture, a core concept was movement, which allowed observers to move around buildings and see them from different perspectives at different speeds.[79] Despite the modernist aim of designing rational cities, this heralded the rise of multiple geometries, rather than fixed arrangements.

Figure 8.5 Built in 1900 and still working, Schwebebahn is a suspension railway above the river Wupper, displaying a fascination with technology taking over the city, integrating time and space through motion (Wuppertal, Germany).

The segmented city

The hunting and gathering or nomadic societies established a system of territories, where each group would mark an area and defend it against others. This was an area in which they searched for food and their survival depended on being able to exert control over it by excluding others from entering and using it. This territorial behaviour in humans shows a close parallel with some animals in marking and controlling existential territories.

The systematic segmentation of space started with agriculture, which in turn made human settlements possible. Segmenting and reconstructing time has been ever more sophisticated in response to the increasing complexity of tasks in human societies and advances in the technology of measuring time. In the same way, reconstructing space has been a response to the increased intensity of its use. Urbanization increased the intensity and complexity of living conditions, which has been addressed by ever more detailed segmentations and ever more complex reconstructions of time and space.

The limited size of population and the patterns of consumption in hunters and gatherers would mean that these territories were carved out of the vast expanses of nature as small pockets. The rising population, transition to agriculture and the establishment of towns and villages created a systematic control over land. The establishment of city-states, and later empires, and much later the modern forms of nation states and empires have expanded the human control over land and sea to all areas of the world, so that almost no territory has remained free of such controlled segmentation. Territorial behaviour continues to be a hallmark of humans, albeit in more complex ways, from personal space and private property to markets and national territories. Large numbers of people living in close proximity led to competition for space. Complexity of society, division of labour and development of new technologies have been followed by a segmentation of space, through which new, more intensive ways of utilizing space have been devised.

Depending on whether we see space as a substance or a relationship, our notion of dividing and segmenting space appears to be affected. It seems that it is possible to say space is divisible if it is a substance, as any other substance, which can then be split into smaller pieces, and measured accordingly. But is it also possible to divide and measure space as relationship? A look at our everyday practices shows that this option is also possible, as we normally measure distances, between two objects, two bodies, two walls, two towns. This is indeed the measurement of space, whether conceived as a freestanding substance in which objects are located, or as merely a relationship, which can be expressed as a distance between two objects.

As the notion of space as an existing matter dominated the scientific and popular imagination after the seventeenth century, it is the idea of dividing it into pieces that has informed the shaping of the modern city. Land and property was subdivided throughout the history of human settlement. It was, however, the modern scientific-metaphysical approach to space that detached it from human experience, and paved the way for its commodification. Believing in a substance called space may be a metaphysical illusion. But when it comes to the city, we are dealing with land, which is divided into roads, houses, schools, etc. Subdividing abstract space may not be a concrete exercise. Subdividing land through the erection of walls, boundaries and buildings is a common everyday occurrence. But especially at the urban scale, we do so through the abstract mediums of representation, through the detached institutions of professionals, and handled through the impersonal mechanisms of market and bureaucracy. The only way these impersonal and detached mediums could work was through the segmentation and abstraction of space.

Social and spatial division of space was part of city living from the beginning. As ever larger numbers of people came together in cities, a division of labour and a hierarchical stratification developed. Activities and

groups were separated from each other in space. Social and spatial segregation thus came into being, where access to power and resources determined the place of human beings in society and their geographical location in the city. As exemplified in the birthplace of the city, Mesopotamia, the separation of citadels from the rest of the city, of the inner city and outer city, and the city from the countryside, the social and spatial subdivision of space was parallel with a hierarchical subdivision, in which physical location went hand in hand with social location and therefore with power and well-being.[80]

A subdivision of space, which followed the division of labour, was functional segmentation: separating public and private spaces, streets from houses, temples from stables, garrisons from hospitals. This process of specialization, which started very early on in urban living, is still a major form of differentiation in the city. The medieval city was marked by its subdivision into neighbourhoods, in which trades, tribes or attachment to feudal powers created social subdivisions that were manifest in urban space.

With the rise of the modern city, new forms of segmentation have emerged: rich and poor live apart in their segregated neighbourhoods, even to the extreme level that some have gated and walled themselves apart from the rest (Figure 8.6). City centres and suburban peripheries are

Figure 8.6 A high wall protects a gentrified area from the adjacent poor neighbourhoods, which is hated by those left on the outside (Dublin, Ireland).

distinguishable through patterns and intensity of use. The use of motor cars and other means of transport, and increasingly communication and information technologies, have led to the spread of cities across much larger areas, inevitably fuelling further segmentation and segregation.

The space of cities, therefore, is segmented throughout history, reflecting the accumulation of power and wealth that the cities made possible. Centre-periphery, separate neighbourhoods, functional districts, character and identity areas, and polarized social clusters are some of the structural ways that urban space has been subdivided. This was a reflection of the division of labour, of the specialization of activities and stratification of large and complex populations living together in limited areas, and of the use of technology to make stratified living possible. In this sense, the segmented city is inevitably a city of reason, in which space is segmented to suit our social differences. Some of these differences are undesirable or unjust, but the act of segmenting space to reflect them is doubtless a consequence of attempting to use reason. It appears that the fragmented city of today, in a sense at least, is a city of reason, if reason is defined in an instrumental and narrow sense. The best evidence is the huge efforts that have been invested in zoning, subdividing space according to different functional and social considerations, resulting in engineered differentiation and fragmentation of the city. Overcoming fragmentation, therefore, requires an emphasis on mending the fractures through enhancing the public realm, overlapping of areas, mixture of land uses, integration of activities and groups, and freedom of movement across the city. This is another way of imagining a city of reason.

Critique of segmentation: lived space

Time and space can both be seen as intrinsic features of the natural environment, as socially produced conventions, or as aspects of individually felt experiences. If taken to exist independently and as real substances, as suggested by the absolute concepts of space and time, the only way to understand space and time is to look at them from outside, from the scientific third-person viewpoint, even if they are metaphysical in nature. In this scientific endeavour, we tend to subdivide space to understand and use it, to impose an order on an infinite substance which we cannot grasp with our senses. Significant examples of this imposed order in the pure realm of geometry are Euclidean perfect shapes and Cartesian coordinates. The examples in the concrete realm of cities include, most famously, the modernist architecture and town planning, with their desire to impose a utopian order onto the living space of cities.

But if space and time do not exist as such, the only way to understand them is to see them from within human societies, and from the eyes of the individual observer, as for example Einstein does. This approach, however,

can be further subdivided into two approaches: into social and individual accounts. The social account of space tends to rely on social conventions, which can be found in the rules of geometry, in the accounts of geography, or in the explanations of social sciences. In these accounts, the relations of distance among objects are given social significance. To understand these relationships, they too are often analysed from a third-person viewpoint, hence segmenting space in a process of breaking it into its constituent parts. The individual account, on the other hand, can be entirely based on a holistic experience and narrative, on a first-person account of the world, which combines different aspects of experiencing space, rather than segmenting it into different analytical categories. This was the pre-Euclidean and pre-scientific approach, which is also used as a critique of dividing space into understandable, functional segments. Individual accounts, of course, are not divorced from their social contexts, as they are experienced and expressed through living in society and using its conventions of thinking and speaking.

In understanding space, this means moving from the bird's eye view to the human's eye view. The bird's eye view of the world sees space from above and how it is structured and subdivided according to some classification. By contrast, the phenomenological view of space sees it as experienced by individual observers, as they move from one space to another. In the same way that time can be seen both as a public infrastructure and a personal experience, space can be seen as a system of subdivisions or the three-dimensional environment in which we live.

This distinction is captured by some as that between space and place. The abstract notion of space that was promoted in Euclidean geometry was a culmination of several centuries of philosophical and mathematical development in Greece. It seems to have started with some Pythagoreans who equated air with void. Plato reduces physics to geometry, reality into perfect ideal forms, from which it follows that reality is an imperfect manifestation of these pure forms. Plato's concept of space has been compared to Descartes'.[81] Aristotle sees space and time both as continuous quantities. Space is then the sum total of all places occupied by bodies, while place is that part of space occupied by a body.[82]

The ancient Greek language did not have a single word equivalent to our 'space', and the philosophers' conceptualizations were rooted in ordinary language.[83] They used the terms *chôra*, *topos* and *kenon* to denote space, place and void. *Chôra* and *topos* were, however, interchangeable and their translation as space and place depends on the context in which they are used. The main difference between the two words appears to be that *topos* denotes relative location (in relation to the surroundings), while *chôra* refers to a larger extension than *topos*. Epicurus turned these words into technical terms, using *chôra* as 'space as "room" when bodies are moving through it', and *topos* as 'space when it is occupied by body

(i.e. place)'.[84] The term *kenon* was used to refer to space, empty space or empty place, an empty thing (such as an empty vessel) or an empty part of a thing.[85]

In the modern period, the distinction continues to be made. Isaac Newton saw place as 'a part of space which a body takes up'.[86] According to John Locke, while space is 'the relation of distance between any two bodies or points',[87] place is the 'relative position of anything'.[88] According to a relational notion of space, however, the distinction between space and place seems to be redundant. If space is no more than the relationship among objects and people, then relative location is one of these relationships. All space is about relations. It is a matter of selecting a set of relationships and calling it a place, which can ultimately be an arbitrary and unjustifiable choice.

A place can only make sense if it is the location of an object or event, a location imbued with meaning for a particular person or group. This, for humans, has meant the development of personal interpretations and meanings, and emotional ties. Social and psychological significance of people, objects and events only makes sense in a context, which primarily includes location. This location will inevitably be a combination of a physical location and a social disposition.[89]

A quick glance at the works of urban geography and urban sociology shows that the dichotomy between space and place is much loved and widely used. A well-known example is the work of Manuel Castells, who confronts the 'space of flows' with place, the dynamics of globalization with the needs of localities.[90] Place is conceptualized as holistic, imbued with emotion and memory, with meaning, as distinctive from space, which is cold and detached from any such association. While space is considered to be open and abstract, place is a part of that open expanse which is occupied by a person or an object and is endowed with meaning and value.[91] By interacting with their environments, people give particular character to their context, which distinguishes it from the surrounding areas.[92] Whereas space is considered to be good for movement, place seems good for pause. Carving out a corner in the open, undifferentiated space, place becomes a site of security and stability, a centre of 'felt value'.[93] The place, however, is not a safe haven, as some wish it to be. In fact it is as open to the outside world as space is, especially in the conditions of rapid social and spatial change, which would only allow temporary connections and meanings (Figure 8.7). Normatively, if place is conceptualized as porous and flexible, it would allow for multiple meanings and identities, rather than being fixed, rigid, reactionary and at odds with the rest of the world.[94]

The distinction between space and place is a distinction between modernity and pre- (or to some extent post-) modernity; the distinction between society and community (*gesellschaft* and *gemeinschaft*); the distinction

Figure 8.7 Place can be as porous and flexible as space. A temporary park in the middle of the city can become a place for a short period of time (Newcastle, UK).

between rationalism and Romanticism; the distinction that we see between the Enlightenment thinkers, such as Hume and Smith, and their critics, such as Ferguson. The forces of modernism and capitalism that were unleashed in the eighteenth century are still expanding, and dealing with them is apparently a task of managing and regulating these forces rather than removing them. It is a tension between exchange value and use value, between view from outside and inside, between calculation and attachment. In a sense, both of these sides are necessary parts of our everyday life, and are continuously used by most people. While I have use value, a view from inside and emotional attachment to my place, I will look from outside at other people's places, which could be even be cold and detached. View from outside cannot be banned; it can only be invited to be sympathetic and understanding, or harnessed and systematized to be functional and useful. Similarly, view from inside cannot be banned; it needs to be put in touch with other such views to enable intersubjective communication and coexistence.

The distinction between space and place is essentially a distinction between detaching ourselves from the world and seeing it in a cold and calculating light, or keeping and nurturing our attachments to the world.

It would appear that the city of reason is the city of space and the city of emotions a city of place. Yet we know that the clear separation of reason and emotion may not be possible, as they are points on a continuum, rather than completely separate poles. Furthermore, what appears rational to one person may appear emotional to another. Space and place, or objective and subjective space, are therefore not necessarily mutually exclusive. What is space for one becomes place for another, what is view from outside for some becomes a view from inside for others. In other words, what motivates and stirs emotions in one person may mean nothing to another. How could then the same environment be at the same time space and place, hot and cold, near and far, valuable and worthless, beautiful and ugly; simultaneously a place of reason and emotion?

Different accounts, therefore, clash with one another. Conventions and public infrastructures may reflect a particular order that can be outdated, or can be at odds with individual needs and experiences. Public infrastructures are more than conventions or laws. They also include objects and symbols that represent these conventions, and cultures that grow around these symbols and conventions. They are frameworks that are aimed at becoming widespread and universally used. In studying them, it is important to see who produced them, how they came to be widely accepted, and what different experiences of using them are. This process reveals the nature of power as displayed in the public domain, through identifying and establishing a set of public infrastructures, formally or informally. The other side of the coin is the acceptance of these displays of power by those affected by them, or challenges to change them.

The differences between third-person and first-person viewpoints can be exaggerated. Each of us may be simultaneously engaged in these ways of seeing the world, looking at others inevitably through a third-person viewpoint and at ourselves through a first-person viewpoint. We seem to have no other choice. The idea of a lived experience that is entirely phenomenological, therefore, can only apply to a single person, and only partially to groups and communities. The relationships among the members of a community will be intersubjective, whereby a multitude of views and experiences coexist and interact. The notion of place, in its positive sense, however, seems to undermine the negative aspects of this multitude, as if it lacks hierarchies, power imbalances, injustices, etc. What is a place for one person can be space for another. A place can be as cold as a space.

The key point about spatial relationships, therefore, is to ensure that individuals and groups do not have to suffer a force from outside, or even from within their own community, that transforms their life without their consent. Overemphasizing the emotional value of the place displaces the main concern, which is that people should not suffer from the imposition of the will by others without themselves being a party to the decision-making process. Being subject to the will of others may have emotional

and psychological disturbing effects. It could also have severe effects on the material conditions of life, with far-reaching consequences for individuals and groups.

Reference to lived experience is not detached from reasoning; it just shows a potential gap between theoretical and practical reasoning. Rather than first drawing abstract principles and then trying to fit reality into that abstract model, the challenge is to be flexible with any such models and change them according to changing circumstances. Phenomenologists like Husserl have criticized mathematics as the language of science that reduces personal and emotional meaning to numbers.[95] Those who defend measurement, however, argue that 'numbers are assigned to *aspects* of objects, not to the objects themselves'.[96]

Conclusion

The rational scientific attitude has seen the universe, and following that the city, as a mechanical clock, which had a powerful influence on the imagination of Europeans after the Middle Ages. Everything had its own time and space, according to natural laws that needed to be discovered and then applied in the development and management of the city. What we find from this analysis of time and space and the way they are segmented and measured, is that they start by practical concerns, at some point turned into abstract categories, which in turn are used to deal with practical concerns. Timekeeping and space measuring both started as dealing with duration and distance, both part of practical concerns of everyday life and in trying to understand the universe. Measurement became a complicated endeavour in the urban settings, in response to the increasing complexity of tasks at hand. When time and space were measured, systematized and theorized, they turned into abstract systems, which by their nature were divorced from real life as reductions of the plural realities, mental constructs. The next phase was trying to impose these abstract systems of mental construct onto the complex, multi-dimensional life of cities. It is this cycle of practice and theory that tends to limit deliberation, resulting from a gap between abstraction and reality, between mental constructs and actual diversity and complexity. This has, however, always been challenged by lived time and space, in which distinctions may become blurred and human experience may resist classification and abstraction.

We have seen how space has been measured, and how this developed into systems of measurement that were shared, first by individual cities and countries, and then by networks of countries at the international level. The measurement of space, therefore, became a public infrastructure for communication and exchange of information, goods and services. Measurement of space also turned into a method of thought, developing abstract deductive reasoning, which lay at the foundation of modern science. Yet

this abstract thinking also led to a metaphysical notion of space, according to which it was held to exist as an independent substance, which meant it could be subdivided into smaller pieces. This orthodoxy was challenged by the non-Euclidean geometry and relativist physics, leading to an integrated conceptualization of space-time. Yet in the practices of dealing with urban space, it is still the norm to subdivide space, or land and property, into segments with functional and symbolic value. The segmented space reflects the stratified society and its complex division of labour. The only way to turn nature's land into a tool for humans, who come together in large numbers in urban areas, was to segment space and assign it with functional and symbolic value.

Humans have conceptualized the sequence of events and co-presence of objects as two metaphysical notions of time and space. We have envisaged them as homogeneous and all-encompassing dimensions of our universe. We have then subdivided these into units, associated them with functional and monetary value, and have been able to utilize and exchange them, which has enabled us to live together in complex human societies. This has not been created at a single moment. Nor is it merely associated with the modern era. It is the result of a process of specialization and urbanization that has been going on for thousands of years, even before the dawn of our recorded history. It reflects, first, a process of developing abstract notions out of practical challenges of dealing with settled urban life, and then applying these abstractions, as public infrastructures, onto the daily life. The technology of measuring time and space has been increasingly more sophisticated. The scope of expanding these standardized systems of measurement as public infrastructures of human societies has expanded enormously. The underlying principle, however, appears to be essentially the same throughout the history of settlement, i.e. creation of order out of complexity by going through recurring cycles of abstraction and application.

The city of reason, therefore, can be one in which temporal and spatial orders have been established, where time and space are accounted for, dissected, managed and used functionally. In this sense, all human settlements are cities of reason, as such orders are identifiable in all. The temporal order of the agrarian settlement may have been more relaxed and loosely structured than that of the industrial settlement. Nevertheless, it had a distinctive temporal order. We can see in our own time how the transition from manufacturing industry to services has created a less rigid, or more pluralistic temporal order in the city. All in all, the rhythms of work and life in agriculture, industry and commerce are different variations on the theme of establishing a temporal order for the city.

The same applies to space, where different types of working and living have had different spatial orders, segmenting and managing space in different ways, creating their own spatial orders, especially at structural levels.

Diverse spatial orders have been associated with the diverse divisions of labour, which have generated different urban structures. However, the overall theme of a power structure that controls and maintains social order through spatial and temporal orders has remained the same. Within these rational structures of time and space, there are always elements that cannot be accounted for, as time that is 'wasted' and space that is not 'properly' used. It is in these corners that the weakness or limits of our temporal and spatial orders becomes evident. Historically, we always try to extend these orders, and at the same time wish to save places in which we can take refuge from the rigidities of these orders.

Chapter 9

Assigning value

A narrow definition of rationality has tended to deny the relevance of values and imagination. Scientific knowledge and technical expertise have been considered to be value-free, and imagination has been seen as a wild-card that needs to be put to one side for our knowledge and action to be rational. In practice, however, all rational actions in city design have been imbued with value and imagination.

Making distinctions

The ancient analyses of reason, as represented in the works of Plato and Aristotle, show how reason works: through first establishing systems of distinction among the phenomena, and then connecting them in a way that appears to make sense. Modern observers, armed with modern scientific discoveries and liberal democratic sensibilities, may or may not agree with the way these distinctions have been made, as indeed the ancient thinkers did not agree among themselves. Nevertheless, the act of making distinctions seems to be one of the major tasks in human reasoning. This was an analytical approach to the world, segmenting it into its apparent constituent parts in order to understand it (Figure 9.1).

Analysis, however, is not enough, as segments can only make sense in relation to one another. Understanding the relationships between these constituent elements meant discovering or making connections. The interest in pure and practical reason, as reflected in science, as well as in morality, led them to establish a hierarchy among the elements identified in the process of analysis. As a result, what appears to be more reliable and significant finds a higher place in the hierarchy. In this way, it is expected that clarity and predictability are produced out of what is complex, ambiguous and unpredictable. The ancient and the modern observers may again not agree on the way these constituent parts are identified, or on the nature of their relationships and hierarchies. But it is observable that the tendency to establish systems of distinction and hierarchical relationships are at the core of these thinkers' approach to understanding and creating a

Figure 9.1 An analytical approach to the world has segmented it into its constituent parts (Brussels, Belgium).

rational moral world. This tendency is perhaps best manifest in the Cartesian method, with its four stages, which was mentioned earlier.

Another philosopher who represents the age of emerging scientific rationality is Thomas Hobbes, who closely related reason and science. For him, reason was a faculty of the mind and was 'nothing but *Reckoning* (that is, Adding and Subtracting) of the Consequences of general names agreed upon, for the *marking* and *signifying* of our thoughts; I say *marking* them, when we reckon by our selves; and *signifying*, when we demonstrate, or approve our reckonings to other men.'[1] This was not merely a matter of dealing with numbers, as in arithmetic, or with lines and shapes, as in geometry. It also dealt with words, so it applied to logic, politics and law, and in general, wherever there was a need for some calculation to work out the consequences of numbers or words. To avoid absurdity, Hobbes emphasizes the necessity to avoid metaphors and ambiguous words. When words are clear and well connected, reasoning leads to science. This is not innate, but attained by human effort, leading to science, which is 'the knowledge of Consequences, and dependence of one fact upon another'.[2]

> Reason is . . . attained by Industry; first in apt imposing of Names; and secondly by getting a good and orderly Method in proceeding from the Elements, which are Names, to Assertions made by Connexion of one of them to another; and so to Syllogisms, which are the connexions of one Assertion to another, till we come to a knowledge of all the Consequences of names appertaining to the subject in hand; and that is it men call SCIENCE.[3]

In his search for certainty, Hobbes fell in love with geometry, as it was showing him a deductive method of reasoning. By using simple premises, a complex and apparently unlikely proposition could be proven, so that all would agree with its truth. He tried to apply this and other scientific methods of the time (such as the laws of motion) to moral and political philosophy, to establish politics as a science.[4] His initial premises were that competition for power and avoidance of death characterize the individuals living in a society. The conclusion of this analysis for him was the need for individuals to submit their natural rights to the sovereign state, which could then prevent the destructive effects of this power struggle.

The workings of reason, therefore, in finding truth and solving problems, can come down to an analysis and a synthesis, first segmenting phenomena into smaller pieces, and then establishing an often hierarchical relationship among them, which can be expressed in words or numbers. Inherent in this hierarchical relationship is power, which is exercised by those who can define the segments and articulate the relationships. Whenever such a relationship appears to fit into observable phenomena, which means others can agree with it, it is called a revelation, a discovery.

Making connections

When we think of a city of reason, many questions emerge that need answering. What is reason? In what sense is it different from other human faculties? How does it work? What is involved in the process of reasoning? What can be called rational?

Historically, reason has been considered by many as the defining characteristic of human beings, or in other words the human essence, what distinguished them from animals. Despite debates about the use of reason by some animals, this view has remained powerful.[5] Reason has been distinguished from, and contrasted with, emotion, faith and experience, so that the reason–emotion, reason–faith and reason–experience dichotomies are well known. In a sense, these dichotomies draw on the debates on the distinction between mind and body, and on the search for a foundation, as we saw in Part I. On the basis of these dichotomies, what can a city of reason be like? Is it a place where emotions and experience are suppressed?

The definition of the word reason suffers from a classical ambiguity between a noun and a verb. Does reason have a substance or is it merely a procedure? On the one hand, it is a process of reasoning, through which we search for and provide convincing accounts for our beliefs and actions; on the other hand, it is a human faculty with which we do so. These two aspects of reason are closely intertwined: substantive and procedural definitions of reason are two sides of the same coin. Another example of such ambiguity is the word design, which refers to the set of instructions for making something, as well as to the act of preparing those instructions.

Etymologically, the word reason has found its way to English via French, from the original Latin word *ratio*, which is the functional noun of the verb *reor*, 'I think' (i.e. I propose a *res* to my mind). *Res* means an object of thought or, in other words, that which is handled. In opposition to *res*, *ratio* refers to the mode or act of thinking, designating both the faculty of thinking and the formal element of thought, such as plan, account, ground, etc. The commonest use of the word reason, however, has been to denote the cognitive faculty.[6]

After dividing the human psyche into a rational and an irrational part, Aristotle divided the rational part further into two parts: a scientific part and a calculating part.[7] The scientific, contemplative part is the locus of scientific knowledge (*episteme*), which is involved exclusively with universals, as it is demonstrative knowledge of the necessary and eternal. The proper object of the contemplative part is truth. Aristotle identifies the subject matter of theoretical reason as mathematics, physics and theology.[8] The calculating, deliberating part is the locus of practical wisdom (*phronesis*), which is concerned with both particulars and universals. Specifically, it involves how to bring the knowledge of universals to bear appropriately in particular situations.[9] The proper object of the calculative part is 'truth

in agreement with right desire', as 'choice is deliberate desire'.[10] Practical wisdom is, therefore, 'a true and reasoned state of capacity to act with regard to the things that are good or bad for man'.[11] It is concerned with deliberation and action about human goods.[12]

Aristotle distinguished between the intellect as an intuitive faculty (*nous*)[13] and reason (*logos*) as the discursive or inferential faculty.[14] The word *logos* in Greek meant both spoken word and written word, although for the ancient Greeks the spoken word was much more important than it is for us today. Other meanings of the word *logos* include 'account', 'argument', 'definition' and 'rational explanation' as distinct from a story.[15] In a sense, as *logos* broadly means expression in words, reasoning may then refer to any cognitive exercise, which is inevitably linguistic. As defined by the *Oxford Companion to Philosophy, logos* refers to the rational, intelligible principle, structure or order which pervades something, or the source of that order, or giving an account of that order.[16] At times, both terms are used to refer to the mind's rational part.[17] In different translations of the ancient texts, there seems to be much interchange between the terms that denote different parts of the mind and different forms of reason.

Aristotle's typology of reason has been widely used to the present day, particularly the distinction between the scientific-theoretical and deliberative-practical reason, which can be found in the dictionary definitions of reason.[18] According to the *Oxford Companion to Philosophy*, reason is 'The general human "faculty" or capacity for truth-seeking and problem-solving, differentiated from instinct, imagination, or faith in that its results are intellectually trustworthy'.[19] These two aspects of reason are also reflected in the *Cambridge Dictionary of Philosophy*, which offers two entries on theoretical and practical reason. Theoretical reason, which deals with theoretical knowledge or inquiry, is broadly defined as 'the faculty concerned with ascertaining truth of any kind'.[20] This is traditionally distinguished from practical reason, which is 'a faculty exercised in determining guides to good conduct and in deliberating about proper courses of action'.[21] According to the *Oxford Talking Dictionary*, the word reason has both theoretical and practical meanings and can denote both a noun and a verb. It defines reason as 'the intellectual faculty by which conclusions are drawn from premisses'.[22] In practical terms, it is defined as 'sense; sensible conduct; what is right or practical or practicable'. As a verb, it refers to 'form or try to reach conclusions by connected thought'. This seems to suggest a general definition for reason as the ability and process of making judgements about what to believe and what to do, through making distinctions and connections. Distinctions are made between different phenomena, and connections are established between premises and conclusions, between causes and consequences.[23] Our search for clarity urges us to probe into how these distinctions and connections are made, and it is there that most doubts and controversies about reason and rationality lie (Figure 9.2).

Figure 9.2 One of the main features of using reason is making connections: between premises and conclusions, between causes and consequences, between places (Millennium Bridge, Newcastle-Gateshead, UK).

An inherently normative process

Depending on how we define reason, the first definition of rational is that which is based on reasoning or reason. It also commonly means sensible, sane, moderate; not foolish or absurd or extreme. A rational person is endowed with reason and reasoning; to act rationally means rejecting what is unreasonable or cannot be tested by reason in religion or custom.[24] However, this does not offer much clarity if we do not know or agree on what is sensible or reasonable. The Socratic tradition of the ancient Greeks equated morality with rationality, and related both with moderation and avoidance of extremes. This was a normative notion of what was rational, and was different from a more descriptive one.

When cognitive agents adopt beliefs on the basis of appropriate reasons, they are considered to have exhibited rationality, as defined by the *Oxford Companion to Philosophy*.[25] According to the *Oxford Dictionary of Philosophy*, which gives an entry for rationality rather than reason, the notion of rationality is broadly defined, so that any exercises of human mind,

such as pieces of behaviour, beliefs, arguments, policies, etc., are considered as rational.[26] Blackburn suggests, 'To accept something as rational is to accept it as making sense, as appropriate, or required, or in accordance with some acknowledged goal, such as aiming at truth or aiming at the good.'[27]

A distinction has been made between descriptive and normative definitions of reason and rationality. The descriptive aspect of rationality refers to human intellectual capacities, which is most significantly exemplified in the use of language, and the ability to make distinctions and connections between phenomena. Primarily, though, rationality has been used throughout history in a normative capacity. If an action, belief or desire is designated as rational, it means we ought to choose it, while irrationality has been used as a pejorative term, referring to that which should always be avoided. However, this does not necessarily generate a choice which everyone agrees with. There is no universal agreement as to what counts as rational, as there will always be competing actions, beliefs or desires which can be considered as such.

There have been many attempts to clarify the relationship between theoretical and practical reason. One attempt sees reason as a single mental faculty with the essential normative function of 'directing or guiding other human functions'.[28] This is a single faculty that is used in different ways. If it is dealing with belief, it becomes theoretical reason and if with action practical reason. Rescher argues that the attempts by various social scientists to separate these two aspects of cognitive and normative rationality have been futile.[29] He puts forward a thesis that a normative theory of rationality can be adequate to deal with the complexities of the subject. He equates reason with intelligence, and following Kant sees it to have three dimensions: cognitive, practical and evaluative. Rescher defines rationality as 'the intelligent pursuit of appropriate ends'.[30] Despite his criticism of narrow definitions of rationality, this amounts to an instrumental account:

> Rationality consists in the appropriate use of reason to resolve choices in the best possible way. To behave rationally is to make use of one's intelligence to figure out the best thing to do in the circumstances. Rationality is a matter of deliberately doing the best one can with the means at one's disposal – of striving for the best results that one can expect to achieve within the range of one's resources – specifically including one's intellectual resource. Optimization in what one thinks, does, and values is the crux of rationality.[31]

As Rescher reminds us, for Plato and Aristotle rationality involved giving an account of what one believes in and does. It follows that a belief, action or evaluation is considered as rational 'if the agent can tell a story that suc-

ceeds in making sense of it'.[32] This view of reason is used in legal reasoning. Carter, for example, argues that conceiving of reason as a cause of behaviour leads to unmanageable problems, as any given event or behaviour can have potentially countless causes. Instead, he suggests seeing reason as 'a *description* of a way of deciding how to behave'.[33] To judge in law is 'to decide the fortunes of others before an audience', while appearing impartial and conforming to the audience's expectations of decision process.[34] It follows that reason is 'a form of calculation' and reasoned decisions involve 'an attempt to estimate the consequences of alternate possible decisions and to choose among them by valuing some consequences above others'.[35]

If reason works through making distinctions and connections, it is difficult in the social sciences and humanities to separate the normative from descriptive, theoretical from practical. A perspective and a value system are always inherent in making these distinctions and connections. The crucial issue is whether and how we share these with others, and how they become publicly accepted and enforced norms and rules, rather than private judgements of individuals.

In search of values

Value is the 'worth of something'.[36] Philosophers have identified different forms of value: a basic form, intrinsic, and other forms that are defined in terms of it: instrumental, inherent and contributory. Something has intrinsic value if it has value solely by virtue of its nature, or is worthy of desire in and for itself. It has instrumental value if it is a means to, or causally contributing to, something with intrinsic value.[37] It has inherent value if its experience, awareness or contemplation is intrinsically valuable. It has contributory value if it contributes to the value of a whole.

A key question about intrinsic value has been: what is desirable for its own sake? Plato's answer was that good things owed their goodness to harmony.[38] Hedonism's answer has been pleasure, i.e. experiences or states of affairs that contain more pleasure than pain are intrinsically good. Some see 'satisfactoriness' as the measure of intrinsic value. As distinctive from these monists, value pluralists refer to a range of experiences or states of affairs as intrinsically good. In addition to some kinds of pleasure, they list 'consciousness and the flourishing of life, knowledge and insight, moral virtue and virtuous actions, friendship and mutual affection, beauty and aesthetic experience, a just distribution of goods, and self-expression'.[39]

Intrinsic value concentrates on what sorts of things are good in themselves. A rival theory focuses on what to do to support human well-being, asking questions about the components of good life. The ancient Greeks called it *eudaimonia*, which is translated as happiness, or human flourishing. For them the ultimate justification for morality was happiness, and they saw the best way to achieve a happy life to be through the cultivation

and exercise of virtue.[40] The road to human well-being, however, has been identified differently by those who see its core as feeling good or pleasure (hedonists), and those who believe that doing well or excelling at things worth doing is the key (perfectionists).[41] The rational agent would be expected to choose the road that maximized happiness, which has been interpreted as egoism. The difference between this egoism and its modern counterpart, however, is that some ancient virtues were based on regard for others and not merely for the agent.[42]

Rather than personal happiness, utilitarians believed in providing the greatest utility for the largest number of people. Utility, or intrinsic value, was first defined as experience of pleasure and absence of pain. But others focused on happiness, while giving a proper account of happiness was the subject of many debates among utilitarians. The principal tenet of utilitarianism was formulated by J.S. Mill as acting to produce the greatest happiness. Those utilitarians who saw pleasure as too narrow an interpretation of utility, however, believe that utility is the satisfaction of people's informed desires or preferences, whatever they may be.[43] Utilitarianism's emphasis on human welfare continues to influence public policy in western democracies. The moral implications of utilitarianism, however, have been criticized for being universal and therefore insensitive to diversity of people and their special circumstances, i.e. at odds with commonsense moral beliefs. One major criticism has been utilitarianism's disregard for distributive justice. In individual action or in public policy, utilitarians aim at maximizing utility for everyone without paying attention to its patterns of distribution, and so they are accused of ignoring individual rights and endorsing great inequalities. Another criticism has been utilitarianism's disregard for the diversity and relativity of moral aims: the common moral beliefs accept that people can give special weight to their own projects and commitments, while utilitarianism aims for universal moral aims.[44]

Another theory of ethics that continues to inform social sciences and influence public policy in liberal democracies is Kant's ethic of duty. By reflecting on the notion of a moral reason for action, he argues, we can arrive at an ethics whose maxims are universal, impartial and impersonal. A moral community is 'a kingdom of ends', where human beings are treated as ends, rather than means, free from being instrumentally used. They are autonomous agents, whose relations are guided by 'categorical' moral imperatives.[45]

To make decisions about the design and development of cities, a number of values will be employed, knowingly or otherwise. Without necessarily articulating it explicitly, designers, planners, developers and policy makers make decisions about the city on the basis of some values (Figure 9.3). They make assumptions about what may have intrinsic value in the city, what the aim of urban development is or should be, and what constitutes a good city. Public sector decision makers may consider how to

Figure 9.3 Urban development projects are based on a system of value; only some claim to make their values explicit (Celebration, Florida, USA).

maximize utility in the city. Designers may aim at balancing functionality and aesthetic appeal. Private investors may aim at maximizing returns on their investment. Each group appears to follow different aims, with potentially different intentions and values. While citizens' well-being may drive some actions, monetary gains drive others. Some focus on providing basic public services, others search for maximizing the possibility of choice. Some see citizens as a homogeneous group with similar interests and needs, while others see nuances and differences. Some work on the basis of egalitarian principles, others aim at generating luxury and secure places for those who can pay the highest. These assumptions generate different types of city; and as the city grows over time, it becomes a mosaic of fragmented places, reflecting different intentions and values.[46]

Value-free knowledge, value-free action?

The consideration for the value of something influences choice and guides people, a feature of things which is taken into account in decision making. This value can be considered to be 'subjective', i.e. a personal choice not

open to rational argument, or 'objective', i.e. based on an independent standpoint.[47]

In the social sciences, a key concern has been whether it is possible or desirable to describe social phenomena in a 'value-free' way, so that they do not express the values of the author. It is normal for individuals in their daily exchanges to describe the world from their own perspective. But can we expect the same from social scientists? If their representations of the world are as personal as anyone else's, how can they claim the title of 'social science'?

Weber split the process of enquiry into three parts: selection of topics, the process of investigation and the use of results. He argued that the first and last phase can be value-relevant, the middle phase can and should be value-free.[48] This view appears to treat the middle part as a single, homogeneous phase in which all choices are made according to the same set of rules. In practice, however, it may be a complex process of selection and judgement, which could be as value-laden as the other two parts.

This concern for value-neutrality in knowledge can also be observed in action. Are actions only representative of a person's or a group's interests, or can they be value-free, good for all? Can we plan and design cities, or any social framework for action, which is value-neutral? (Figure 9.4). Can

Figure 9.4 Can particular urban forms, such as grids, be neutral in value? (Los Angeles, USA).

we avoid favouring some groups over others? While it is generally held that private sector agencies and individuals may act in self-interest, governments and professionals are expected to be value-neutral, acting according to universal standards and in the name of public interest. Has this been possible?

Making a distinction between facts and values is attributed to Hume, and has informed many areas of modern thought and action. Values are expected to be held as subjective and personal, as in religious beliefs. Professional training, for example, involves a belief in a set of value-neutral scientific facts. Planning in local authorities, for example, is organized as a technical expertise, separated from the political processes. In doing so, it is believed to provide neutral expert advice on the basis of scientific knowledge and rational calculation. However, as Cullingworth and Caves put it, 'Rational planning is a theoretical idea. Actual planning is practical exercise of political choice that involves beliefs and values.'[49]

The possibility, and even desirability, of a neat separation of facts and value has been doubted. As Hollis argues:

> Rationality, at least in the modern, rational-legal forms, can be dangerous. Although traditional societies are oppressive, the spread of rational order need not be liberating. This is no doubt partly for the obvious reason that rational order concentrates power and nothing guarantees that power will be used for good.[50]

People seem to talk about the values of science in two opposite ways. On the one hand, science is being praised for its value-neutrality, being a source of objective, unbiased, neutral facts. On the other hand, however, science is seen as 'a source of values, perhaps indeed the only true source of them'.[51] It is possible to see science as a huge store-cupboard of unquestionable data about the world. It is also important to see 'the huge, ever-changing imaginative structure of ideas by which scientists contrive to connect, understand and interpret these facts'.[52] Information can be said to contain no value in itself. It starts to have value when it is linked with people's attitudes and beliefs. Science alone cannot be a source of value, 'because it involves a wider context in the life around the knower'.[53] Individuals alone cannot be the source of value either, as Nietzsche and Sartre had claimed.[54] It is the background of common humanity that is the source of moral values and insights, rather than the pure facts of science, or the decisions of individuals to invent values. In other words, scientific facts and individual choices can only make sense in a context.

Segmented values, abstract landscapes

The distinction between instrumental and intrinsic value is one of the core subjects of the social sciences. According to Max Weber, the categories of 'means' and 'ends' form 'the ultimate elements of meaningful human conduct'.[55] However, the distinction between what we desire for its own sake and the means we use to achieve it can be blurred. Money is an extreme example of this blurring. As Georg Simmel explains, exchange is the process in which things find significance in relation to one another.[56] Money, which was developed as a means of exchange, has found intrinsic value in itself, ultimately becoming a measure of value. Money becomes an end, rather than a means. It finds an abstract character, which became historically associated with the psychological conditions of urban living: anonymity and emotional detachment. It becomes responsible for non-commital relationships between people, which marked individual freedom. The emotional and social ties that connected people to one another have been replaced by new forms of association brought about by money: 'the association planned for a purpose'.[57] Individualism and the rise of money economy are, therefore, closely related.

On the other hand, money undermines individuality. Through its abstract character, it assigns a general value to something, and disregards its individual features. 'Money is concerned', Simmel put it, 'only with what is common to all: it asks for the exchange value, it reduces all quality and individuality to the question: How much?'[58] Rather than expressing an individual element in objects, it expresses a general element in them, which is their exchange value. Their individuality is thus levelled down to a general level which is shared by all saleable objects.[59]

In analysing the value of labour, Marx had argued that employers paid a limited wage but received a greater value from the workers in return, which helped them accumulate wealth. The workers' labour power could turn exchange value into capital, but in the process their value as human beings was undermined. This represented the conflict between labour and capital, which he saw as the source of social change.[60] Marx's focus is instrumental value. As he put it, 'Value exists only in articles of utility, in objects.'[61] He suggests that useful things may be looked at from the viewpoints of quality and quantity, which he uses to distinguish use value from exchange value, i.e. being useful for what they are and being useful in relations of exchange, which takes place through money.[62] Commodities were at the same time 'objects of utility' and 'depositories of value'.[63] But human beings could also be treated as objects, embodying the labour power residing in them.[64] Exchange value is abstracted from use value to make comparison between different objects possible. As he puts it, 'As use-values, commodities are, above all, of different qualities, but as exchange values they are merely quantities.'[65] It is in this conversion from quality to

quantity, this abstraction, that his critique, and more broadly the nineteenth-century critique of the modern age, lies.

The city is one of the most visible manifestations of the tension between use value and exchange value. Urban space is treated as a commodity, like any other, and subject to the rules of the market.[66] A building is a useful place for those who live or work in it. It is also a generator of rent for its owner. In the normal circumstances, this appears to be a peaceful mutual arrangement. However, when the two interests come into conflict, their peace may be disturbed. There are many examples of this disturbance, when owners have decided to redevelop their properties, or sell them in the market and raise some exchange value. The residents, however, are interested in continuing their life as lived before, rather than be disturbed, or be displaced, for someone else's sake. Large-scale redevelopment schemes have had the effect of disturbing or displacing large numbers of people, sometimes those tightly related together in close communities. This tension, some have argued, determines the shape of the city, the distribution of people and activities, and the way people live together.[67]

The tension between quantity and quality, inherent in generating an abstract meaning out of a concrete situation, has shaped cities, both through workings of the market and through policies of the state, even when they were ideologically opposed. This has resulted in an urban landscape that reflects those abstract values and some underlying structures, rather than the concrete conditions of individuals and their different stories. Values have been segmented, individualized and assigned an abstract meaning. The abstract medium of money, therefore, carries the new form of value, allowing the exchange of goods and services, and extracting value which can be mobile, taken away and used in other places and for other purposes. Urban life and urban form take on this value, hence the actions of those who develop, manage and use space becomes primarily driven by the exchange value.

When asked the question, 'Who designs cities?', an experienced city planner answered 'bankers'. The investment decisions of business corporations, speculative developers and housebuilders have shaped cities. These decisions, in return, are driven by the principle of maximizing returns on investment. The urban land theory shows how competition for resources shapes the urban landscape (Figure 9.5). According to this theory, in pursuit of best locations, central areas become what they are.[68] Central areas are considered to be the most accessible and desirable locations, but due to the limited supply of land, they can be accessed through competition in the market. Rising prices mean a denser form of use, hence the high-rise buildings that dominate city centres. This theory may not explain the complexities of decision making. For decades, large tracts of land around these towers are left open, used for car parks. If the urban land theory was the only basis for explaining the urban form, these places must

Figure 9.5 According to the urban land theory, competition for the most accessible and desirable locations shapes the urban landscape (Boston, USA).

have been filled with buildings, but the suburban office parks have flourished. However, it shows the significance of economic decisions for the shape of the city. It is the abstract medium of money in relations of exchange that drives the agenda, and the result is abstract and quantitative.

Similarly, the public sector policies have been based on quantitative considerations. Whether in socialist or capitalist countries, it was often quantity rather than quality that drove the agenda. It was ultimately a utilitarian frame of mind that promoted building large-scale public housing schemes for large numbers of people. Whenever a problem is addressed at the scale of cities or nations, it was inevitable that quantity becomes the key organizing principle. However, the absence of emphasis on quality would limit the success of the process. The problem was being addressed at an abstract level, which was a characteristic of the approach adopted by science and technology, as reflected in modernism.

We have seen that a place can have a use value, which shows how it can be useful for people to live, work and enjoy. It can also have an exchange value, in which its place in the market and its monetary equivalence are expressed. Beyond these values, we can also trace what a place represents and means for people, its symbolic value. Design is the process that can bring these different forms of value together, or it can merely emphasize one at the cost of the others.[69]

In rational calculations, the elements of imagination, symbolic representation and meaning are often left to one side. Calculations are made on the basis of use or, more often, exchange values of a place. However, design is a creative endeavour that employs imagination in a problem-solving process. It draws on the existing store of symbols and meanings to generate new meaning. While it is firmly rooted in cold calculations of the market and its regulating frameworks, it works as an imaginative exploration of possible form. As defined by Kevin Lynch, design is 'the playful creation and strict evaluation of the possible form of something, including how it is to be made'.[70]

Critique of calculative reason

Practical reason has been described as 'the capacity for argument or demonstrative inference, considered in its application to the task of prescribing or selecting behaviour'.[71] Two major issues have been identified in studying practical reason. One is concentrating on the thought processes that are involved in formulating plans of action and carrying them out. The other focuses on the norms of conduct and the role of practical reason in determining them. Two different positions can be identified to address these.

The first is called instrumentalism and is based on Hume's famous argument, as we saw earlier, that reason alone cannot motivate action; it is passions that initiate action. Pleasure and pain, happiness or sorrow, are,

therefore, the sole objects of value and disvalue and hence the main motivators of behaviour. The second position is based on Kant's view, who considers practical reason as an autonomous source of normative principles. Independent from desires and aversions of passions, which have no intrinsic moral import, practical reason can motivate behaviour by formulating universal principles.[72] The two positions, therefore, oppose one another on analysing the motives for action, passions or reason. They also differ in their moral implications, subjective and particular according to the nature of desires, or objective and universal according to reason.

Kant distinguished between pure and practical reason. The theoretical use of reason involved the 'objects of the cognitive faculty only', while practical reason was involved in 'determining the grounds of the will'.[73] In other words:

> Reason, as the faculty of principles, determines the interest of all the powers of the mind but itself determines its own. The interest of its speculative use consists in the *cognition* of the object up to the highest a priori principles; that of its practical use consists in the determination of the *will* with respect to the final and complete end.[74]

Pure reason can be practical, which means it can determine the will, independently of anything empirical.[75] It does so by being autonomous in the principle of morality. In other words, pure reason could determine action due to the moral autonomy of individuals. Practical reason finds primacy over pure reason, as all interest is ultimately practical, and the interest of pure reason is conditional upon its practical use.[76] Since Kant, the word reason has been used in a wide range of meanings.[77] According to Schopenhauer, those who followed Kant 'tried, with shameless audacity, to smuggle in under this name an entirely spurious faculty of immediate, metaphysical so-called super-sensuous knowledge'.[78]

The implications of different definitions of reason for action are varied. Whether it performs merely a calculation or engages in a holistic intuition is a major dividing line in the understanding of reason and its applications.[79] In the seventeenth century, Leibniz formulated the principle of reason (*principium rationis*), which says 'nothing is without reason', which he thought to be a supreme fundamental principle.[80] In a letter, he wrote:

> *it is always necessary that there be a foundation for the connecting of the parts of judgment, in whose concepts these connections must be found*. Precisely this is my Grand principle ... that nothing happens without a reason that one can always render as to why the matter has run its course this way rather than that.[81]

Heidegger interpreted this principle as saying 'that every thing counts as existing when and only when it has been securely established as a calculable object for cognition'.[82] This was a principle in a long period of incubation which, since its emergence, Heidegger stressed, has shaped the core of western modernity, determining all cognition and behaviour.[83] The success of the modern technology is based on the calculability of objects, which is itself based on the principle of reason.

However, Heidegger invites us to differentiate between calculative thinking and reflective thinking. To do so, he emphasizes the word *is* in the principle of reason, concluding that the principle means that being is directly related to reason, or in other words he equates being with reason. In this interpretation, he uses the ambiguities of the German language. The German word for reason, *Grund*, also means bottom, base, and the lower-lying level, ground or foundation. In medieval thought, humans were thought to have their ground in God. When Leibniz interpreted God as reason, *Grund* found a similar sense.[84] If reason is seen as account, it is possible to see the human as a rational animal, 'the creature that requires accounts and gives accounts'.[85] But Heidegger still asks for going beyond calculative thinking, searching for different answers that reflection can offer. This demand for reflective, rather than calculative, thinking characterizes phenomenology, which was developed earlier by Heidegger's teacher Edmund Husserl, who had emphasized the inadequacy of expressing natural relationships by mathematical formulae.[86] Phenomenology radicalized the Cartesian confidence in the subjective perspective, and similarly emphasized intuitive reason.

Before Heidegger and Husserl, the most influential attack on Enlightenment's fondness with reason came from Nietzsche, with his well-known notion of perspectivism, which he published first in his book *Human, All Too Human*. He argued that all 'truths' are interpretations from particular perspectives. No accurate representation of the world is possible and we have no way of establishing whether our theories are true or false. A simplified interpretation of this principle is that '"knowledge" and "truth" are compliments paid to successful discourse'.[87] What follows is that morality is nothing but rooted in perspectives, and Christian morality nothing but the morality of the weak trying to control the strong. In his earlier book, *The Birth of Tragedy*, Nietzsche analysed the Greek tragedy as a play between reason and emotions. He associated these two poles with the deities Apollo, the god of music, light and intellectual inquiry, etc., and Dionysus, the god of wine, agriculture and fertility. The Apollonian principle was the principle of order, static beauty and clear boundaries, as expected from the sun god Apollo. In contrast, the Dionysian principle was of frenzy, excess and the collapse of boundaries. Nietzsche criticized Socrates for creating an imbalance in the western culture by directing it towards the Apollonian viewpoint. Reason, which was so heavily relied

upon, was indeed limited and could not correct the fundamental shortcomings of human nature, such as mortality and vulnerability. Excessive reliance on reason and repression of vulnerability were disastrous for the modern culture, and it needed to return to myth to strike a balance.[88]

His work has continued to influence thinkers after him, to the extent that Richard Rorty called the twentieth century the post-Nietzschean age and the postmodern thinkers such as Michel Foucault, Jacques Derrida, Gilles Deleuze and Jean-François Lyotard are considered to fall within the Nietzschean tradition.[89] What is significant in the postmodern critique is not that reason's existence is doubted. After all, the critique that is raised by postmodern sceptics is entirely based on rational argument, whatever the language used to convey it. This is only possible through the use of reason, as broadly defined. What is the centre of argument is not whether reason is used, but how to define what constitutes rational.[90] The method of arriving at conclusions through connected thought is not doubted or abandoned. Only the premises and the connections between different elements of argument are doubted. The argument for celebrating difference is partly an argument for accepting the pluralism of the rational; that connected thought can lead to many parallel conclusions. In other words, the contents of rationality are opened to challenge and change. These contents are decided upon through the cultural context in which they emerge. What is reasonable in one context may not be so in another, even within one culture, even within one person's daily life. If what can be done in private is performed in public it can be labelled as unreasonable. This is different from relativism, as all action depends on a context, but shows the necessity of deliberation and judgement, and a wider agreement on the appropriateness of the judgement.

One of the main problems that have emerged is the confusion between theoretical and practical reason, and attempting to apply one to the other, with their certainties and doubts. Some, from Descartes to the twentieth-century modernists, have taken theoretical reason as the only basis for thought and action, thereby extending an abstract theoretical rationality to a diverse human world. The cities that they have created are cities of theoretical reason, imposing some a priori principles on the complex reality of human societies. They have not acknowledged the different nature of practical reason, which according to Aristotle depends on deliberation and allowing for possible alternatives. Here, the need for certainty rules, even where ambiguity might be allowed. Others, such as postmodern sceptics, have applied the pluralism of practical reason to the scientific theoretical concerns. According to this view, all knowledge of phenomena is socially constructed, formed of multiple and contested truths, even the replicable rules of science and technology that have allowed humans to make computers and fly to space. Here the confusion takes away any certainty even where it is possible.

The new critics of reason share in their approach an essential ingredient of the empiricists, a sceptical stance towards seeing reason as all powerful and the sole criterion for all decision making. Both postmodern critics and empiricists, however, can be regarded as proposing rational, rather than rationalist, arguments. In other words, both postmodern critics and empiricists, as well as the rationalists themselves, are followers of reason; their difference lies in the way they define reason and its role in how to deal with the world.

Conclusion

As seen in the systems of measuring time and space, scientific knowledge and technological expertise are based on a process of abstraction, creating universal, abstract, impersonal notions out of the multiplicity of meanings and conditions that characterize human societies. It is a process of taking things *out* of their context and giving them an independent reality that can be transferred from one place to another without loss of significance. When used in new circumstances, however, these notions often take on new shades of meaning, new interpretations, which may or may not correspond to their application in other places. This is a process of dialogue between abstract and applied, between general and particular. The result is often a confusion about theoretical and practical reasoning, applying one to situations where the other is more appropriate.

Scientific and technological reasoning has suppressed the role of value in thought and action. In practice, however, what is considered to be subjective and personal plays a key role in city design and development. Whether or not aware of it, cities are designed and built within particular value systems. Much of urban development is driven by exchange value, assigning an abstract monetary value to space, thus creating abstract urban landscapes. This may be at odds with use and symbolic values of a place, although these different forms of value could be integrated through design, development and management of cities. Rather than a calculative and instrumental approach to reasoning, some have argued for a more integrative approach. Rather than assigning value to the abstract medium of money, use and symbolic values can, and should, also play a significant role in the process.

Chapter 10

Providing accounts

One of the key features of reason is that it provides an account for what we think and do, an account that we hope others find convincing. Investigating the nature of these accounts and the way we provide them is the main aim of this chapter. This takes us to an investigation into its links with language, how meaning is conveyed through linguistic and non-linguistic communication, and how objects and spaces play a part in this process.

Linguistic communication

Meaning is primarily established through communication between human beings, generated, as we have seen in the cases of time, space and value, through collective symbolization. This is made possible through the twin processes of continuous invention of a variety of symbols and the gradual establishment of public infrastructures which regulate these symbols and assign commonly held meanings to them. The symbols that we use to communicate vary and are numerous. Any gesture, word, image and object can be turned into a symbol for communication and creation of meaning. It is, therefore, essential for our study to have an idea of how these various systems of symbolization work through a process of expression and communication. It is necessary to see how meaning is generated through the use of these symbols, through interaction between individual agents and public infrastructures of meaning.

In linguistic communication, words and sentences are used to convey meaning, while non-linguistic communication uses other signs, from gestures and forms of behaviour to images and objects that we produce, display and use (Figure 10.1). But it is essential first to have an understanding of the linguistic nature of meaning. Although some feelings may initially be pre-linguistic, when they are expressed and communicated, common symbols are used. If a main feature of reason is to give an account for our beliefs and actions, an account that is primarily expressed in words, then reason has a close relationship with language. In other

Figure 10.1 In linguistic communication, words and sentences are used to convey meaning, while non-linguistic communication uses other signs, from gestures and forms of behaviour to images and objects that we produce, display and use (Dublin, Ireland).

words, this broad definition of rational, as that which can be convincingly accounted for, is not possible without the use of language. It is therefore essential to have an idea of how language works.

As in time and space, meaning is captured through a common medium, an institution that has emerged through collective symbolization and the use of public infrastructures of meaning. The historic processes of change show the development of these public infrastructures through trial and error, through formal decisions as well as everyday use and practice. As Ludwig Wittgenstein argued, it is impossible to have a private language, the words of which are known only to its originator. The rules that govern language and make communication possible depend on human agreement. Indeed the very possibility of language and concept formation is closely related to this possibility of human agreement.[1]

Language acts as a public infrastructure to make communication possible. The members of a linguistic community share a framework, which they have inherited from previous generations, and which they themselves develop and use in new ways. As an evolving and changing common infrastructure, language becomes a means of establishing common histories and identities, developing shared perspectives into the world by the way words and sentences are used.

The vocabulary of a language divides up the world into separate categories and names them, establishing a relationship between a set of symbols and a particular way of classifying the world. This is a system of classification that is different for different languages, and for societies living in different historical periods. Depending on the particular configuration of their society, and their approach to classifying and making sense of this configuration, different societies capture and segment meaning in different ways. The only ways to understand other linguistic communities that are far from us in time and space are either to live with them long enough so as to see the world with their eyes, which is not possible in most cases, or to resort to translation, which is a form of interpretation.

The use of a language is not the same for all its speakers. From the everyday expressions used by members of a family to the specialist terminologies and jargons used by members of a profession, and to the regional and geographical variations, words and sentences can have a local meaning not shared or understood by others. Does this mean that there is no such thing as a public infrastructure for a language? This is not possible, as any of the thousands of languages that are spoken across the globe can only exist on the basis of a community of speakers who share its rules and contents. There will be variations within the linguistic communities, particularly the very large and complex ones. Nevertheless, what makes one language different from another is its common infrastructure of rules and contents, which at a broad level is shared by its speakers.

Meaning cannot remain fixed and it changes through interactions and

tensions between public infrastructures and individual experiences, which transform the two sides in turn. It is in this interplay of public and private, of abstraction and multiplication, that meaning is established and transformed. Collective symbolization, therefore, creates and captures the contents of communication through segmenting them into pieces and reconstructing them in new ways. Anyone who has witnessed the emergence of new terms, whether in specialist circles or in general usage, recognizes that many words are constantly coined by individuals and groups and only some of these new words come to be widely accepted and used.

One way of analysing how language works is to focus on its use in context, which the philosophy of language calls pragmatics, as distinct from semantics.[2] A sentence can have different meanings in different contexts, depending on its degree of clarity or direction. By making a distinction between use and meaning, speech act theory, a branch of pragmatics developed by J.L. Austin, systematically categorizes the sort of things that can be done with words and their effects.[3] The question posed here is, 'How is it that speakers can impose meaning on mere sounds made from their mouths or on marks made on paper?'[4] Speakers start by performing speech acts, which are acoustic blasts that come out of their mouths. Human communication is capable of using these acts to produce an intended effect on the hearer. This is done by getting the hearer to recognize the speaker's intention to produce that effect.[5] A person in uttering a sentence is likely to perform three acts, which are called 'locutionary', 'illocutionary' and 'perlocutionary' acts.'[6] First, it is an act of saying or expressing the proposition. The next act, which is the focus of attention as the minimal complete unit of human linguistic communication, the unit of meaning, is what we do when we talk or write to each other. Third, the effects of these acts on the hearer, such as persuading, convincing or getting the hearer to do something. Successful communication happens when the audience recognizes the speaker's intention to express a certain psychological state with a certain content.[7]

A further distinction is between 'speaker meaning' and 'linguistic meaning'.[8] The speaker has some intentions when using words and sentences, which may not be exactly the same as their conventional meanings, as generally held. In linguistic communication, a speaker uses a combination of two forms of intentionality: a conventional intentionality of words and sentences of the language plus the intentionality of the speaker which is imposed on these symbols.[9]

The key to understanding meaning, John Searle argues, is to recognize that it is a form of derived intentionality. Intentionality is the term that describes the various forms through which the mind relates to the world, by being directed at, or be about, or of objects and states of affairs.[10] Intentionality may be describing the conditions of the speaker. The meaning of the sentence, however, does not only depend on the words

uttered, but also on the context in which they were uttered. A sentence may have implications that are additional to their linguistic use, as H.P. Grice's theory of conversational implicature showed.[11] For example, when someone asks 'Is he a good designer?', the sentence can be both interpreted as a straightforward question, or one with a negative implication. This partly depends on the social environment in which communication takes place, and whether those engaged in communication share common background assumptions and rules of conversation to understand words and sentences in the same way. Therefore, the collaboration of the hearer is as important as the intentions of the speaker.

In other words, four aspects of language are at work when communication takes place: linguistic conventions, speaker's intentions, conversation's context and hearer's reaction. The symbols of the public language have a conventional relationship with subjects to which they refer. The speaker also has a personal relationship with the world. By speaking the language, the personal and the conventional relationships with the world are combined to create meaning in communication. Communication, however, does not take place in a void, and therefore the context in which it takes place is also significant, which includes hearer's interpretation. Linguistic communication, therefore, requires general constructs of language (words and rules that govern using them) to be employed by a particular agent in a particular context in collaboration with the audience.

These aspects of meaning, however, are not neatly separated from each other. As the growth of prelinguistic children shows, mind and language enrich each other until the mind is linguistically structured. From then on, 'one has to have a language to think the thought'.[12] It is, therefore, impossible to separate the two simplistically by assuming that a speaker has first the thoughts and then proceeds to put them into words. This appears to question the notion of a Cartesian self, in control of the body, first generating thoughts and feelings and then expressing them through words and other means of communication.

If reason is an integral and definitive part of human beings, and if it is so closely intertwined with the ability to symbolize and communicate meaning through language and other means, it becomes impossible to deny its existence or significance. A critique of reason can be only raised not to question the existence of this human faculty, or its significance in what we think and do, as some sceptics do. What the sceptics do is indeed itself an exercise in the use of reason. Those who conduct an analysis of discourses are investigating the accounts given for beliefs and deeds, and in doing so provide an alternative account. They do not refute reason or truth; they merely provide alternative accounts as a critique of an existing one that someone else has provided. The critique, however, needs to include how something is defined as reasonable, while others are refused as irrational; how judgements are attributed to be rational, what premises are used to

arrive at what conclusions, what routes are taken to arrive there, and what accounts are given to justify particular thoughts and actions.

After the relative decline of language as the core of philosophical debates, the discussions about meaning have turned into the problem of truth as the central concept in the theory of meaning.[13] For our purpose of inquiry into the city of reason, this becomes a significant development. If language is the means with which accounts are given of the world around us and of our reasons for our actions, then the notion of truth, understood as justified belief, becomes a key concern. How can we rely on these accounts? In this sense, one of the longstanding problems in philosophy, the problem of doubt and how to deal with it, to assert or undermine human beliefs, once again takes centre stage.[14] Developing a concept of truth that was based on common sense and avoided the claims of the new sceptics now seemed a necessary undertaking. One such attempt, by Bernard Williams, stresses the centrality of sincerity and accuracy in giving accounts of the world to others, if communication is to succeed.[15]

Providing an account

The main task of reason is to provide convincing accounts for our beliefs and actions.[16] Whether engaged in intuition or calculation, we seem to be searching for a string of words that would assert a particular belief and justify a particular action, in a way that others agree with us. As such the account is tightly intertwined with language; it is always a narrative, told from one perspective, and delivered in different forms: from interpersonal communication to public displays and performances (Figure 10.2). Constructing this account is based on a set of judgements, which by definition are exclusionary; the account includes some words and sentences and not others, refers to some facts and events and not others, draws on some values and not others, includes some viewpoints and interests and not others.

As hearers of these accounts, how do we react to them? How do we judge their reliability, i.e. how do we agree that this account was a reasonable one while the other was a mere fantasy? The account may or may not relate to reality; but to be convincing, it has to be told in a public language, in a coherent and well-connected narrative, which corresponds to some initial facts and beliefs that are agreeable by some of the hearers.

This may generate a well-crafted argument; but to be fully convincing, we need to be able to probe the account, to raise questions and receive equally convincing answers. Without this ability, we remain unconvinced about the rationality of an account, and treat it with caution and suspicion. This question and answer may take place in a conversation with the speaker, or inside our minds, as we may not have access to the author of a text or a speaker seen on television. Nevertheless, it is crucial that the process of giving an account and accepting one as reasonable is not often

Figure 10.2 Providing convincing accounts for our beliefs and actions is always a narrative, told from one perspective, and delivered in different forms: from interpersonal communication to public displays and performances (Athens, Greece).

one simple exchange, but an ongoing conversation, which can only be successful if a critical question and answer conversation is possible. As Mill had insisted, human wisdom could only result from the 'steady habit of correcting and completing his own opinion by collating it with those of others'.[17] This required an environment in which freedom of expression was guaranteed, as well as appreciating that the truth may have many sides: 'the only way in which a human being can make some approach to knowing the whole of a subject is by hearing what can be said about it by persons of every variety of opinion, and studying all modes in which it can be looked at by every character of mind'.[18] Nietzsche says almost the same, but in his own words. He warns us that any rational analysis is an interpretation from a viewpoint, but to counter the effects of entrapment in a single perspective, Nietzsche suggests we 'employ a *variety* of perspectives and effective interpretations in the service of knowledge'.[19] As he puts it, 'the *more* affects we allow to speak about one thing, the *more* eyes, different eyes, we can use to observe one thing, the more complete will our "concept" of this thing, our "objectivity", be'.[20]

There are those who treat all accounts with the same level of suspicion and doubt, seeing them as mere subjective narratives that belong only to a speaker, who is either unable to assert a belief, or is misleading others by pretending to do so. But in the realm of commonsense, where communication among the members of a society is a necessity, this level of doubt can only lead to the collapse of social institutions and relations. Therefore, trust finds a central place, which bridges the gap of credibility that this doubt has generated; trust either in the hearer's faculty of judgement or in the speaker's sincerity and accuracy.

The accounts that we give of our beliefs and actions do not all convince ourselves and others; even if they do today they may not do so in the future. Provision of accounts, which is the hallmark of reason, therefore, is embedded in particular times and social circumstances. In some places and times, a particular account may make sense to its hearers. An example is the theory that the earth is flat. As far as the people of ancient times were concerned, this account was perfectly convincing, proven by empirical evidence; for us too it is convincing to think that this was the limit of their knowledge and therefore rational in its time. But now we do not believe in this account any more. This renders this account unreasonable for us, but not for the ancient people, as they had no way of testing this account the way we do. Therefore, they and we are both reasonable in our accounts, relative to our means of justifying our beliefs. When we compare the two competing accounts, we will of course have to choose one as more reasonable than the other. In any given period of history, we may do our best to provide convincing accounts of the world around us; these accounts may change through time, but this does not mean that all accounts are relative, that they are all equally believable, and that using reason is futile. On the contrary, it means that our accounts are never perfect or complete, that they can be challenged and improved, and that this is the best way to remain aware of ourselves and of the world around us.

The same applies to different accounts given simultaneously, whether by competing individuals and groups in the same social context (e.g. opposing political parties in a country), or by different groups in different contexts (e.g. clash of cultures from different countries). It is possible to see how potentially they can all be reflections of using reason to provide accounts for particular beliefs and actions. It is also possible to see how each is embedded in a particular set of conventions, social interests and cultural histories. If they relate properly to these contexts, they may appear to have provided a consistent account of a belief or action. There are times that competing accounts can be both valid, as they are not mutually exclusive. If we have to choose between the two, however, we will do so in relation to our own disposition in the argument. But this does not mean that we cannot see the reasoning behind the other side's argument. The relativity of the accounts does not then mean that they are equally pointless,

but that they are systematic formulations of particular individual and group dispositions.

The only way to choose from these accounts is to look at them as arguments, analyse the way the argument has been constructed, and be willing to change the building blocks of the construction if they do not fit. For an argument to be convincing, it has to be coherent, so that its component parts relate to one another logically; and to be accurate, so that it makes accurate references to the world; both forms of making connections. By investigating these components, we try to improve our accounts of the world, and if we are open to critical evaluation of the process of reference and of the coherence of the argument, we will be able to construct, and agree with, better arguments.

When we listen to the debate between two opposing views, for example, we may already have a position towards them, supporting one and rejecting the other. But what happens if we are undecided? How do we make a choice? The only way is for us to observe the coherence of their argument, and of the way those arguments refer to the world as we know it. But such choices are not always made on the basis of the strength of rational argument, but also on the basis of our personal tastes and preferences. The way the discussants look or behave, their body language and their facial expressions are all elements that they employ to fight one another, and which we use to choose between them.

The ability to communicate is different from the ability to reason, even though some commentators have used these interchangeably. Furthermore, the accounts that convince the audience are not necessarily accurate or complicated ones, but can be merely simple accounts. A further point is that convincing an audience may take more than provision of a single account: they may need frequent repetition of different versions of an account to feel persuaded. These can be delivered through various means, with the effect of persuading a sceptical audience to agree with the point. An example of all these instances being played out can be found in political elections. Candidates provide many versions of their accounts in different meetings and interviews, and even if they are not fluent in delivery or unable to provide a convincing account on their own, repetition and multiple channels of communication convey the point and persuade the voters to support them.

Fixing and transmitting meaning in time and space

For thousands of years, going back to the early drawings in caves, artists had used signs to symbolize meaning. For centuries in Mesopotamia, paintings on the sides of clay vases or engravings on stone seals had been used. It was around 3200 BC that writing was invented there, a fixed system of signs recorded on clay tablets. As distinctive from artistic expres-

sions of the past, this system of symbols could transmit a message in plain language, capturing speech and presenting it to others in other times and places.[21]

It appears that the emergence of writing was not aimed at materializing and fixing thought, but for the more practical task of counting goods, in the same way that conceptualizing time and space started with practical concerns of measuring duration and subdividing land. Writing developed out of a number of record-keeping systems that were used in the growing bureaucracies of Mesopotamian city-states, making the operation of specialized, hierarchically organized administration of economic and political systems more efficient.[22] Clay or stone tokens were in use as long ago as 8000 BC, to represent quantities of particular goods, which were joined later by clay balls, numerical tablets, seal cylinders and protocuneiform tablets.[23] The management of rapidly growing amounts of information in expanding and complex economies necessitated the development of a flexible system of information storage and communication.[24]

The city of Uruk[25] was rich and prosperous, due to large-scale farming of grain and dates and intensive raising of sheep and goats, and their derivative industries. To avoid waste and loss, the distribution of goods and trade with other towns and regions in Mesopotamia and abroad required rigorous accounting practices. Keeping track of vast quantities of traded goods could no longer rely on the fragile memories of accountants, and so it was essential to develop a system of recording, which could document goods and their numbers. But there were too many types of goods to count, and the number of signs needed to be reduced to a manageable quantity, which was around 1,000 in the early days of writing. A method of simplification was used, in which one symbol stood for several objects, objects that were close in nature or when conventions were followed. Each sign was a pictogram or an ideogram, referring to a thing or an idea, and a juxtaposition of several signs could evoke a meaning, for example, plough + wood + man meant farmer. Within one or two centuries, this written system of things evolved into a written system of words and sounds, so that signs now referred to the spoken words in language, which in the Sumerian language were often monosyllabic. From being pictographic and ideographic, writing became pronounceable and phonetic, each sign referring to a syllable.[26]

As scientists have shown, it appears that to deal with the flow of sounds and speech, the human ear and brain divide it into syllables.[27] Dividing words into syllables and using signs to record syllables, rather than words, was a step on the way to segmenting all words into their constituent sounds, which could be written with the alphabet. The development of writing shows how communication in recorded signs first segmented language into words, then syllables, and then sounds.

Other writing systems in the world grew for different purposes: Chinese

for divination, Mesoamerican for recording the passage of time and royal genealogies, and Egyptian for monumental display and administration. They all shared with Mesopotamian writing the tendency to be initially mnemonic, i.e. designed to aid memory, rather than communicating or documenting speech.[28]

During the third millennium BC in Mesopotamia, the number of signs was reduced to around 500, and by around 1500 BC the alphabet was invented, which simplified writing.[29] Writing developed from its original function of simple accounting to recording almost everything that language could express, in all its richness and extraordinary capabilities. By using a bevelled stylus, rather than earlier pointed tools, all curves were eliminated and signs resembling wedges (cuneiform) were produced, turning the script into an abstract system, which could be used to record different languages (Figure 10.3). The complexity of writing also gave rise to writing professionals, who were trained at schools to be able to perform a variety of public tasks, from copying texts to producing documents for social contracts and economic exchanges. These could include marriages, partnerships, sale of land and slaves, renting fields, interest-bearing loans and adoption contracts.[30] While even kings were illiterate, the scribes could exert a powerful influence in society, shaping knowledge in political and economic, as well as cosmological and ritual fields in support of royal power.[31] Some have seen writing as a defining feature of urbanism, an essential tool in the emergence or reproduction of civilization, both a tool of suppression and an agent of liberation.[32] The invention of writing is closely intertwined with the rise of the city-state and its integrated hierarchical order. In Mesopotamia, and its neighbouring Elamite Iran, some argue, writing was helping to maintain social order, as written accounts 'situated each person in his place', by showing the relationship of humans to each other and to gods.[33] It is clear, however, that writing was both a response to major social, political and economic changes, as well as a catalyst for creating them.[34]

Writing, which was 'created to eliminate distance' was used from the middle of the third millennium to write official and personal letters.[35] Producing the works of literature was made possible: the first collection of literature dated from 2600 BC. Through writing, language could become a public infrastructure of communication. First it was Sumerian and then Akkadian that became the international official and cultural language of the time, a means of communication among different cities and countries that made up the ancient Middle East.

Performative communication

A focus only on the traditional notions of rationality, in the way that philosophers prefer, puts the emphasis on words, and not on the extra

Figure 10.3 Fixing and transmitting meaning through time was made possible through writing (Naghsh Rostam, Iran).

measures that we use to persuade others. Body language and personal behaviour can be as important, but they do not find a reflection in the written word, which is transmitted from one place to another without seeing the face and the body of the person who delivered or received them. Eloquence in delivery may be transmitted through the written word, but bodily gestures may not. When time is short and communication entirely word-based, there is always a possibility of misunderstanding, which is one of the key problems of e-mail communication. Provision of accounts in person, therefore, is different in nature from provision of accounts through written media. One has the potential of persuading others with a larger set of tools, while the other has to rely on a limited set of means to be convincing. The spoken word and the written word have different dynamics of persuasion.

Yet the additional means that the spoken word utilizes are not necessarily non-rational. If a person calculates that employing particular forms of body movement would persuade another person to believe in something or act in a particular way, then using that tool would be as rational as providing a verbal account. If emotions are no more than intense interactions with the environment,[36] then using them as a means of communication and persuasion may appear to be justifiable. The conventions that shape the form of action and belief are therefore at once social and biological. While our biology demands solutions to its needs and problems, social conventions limit our ways of providing these solutions. The tension between these biological and social demands, between individual desires and acceptable beliefs and actions, and the search for the illusive balance between the two, is one of the engines of social life. Not all choices, however, are between biological needs and social constraints. If we intend to go from a to b, whether to fulfil a personal desire or a social obligation, we need to make a choice about how to travel this distance, to go now or later, to go by bus or train, etc. These are different choices to find the best course of action; what they all share is the necessity to make a judgement among alternative options, and be able to provide a convincing account as to why one option is better than the other in a given set of circumstances.

Using words is not the only means of expression and communication; in face-to-face encounters or on television screens, words are supported by a complex set of additional material to ensure the accuracy of expression or to control its impact. These include bodily performances such as facial expressions, gestures and other signs that are used to create an impression and convey meaning.[37] Expression and communication becomes a performance, where the non-verbal expression may be performed on its own, or be combined with verbal expression of uttering words and sentences (Figure 10.4).

In the same sense that we can distinguish the speaker's meaning from the hearer's in linguistic communication, we can see a distinction between

Figure 10.4 Expression and communication becomes a performance, where the non-verbal expression may be performed on its own, or be combined with verbal expression of uttering words and sentences (Barcelona, Spain).

the performer's acts and the audience's reception and reaction to them in these forms of direct or technologically-mediated communication. These distinctions also direct us to potential gaps in communication and understanding, where one side's intentions are not shared by the other side. To bridge any potential gap, we resort to social conventions, which are commonly understood and shared, even if differently interpreted. These conventions help create a public infrastructure of behavioural codes which individuals employ in the hope of linking the performer and the audience.

Some conventions are employed only during some social encounters; others are adopted by the performer on a more permanent basis, which become masks that we wear in front of the others. Masks are the public face of individuals as developed over a lifetime, inscribed on their body as their character,[38] or frequently changed at will according to the occasion.[39] The masks are made of socially mediated suppression of impulses, to show a balanced and stable façade, which can hide the biological volatility of moods and emotions. It is the intersection of our biological make up and social environment, the interaction between the individual's deep wishes and desires and the socialization process that restrains them.[40] As we grow

up, we adopt the social conventions, and in the construction of our masks, we use them to show our appreciation of conventions, so as to be able to communicate with others.

Visual and spatial accounts

Another non-verbal element of communication is its spatial component: the stage, i.e. the environment in which the social encounter takes place or the social performance displayed. The impact of the setting on behaviour is undeniable, and the setting is often carefully used to maximize the effect of the expression. Spontaneous social encounters take place in whatever setting that is available; and yet skilful performers always use the environment to help them strengthen their expression. It is here that the designers of the city are engaged in enhancing or hindering communication among the city inhabitants. The same set of distinctions between speaker and hearer, between performer and the audience, can be held here, between the intentions of the stage designers and use made by actors, on the one hand, and the impression created in audiences, on the other.

It might be thought that the use of reason is mainly linguistic, rather than performative, and therefore these non-verbal forms of communication cannot be part of an investigation into the city of reason. However, it is clear that the content of each gesture can be described linguistically, and it can support a linguistic argument. For example, the movement of a traffic policeman's hand that stops a car to prevent an accident is a perfectly rational movement. As such it is part of the armoury of signs and symbols that humans have at their disposal to communicate with one another, and to help in understanding the world or deciding on the best course of action.

Providing an account is providing a connected string of words as the evidence of connected thought. This is, however, produced from a perspective and can be told in many different words and phrases. This is why humans have sought to find an alternative language that represents the connected thought about the world, but eliminates the perspective and limits the number of ways of expressing it. Unlike the language of words, the language of numbers is expected to make expression precise and replicable in as neutral and universal a way as possible. This is why mathematics is considered to be the language of science.

When presented visually, the language of numbers becomes the language of shapes: geometry. By using geometry, it was thought that a reliable system of connections had been employed to express, and to regulate, the relationship among objects and people. Producing a map becomes providing a visual account of the world. Producing a design, then, becomes producing a visual account of how the world should become. When this account uses regular geometrical shapes, it appears to be making connec-

tions between the distinct objects that make up the city, generating an ordered appearance.

This is perhaps why geometrical regularity of urban form has for most of history been regarded as an expression of rationality. It is expected to have the same effect as producing rational accounts for beliefs and actions. It is the evidence of making connections, in a manner that is widely understood by its producers and users. This is what the ancient city builders were anxious to display, a representation of a system of connections that gave them security and confidence. This is why the medieval cities that lacked such regularity were denounced by the modern world, seeing them as representing fragmentation rather than connection (Figure 10.5). This is why the laissez-faire cities of the nineteenth century were denounced by the twentieth-century modernists, who saw them as haphazard rather than well connected. The answer in all cases has been using geometrical designs as a sign of connected thought and connected action.

The language of mathematics is designed to leave out the emotional contents of expression and communication, which is why it has been criticized by phenomenologists for being reductive.[41] However, the visual form of mathematics, geometry, carries an emotional content, in the form of expression that it provides and the form of response it generates in the audience. Nevertheless, this emotional content is subject to strict rules, and as such it limits the freedom of human agents in improvising and finding new ways of thinking and acting.

Gaps in communication

The systematic study of signs, semiotics, focuses on generating and understanding meaning. The Swiss linguist Ferdinand de Saussure saw language as a system of signs, each consisting of a signifier and a signified: a signifier was the physical appearance of a sign that we perceive with our senses, and the signified is the meaning of that sign as commonly held by the speakers of that language. This analysis was extended to study the arts and architecture, seeing physical appearances as clues to socially held meanings. The problem with this system was that it was more interested in signs and their interrelations, rather than the way these signs were related to reality.[42] It treated reality as a text to read and to understand its underlying rules and structures, rather than to engage with the actors, objects and situations that made the social reality.

In linguistic communication, we saw how a speaker tries to convince a hearer of the accuracy and trustworthiness of an account. Can we detect the same process in spatial and visual communication? Designers use visual means of communication, to record and convey a set of messages that capture and shape the environment. Drawing is the means that allows them on the one hand to record and analyse the subject matter, and on the

Figure 10.5 The medieval cities that lacked geometrical regularity were denounced by the modernists, who saw them as representing fragmentation and disorganization rather than connection and coherence (Prague, Czech Republic).

other hand to work out the way an imagined object might look.[43] There are elaborate drawings produced to communicate with clients and planning authorities, but on many occasions designers use sketches to analyse and communicate with other professionals. This is a reductive process, in which the level of detail is controlled to ensure effective communication. This involves a process of abstraction, where details that are considered unnecessary or time-consuming to produce are left out, so that the key points can be captured and communicated.

But what about the built places, in which designers and producers of the urban environment communicate with a larger number of people, who do not necessarily share the same set of assumptions and conventions as do designers and their clients? This is where many of the gaps and failures of design can be observed. Upon entering a profession or an academic discipline, through education and engagement with professional circles, a novice is integrated into a new social field, with its own assumptions, frames of reference and conventions.[44] This is not, however, necessarily shared by other social fields or by the public at large, resulting in environments appreciated by designers but abhorred by their users. A resident of a peripheral neighbourhood in Birmingham called some unconventional buildings that were part of the regeneration of his neighbourhood as 'a designer's dream and a resident's nightmare' (Figure 10.6).[45] The many examples of postwar public housing schemes are a witness to this gap between professional fields and public needs and expectations. This in part refers to the gap in conventions that constitute these social fields, which leads to a failure of communication. No account provided by one social field can persuade another if they do not share some basic assumptions and supporting conventions.

The relative clarity of linguistic communication may not easily extend to the built environments, due to the complexity of the signs used, as well as the multiple meanings of the objects and environments built. The urban environment would allow different forms of use and interpretation for long periods of time. Through their encounters with the built environment, individual users may form personal, emotional and functional links with these objects and places, which would be different for different users. The process of communication and formation of meaning, therefore, becomes far more ambiguous and multi-layered.

If future generations were to interpret today's culture only through the artefacts of our time, not knowing our context and our patterns of behaviour and use, they will have only ambiguous, possible interpretations that lack certainty. We are in the same condition when trying to make sense of other cultures that are separated from ours by time and space. We ourselves tend to transform the historical monuments and landmarks, which for previous generations may have been imbued with deep meanings and emotional attachments, to instrumental use, e.g. for navigation and

Figure 10.6 The same objects and places can have different meanings; in a peripheral neighbourhood, these new buildings were identified by the authorities as innovative, but described by a resident as 'a designer's dream and a resident's nightmare' (Birmingham, UK).

aesthetic enjoyment.[46] The statue of a god or a king at the time that it was set up had a relatively clear meaning; often to generate awe, respect and obedience in the subjects. But long after the time of its erection, the statue may turn into an object of curiosity, an aesthetic experience or a glimpse into an obscure past. At the time, it was a public symbol which transmitted to the rest of society the wishes and intentions of those who set it up. It gave out a set of signs that most could read, reflecting the political and economic reality of the time, as well as symbolic sensibilities and social institutions. Now, it can only generate a guess, as it is the case with the buried objects archaeologists discover from previous civilizations. The lines of communication have been disrupted, as the multidimensional links that full involvement with a society provides are not in place. The lines of communication are at best ambiguous, and at times limited to an aesthetic impression.

The multidimensional relationship between an object and a society, or with an observer, generates multi-layered complex meanings. In its absence, meaning is limited in range and depth, visual contact and aes-

thetic experience becoming the only possible channels of understanding. This may apply to any system of meaning at work from across the historical divide that separates us from the past societies. It may apply to the social divide that separates the different societies that live far apart but in the same period. It may also apply to the members of a stratified society, where complexity and multiplicity of non-converging networks may generate limited communication among them.

Providing accounts enables a speaker to establish a relation of power with the hearer, through interpreting the world in a particular way, and offering, or even imposing, a particular order onto the complexity of the circumstances. The fields of knowledge are examples of providing such an order, systematizing what appeared to be chaotic or mystified. When accounts are entwined with practices, they become far more powerful. However, both as accounts and as practices, they are open to critique and resistance by others who do not agree with their interpretations. So shaping a city in a particular way may represent a particular interpretation of how urban lives should be lived, asserting a particular order for others to conform with. An example is the way the modernist towns and cities were designed and developed, with very clear and simplified assumptions about what individuals and households needed and how they lived. However, human beings are far more complex to be predictable in such a way; and the circumstances also change, so that these assumptions were no longer valid within a short period of time, if they ever were. The result is that there is a gap between the account, the built environment, and the evolving life patterns.

As we saw in Part I, cities have been built on the basis of particular foundations, each used to provide an overall account for the way they were built in that way. We also saw how, despite their difference, in practice many of the spaces may be similar, or many may use geometry as a means of communication and technology as a means of production in the same way. However, the gap between accounts, space and society offers the possibility of alternative interpretations and use of the city. We may still live in a Georgian street, but our reasons for doing so may be very different from the ones that its designers provided at the time of its construction more than two centuries ago.

In thinking about design and development of a city, we may think that the process of visual representation, creativity and artistic expression is non-linguistic and therefore be concerned about extending an analysis of linguistic communication to a visual and spatial undertaking. This is a non-linguistic experience that cannot and should not be over-intellectualized in this way. Would this way of thinking take the activity of urban design and development out of the realm of rationality? The answer must be no. Design and development are processes that are conducted by a number of professionals for a number of clients, engaged in a dialogue of persuasion

and critique. Designers will have to explain their scheme to their clients in an intelligible language, giving them an accurate account of the project and hope that the clients' judgement is the same as theirs. The same critical dialogue of persuasion takes place between the developers and their funders, the financial backers of the project who need to be persuaded of the viability of their investment. Even when the discourse is entirely about the aesthetic aspects of the project, the client needs to be persuaded of the aesthetic appeal of the project to potential users, and the designer has to give a convincing account, partly expressed in visual representation but also partly in words, of the worth of the scheme.

In his analysis of emotions, Goldie complains about philosophers' tendency to over-intellectualize their approach to emotions.[47] This may be the case with our analysis of architecture: if it is taken to be an art, then it needs to be given the free space of emotional expression. Trying to analyse this too closely would deprive it of its vitality and dynamism, its expressive freedom. At the same time, the functional aspect of architecture requires it to have a rational basis, so as to account for the resources that have gone into the building and the uses that are made of it. Architecture does have an aesthetic aspect, which requires emotional response and avoidance of overly intellectual approaches. It also has a functional aspect, which requires, in equal measures, a rational approach. The combination of the emotional and rational, however, is a very difficult balance to strike. If this is so difficult in a single building, it is much more so at the scale of urban design.

Public infrastructures and individual meanings

The notion of public infrastructure is wider than the notion of conventions. For example, we set up a series of conventions to measure time. But the network of physical objects, from clock towers to digital screens that show us the time, are not conventions: they are means with which we are reminded of conventions; frameworks through which the use of social conventions are made possible. I call these public infrastructures, which are the overall frameworks on which social conventions need to rely for their use and reproduction. Physical objects and the way urban space is organized constitute these public infrastructures, which show us how society is organized, how meaning is created, and how individual and public behaviour is shaped. Language is another public infrastructure, where many layers of conventions are created through time to generate an infrastructure for communication. It is possible for us to see how it makes sense to set up these public infrastructures; it is also possible to see how their construction is potentially fragile and contested, and how their use creates tensions with our individual trajectories that may or may not conform. It is a tension between the universal and the particular, whereby the universal

has to be open for reconstitution through constant dialogue with the particular. This would ensure a degree of flexibility, whereby the particular can be given space to exist, and the universal the chance to survive and grow stronger through adjustment. The universal can only exist through collective subscription to a set of norms and ideas. It is a reflection of the rule of the majority: even when they are established though the force of an individual, they can only become universal if accepted and used by a majority of others. Otherwise they remain a minority pursuit, an incidence of the particular.

Rather than metaphysical notions, public infrastructures can be understood as institutions, created by human agreement and sanctioned through common use.[48] The process of their creation has been long and embedded in many forms of struggles, from seeking knowledge to asserting power. The frameworks of time, space, value and meaning that are available at each moment may not be the best possible or the most accurate. They, however, do exist by agreement and as such are not merely fictitious. They are, therefore, as real or unreal as the rest of institutional facts that populate our human society, from government and money to marriage and property. These are institutional facts, in the sense that they do not exist outside human agreement, which takes place through collective symbolization.[49] If we decide to call the void between two walls the space of a room, we have not suddenly subscribed to a metaphysical notion; we have not lost our common sense. We have merely agreed to use the language to assign meaning to a particular composition of objects and their relationship.

As institutional facts are created by human agreement, they are constantly subject to probing and questioning by members of a society. At any time, these institutional arrangements may be challenged due to a bad fit to some circumstances, and so be pressed to take on new forms. Many of these frameworks may be so large and impersonal that they are beyond the access of individuals. Like the systems of measuring time and space, they are so widely accepted that they cannot be easily challenged or changed as a whole. In our individual experiences, we may find a gap between our personal perspective and the format and shape of the public infrastructure of an institutional fact. It is, therefore, at this micro level that we interact with the public infrastructure, and it is at this level that ultimately the change of infrastructures is initiated and transformed. The public infrastructures of meaning need to be robust and flexible at the same time; robust so that they can be used in thousands of different circumstances, and flexible so that they can change and be improved (Figure 10.7).

What we arrive at through abstraction, we apply elsewhere, as a ready-made unit, which at best is filled in a new context, as something we take off the shelf. These abstractions may or may not be appropriate for the task at hand. The entire question is about the relationship between abstraction and

Figure 10.7 At the individual level, public infrastructures of meaning are challenged and transformed (Berlin, Germany).

multiplicity. In knowledge, this means abstractions that are applicable to different conditions. In communication, this means words and symbols that may mean the same thing in different contexts. In practice, this means tools and skills that are applicable to different needs. The reality is that collectively developed notions (words, symbols, skills) are applied by a particular individual or group of individuals in a particular context.

This, then, means finding tools to deal with complexity and for communication; the ability to reduce multiplicity to simplicity through reduction and abstraction, and later to be able to expand simplicity to complexity and multiplicity. It is true that this process involves a degree of interpretation and imagination, and hence the accuracy of information may suffer on the way. However, without this ability to summarize and expand, the survival of the weak human species in a world full of stronger animals may have been in doubt. The ability to share information and help each other overcome obstacles is essentially based on communication, which in turn is only possible through reducing larger amounts of information into communicable amounts of signs. This enables us to unpack the reduced packages of information and ideas and use them in our own capacity, applying them to our own circumstances.

Public infrastructures are developed through relying on some intellectual foundations (foundations such as gods, science and technology, individual freedom, society and nature) and a process of analysis and synthesis: segmenting phenomena into small units and reconstituting them in new ways. Rationality often means drawing on these public infrastructures, to which we refer to make our judgements, hold our beliefs and undertake action. The complexity of living together in cities, in ever larger numbers and higher densities, has made the development of these frameworks inevitable, which are embodied in spatial configurations and social institutions. At the same time, there is a constant tension between these public infrastructures and individual thoughts, feelings, expressions and actions; tensions which shape our everyday social reality. These frameworks are under constant pressure for change, as they tend to reflect a particular context: the beliefs and actions of particular periods, circumstances, groups and individuals. They show a particular power relation at a particular time. The best course of action often needs to be flexible enough to allow for new players and new interpretations. It should allow these arrangements to be questioned, and these different pressures to be expressed, debated, and to be potentially influencing the shape of the public infrastructure of reason, transforming the inherent power imbalance towards a more inclusive outcome.

While some of these frameworks are resilient and can operate in other periods and places, many others cannot. The more permanent they are thought to be, the more rigid they become. What is acceptable in one period can be obsolete in another, what seems reasonable in one set of circumstances may not be so in another, and what is valued by one social group may be challenged by another. One result is aestheticization, which results from distanced reinterpretations of other times and other places. As we do not relate directly to the past periods and far-away places, we either try to recreate them in our own image, as the modernist reform intends to do, or to keep the distance and look at them through an aesthetic lens, as much of postmodernity has done. In the former, we judge and accordingly transform what we find from other people and other periods. In the latter, we suspend judgement, and focus on the enjoyment that they can give us. In modernism, the traditions and the monuments are there to be conquered and potentially destroyed. In postmodern sensibility, the traditions and the monuments are merely the objects of aesthetic contemplation.

The desire to establish public infrastructures and to challenge them are two constituent parts of social life. We build public infrastructures to make living possible in a potentially harsh natural environment and a complex social environment. On the other hand, we need personal freedoms, individual spaces to act freely and not feel under pressure from others. This is the core of the difference between the eighteenth-century drive for reason, which put reason and the public space at the heart of the

modern society. The companion to this, which emerged first as a critical reaction, but thereafter somewhat integrated into it, was the drive towards emotions, towards privacy and nature. This provided a critical stance, a way of striking a balance. From our vantage point, however, we can see that we need both these wisdoms. The dichotomies that we have inherited from the nineteenth-century debates include mechanical versus organic, instrumental reason versus feeling, discursive description versus expression, etc. Some of these dichotomies are necessary to keep, argued the late British philosopher Bernard Williams, 'in particular to assert their right-hand side, but certainly we should stop using them to assail the Enlightenment, a phenomenon which entirely transcends them'.[50]

Conclusion

Reason is the human capacity to produce convincing accounts for belief and action. This account is a narrative told from one perspective, and needs to accompany other accounts in a conversation, whether in person or mediated through symbols that transmit meaning in time and space. The account is produced through linguistic communication, which includes the speaker's intentions, linguistic conventions, conversation's context and hearer's reaction. In addition to words, other symbols such as numbers, objects and images, as well as performances with the help of facial expressions and body gestures, are employed to produce accounts and persuade others.

Geometry is the visual presentation of a set of existing or desired connections among the material objects that make up the city. A design is a visual account of how the world should become, drawing on geometry to generate an ordered appearance. Here, however, the relative clarity of linguistic communication gives way to ambiguity and multiplicity of meaning. Inherent in any account are the relations of power: empowering the one who provides the account over those who receive it. At the same time, an audience who cannot identify with the process or content of the account will resist it. Public infrastructures of meaning, which include institutions and material arrangements, rely on commonly held accounts, made possible through collective symbolization, as well as on individual experiences that challenge and change these infrastructures.

Chapter 11

Connecting actions

The design process often involves exploring different options and developing a series of alternative solutions to a set of problems. The design that is finally selected is the alternative that is judged to offer the best solution. Other alternatives will have their own points of strength, but this one would be the one that the designers and other key decision makers see as providing the best fit for the task. A key question, therefore, is to know how we arrive at these alternatives, and on what basis we decide that the selected solution is considered to be the best course of action. This is the main theme of practical reasoning and we search for its implications for designing cities by asking: how do we ensure to undertake the best course of action in shaping cities? If the task of practical reason is to help us undertake the best course of action in any particular set of circumstances, then a city of reason would be one in which there are mechanisms for doing so.

A challenge for rationality is pluralism and diversity. What may be reasonable for one person may not be so for another. In private actions, this may not cause much trouble, but in public affairs, such as design, development and management of cities, it can lead to conflict and ineffectiveness. The way one action can be compared and linked with another, therefore, becomes a major issue. For some, the solution has been connectivity; seeing connected action as a reflection of connected thought, a sign of rationality. This is perhaps the key feature of planning: the ability to connect different actions together to lead to a desirable result. In this chapter we investigate the nature of such connections. First, we investigate the division of labour, in which action is segmented into different functions and roles, and the relationship between those who perform these different functions, whether engaged in competition or collaboration, in contrast or harmony. The chapter then explores the nature of connected action, its limitations and the gaps between accounts and actions.

Is the designed city a rational city?

All cities are, in a sense, cities of reason, as they are built, piece by piece or wholesale, by intelligent human beings engaged in purposeful action. But do we recognize all cities as rational? We hear complaints by the citizens of many cities on how irrational their city is, how badly designed and managed it has been, and how life in that city is less than desirable. How do we explain the discrepancy?

Design may have acquired a glamorous image in the popular imagination, associated with fashion and wealth; it may have been considered as a mysterious process in which creative people produce beautiful objects; it may have been seen as subjective and emotional, and hence seen as a wild card by some in the development industry. Stripped of these images and myths, however, design is a set of instructions for making something, and the process through which these instructions are generated. From industrial design to city design, this often means one or more individuals engaged in the process of understanding the needs of users, the capacities of producers and the requirements of the larger society; and proposing imaginative solutions to particular problems. As Kevin Lynch defined it, design is 'the playful creation and strict evaluation of the possible forms of something, including how it is to be made'.[1]

This is a process that is at once technical, as it draws on the available technology to make objects; social, as it involves a large number of people in the production and use of these objects; and creative, as it involves subjective and aesthetic expression as well as cultural production.[2] At once it involves an instrumental use of reason, as well as emotional investment by the designer and the observer; it involves goal-oriented problem-solving as well as exploratory expressive exercise. In a sense, design is the hallmark of rationality, as it is a manifestation of the use of theoretical reason, in employing a range of scientific techniques and geometrical knowledge to understand and to shape things; practical reasoning of deciding on the best course of action in the process of such shaping; and productive reasoning of how best to make something. But does this mean that a designed city is a rational one, a city of reason?

According to Vitruvius, the expertise of the architect is a result of both practice and reasoning. Practice means 'the constant, repeated exercise of the hands', which brings 'the work to completion in whatever medium is required for the proposed design'.[3] Reasoning, however, means, 'what can demonstrate and explain the proportions of completed works skilfully and systematically'.[4] With these words, he seems to be referring to the practical skills of making and to the theoretical knowledge about the product; the twin abilities of making something as well as reflecting on it, the abilities of shaping objects as well as giving an account of this process. It is not sufficient to produce a building and not be able to

explain why it is built in this way; it requires a mastery over objects as well as words.

Descartes equated the idea of rationality with a single design. He felt that a single designer for a city or a legal system would turn it into a more rational system, rather than relying on the inheritance of the past, which revolves around custom and habit. The question that arises is: can we redesign everything any time that we add some new object or a building to our environment? Can we change all our old institutions to fit our changing circumstances? This may appear logical at a moment of renewal, but can we repeat this renewal at each and every moment? Can we reshape all the old buildings and spaces to fit into the needs of the new society? The answer is that we constantly do this through adjustment, through renovation and refocus. But it is not physically and humanly possible to redo this all the time, as every moment there is a new need, a new condition; a new building is built, a new habit is formed, a new object is created. These changes cannot dictate reshaping the entire existing stock of institutions and objects. Indeed much of their design revolves around how they should fit into the existing contexts, rather than changing them. At the end, the outcome will be an interaction between the new and the old, rather than one ruling the other out completely.

In cities today, we are surrounded by objects whose shapes and qualities have often gone through a process of deliberation and production to make sure they are attractive and functional. This applies to almost all objects we come across: the clothes we wear; the furniture in our homes; the tools we use to eat, work and play; the houses we live in; the cars, buses and trains we travel on; and the roads, schools, offices, hospitals, museums, parks, etc. In short our cities are a collection of designed objects. The quality of design and production may vary, but the fact remains that our cities are thoroughly designed. Would this make them cities of reason? If all the objects in a city are produced through the purposeful process of design, would a collection of such objects which make up the city make it a place of reason?

One answer may be to realize that these objects have been designed according to different sets of considerations and circumstances and in different periods of time. When they come together, they may or may not be compatible. If an object is fully rational on its own and in its own place, it may clash with another object that is equally rational but not compatible with the first. An example is trying to put a large vase on a narrow table, or to drive a large bus into a narrow road; the system becomes unstable and it may cause damage to both elements.

To avoid this type of clash, the modernist design has attempted to design the entire environment according to a coherent set of principles. Would such an environment be a rational one if everything followed the same logic? All the objects have been created according to a system of

standards that would avoid misfits, ensuring a degree of functional compatibility and aesthetic coherence. The urban environment, however, is so full of different objects that it is entirely impractical to change everything at the same time. Modernism may have attempted this, but there will always be objects that are created in the past, or objects that will be made in the future, where the logic of production may have moved on to new ways of thinking and acting.

The wholesale change of all of our objects may be unrealistic. How about trying to adjust each new object to the existing objects so as to ensure full compatibility? This is paying respect to the context, to the existing ways of doing things. While this may be a more robust approach through time, it cannot possibly address the entire range of objects that exist in the city. The result is compatibility with some and misfit with others.

The city of reason, therefore, cannot be the result of a collection of the designed objects. Whether through changing all existing objects, or through adjusting new with old, incompatibility and misfit remain as essential features of complex systems, even if individual elements in this complexity are well thought out. The natural organisms and ecosystems that appear to have a degree of coherence and fit between elements are the results of extremely long periods of adjustment and coexistence. In comparison, the human societies and their objects and relationships are a mere sudden appearance, as their frequent change and short periods of existence make it impossible to arrive at these degrees of coherence observable in natural organisms. Those who compare the city with organic lifeforms hardly notice the different timescales that determine the shapes of these different systems.[5]

Segmenting action: division of labour

We have seen that a major step in applying reason has been subdividing phenomena into smaller parts, going through a process of segmentation that would allow us then to reconstitute those elements in new forms and utilize them in new ways. In making social actions rational, a major form of this segmentation has been the division of labour. By dividing action into different tasks and assigning each task to a different person, human societies were able to settle in towns, where the surplus from agriculture and the division of labour made the emergence of artisans and traders possible.

The establishment of cities was first made possible by the productive countryside, which provided the necessary surplus to be accumulated in a particular place, and a new way of working that freed some workers to do other things. The birth of cities in ancient Mesopotamia was made possible by the surplus from agricultural production, followed by a complex divi-

sion of labour and its associated social and spatial stratification, giving some social groups, and particularly men among them, the upper hand. Some feminists have associated the advent of writing in Mesopotamia with the demise of goddesses in their religion, where the gods became the dominant force, as reflected in the Mesopotamian god Marduk's killing of the goddesses. For a long time, goddesses were worshipped as the sources of life. With the establishment of writing and reasoning, men took over the dominant position in mythology and religion. The former goddesses were then incorporated as angels into the male gods' domains. The god Apollo is believed to have gone from Asia to Greece, as reflected in the Babylonian elements in the cult of the god.[6] If reasoning and religion both originated in Mesopotamia, it is no surprise that their combination, i.e. the god that represented reason, also came from there.

The achievements of the Mesopotamian civilization also depended on the exploitation of large numbers of people, whose conditions of life sharply contrasted the luxury life of the rich and powerful. In the birthplace of cities, the city was divided into core and periphery. At the core lay the temples and palaces of gods and kings, surrounded by the priests and powerful families, separated from the rest of the city by high walls, and the city itself was separated from the countryside by another ring of walls. Cities were stratified along the division of labour and the power that emanated from this division.[7]

As roles and functions became well established, the division of labour formed a significant part of the social order, to the extent that these roles became rigidly guarded and enforced. An example is the way Plato's ideal city is organized alongside a functional division of labour. Plato analysed the process of community formation on a functionalist basis. First, human beings who realize they are not self-sufficient come together to form a community. As he puts it:

> So people become involved with various other people to fulfil various needs, and we have lots of needs, so we gather lots of people together and get them to live in a single district as our associates and assistants. And then we call this living together a community.[8]

But people are also different, with different capacities and talents. For a community to succeed, then, it is necessary that a division of labour is established, on the basis of a degree of specialization. Plato identifies three classes of people in a community, which correspond to the three parts of mind: guardians (reason), military (passion) and artisans (desires). Both in mind and in community, the ideal condition was, therefore, that reason be leading the desires with the help of passion. The communion of reason and passion under the leadership of reason was the perfect arrangement for protecting the body and mind, as well as the community of humans,

against external enemies. 'The rational part will do the planning, and the passionate part the fighting. The passionate part will obey the ruling part and employ its courage to carry out plans.'[9] Therefore, the best arrangement would be 'when an individual sets aside his other pursuits, does the one thing for which he is naturally suited, and does it at the opportune moment'.[10] For Plato, this functional rationality is equated with morality, which is 'doing one's own job'.[11] For the community to be moral, it meant that 'each of the three natural classes that exist within it did its own job'.[12]

This strict functional division of labour articulated rather rigid social circumstances, where perfection through physical exercise and cultural education was expected. Each person's roles and responsibilities were narrowly defined, and their place in the social hierarchy fixed. Morality and rationality were closely related, resulting from a clear division of labour on the basis of functional segmentation of tasks, and a hierarchical relationship between those who performed these tasks. Aristotle criticized Plato's utopian ideal and argued for a more democratic city, but he himself held a conservative view about the place of different genders and classes, whereby some people were only suited to be slaves and others would naturally be fit to be masters: 'For the element that can use its intelligence to look ahead is by nature ruler and by nature master, while that which has the bodily strength to do the actual work is by nature a slave, one of those who are ruled.'[13] For Plato and Aristotle, the perfect city could be achievable, but that meant no change was thereafter desirable.

The ancient Greek town planner, Hippodamus, who designed a street plan for Piraeus, also had a functionalist political philosophy, which he turned into a particular city design. He proposed a city with a 10,000 population, which consisted of three types of people (skilled workers, farmers and soldiers), three types of land (sacred, public and private), and three types of laws (for outrage, damage and homicide). He was the first in Greece to have divided land into precincts: farmers owned the private land, soldiers were fed by the produce from the common land and skilled workers had no land. Aristotle, however, criticizes his plan, particularly the rigid segmentation of people and land along their functions, as they were all citizens and deserved equal rights to hold office.[14]

With the rise of complex commercial and industrial societies in the modern period, the division of labour became a key focus. This time, however, it shed the rigid social frameworks of the previous periods and found a new emphasis: the freedom of exchange. There was, Adam Smith argued, a propensity in the human nature 'to truck, barter, and exchange one thing for another', which was unique to humans and was probably 'a necessary consequence of the faculties of reason and speech'.[15] As a result, it was possible, particularly in the more advanced economies, to divide any work among a large number of workers, each specializing in a different task, and thus substantially increase productivity, level of skills and wealth

of the nation. Unlike Plato's more rigid allocation of tasks, therefore, the differences between people arose 'not so much from nature, as from habit, custom, and education', i.e. their 'disposition' in society.[16]

From early on in the development of modern capitalism, the notion of individuals freely engaging in economic exchange was a key driving force. Inherent in this notion, however, was a notion of interdependence. It was accepted that individuals stood 'at all times in need of the co-operation and assistance of great multitudes'.[17] This cooperation was made possible, however, by self-interest. It was argued, by Adam Smith and the Victorian liberal economists who followed him, that the driving force for humans was self-interest in satisfying their desires, and that they should be free to do so. 'Every man, as long as he does not violate the laws of justice, is left perfectly free to pursue his own interest in his own way, and to bring both his industry and capital into competition with those of any other man, or order of men.'[18] Within a sophisticated division of labour, it was possible that individuals could be engaged in exchange of their goods and services only for their self-interest; but unintentionally and 'led by an invisible hand', the result was also good for the society: 'By pursuing his own interest he frequently promotes that of the society more effectually than when he really intends to promote it.'[19] As Smith puts it, 'It is not from the benevolence of the butcher, the brewer, or the baker, that we expect our dinner, but from their regard to their own interest.'[20] This may appear to be a model of competition between free individuals, which is the ideal type *homo economicus*, but it is also a model of collaboration between them, as exemplified by the necessity of the division of labour. By dividing the tasks among different workers, Smith argued, they can focus on a particular task and become better skilled and more productive. But their cooperation is essential if these different tasks are to be related to one another, and the finished work to be the sum of its parts. Furthermore, the exchange of goods and services in the marketplace can only function if those entering the exchange relation cooperate around a framework. The diversification of the economy and the wealth of nations, which the division of labour may bring about, would only happen through the mutual dependence of those involved.

The contrast between competition and collaboration has defined ideological battles ever since Adam Smith. Competition, it is argued by some, would lead to energy and wealth; while others argue that it is wasteful and leads to inequality and polarization. Both groups see the need for the state, but they disagree on the extent of its role. For the first group, free competition in the marketplace is the key, and the state's role should only be limited to regulation and guarding the rule of law. For the second group, however, the state should do more by intervening in the market to rectify its weaknesses, in support of the vulnerable and the public at large, and instigating collaboration among the stakeholders. As urban societies and

economies grew ever larger and more complicated, it became clear that a simple formula of competition among small-scale operators was no longer sufficient. New institutions and bureaucratic infrastructures evolved in response to this complexity. The only way that coordinated action becomes possible in complex societies, where a large number of actors are needed for a system to work, is through the establishment of some institutions. Stable systems have only emerged out of the institutionalization of key social forces, and their collaboration around an institutional nexus, which has formed a backbone, around which variations and innovation became possible.

The division of labour that the modern economies demanded, however, generated much resistance, which was articulated by Romantics and revolutionaries. The problem with the division of labour increases functional separation as well as interdependency in human society, which the Romantics such as Rousseau disapproved of, when they looked nostalgically at the self-sufficiency of the rural populations. In one of his polemical writings, Rousseau refers to a Swiss village, which had impressed him as a youth. This was a village that stretched up a mountainside near Lake Neuchâtel, comprised of little wooden houses of equal size, each standing in the middle of the piece of land that fed the family. This was a happy community of peasants who supported themselves by their own work, and were not burdened by taxes and tithes, and did not need cabinet-makers, locksmiths, glaziers, carpenters and the like. They had a wide range of such skills and could build and maintain their own houses. They were also able to entertain themselves, by singing, dancing and playing the flute, with taste that Rousseau thought to be superior to the modern townsfolk. This had appeared to him to be a model of free and egalitarian life, as he explained in a letter to D'Alembert.[21] A twentieth-century version of this opposition to the division of labour and the spheres of life, although from an individualist rather than a holist perspective, was developed by the American architect Frank Lloyd Wright. In his Broadacre City, he envisaged households living in homesteads, as part-time farmers and part-time mechanics and intellectuals.[22]

On the other hand, the nineteenth-century revolutionaries such as Marx and Engels fought hard against the division of labour as the source of inequality and alienation. Together with the German idealist thinkers of the time, they resorted to the notion of holism to protest against the idea of division and individualism. In a division of labour, some people will inevitably be doing lower order jobs and therefore be worse off, while others can enjoy less demanding activities and be better off. This is a distinction that becomes ingrained in society and once people are born into lower and higher groups, it will be very difficult for them to move out. Thus a functional order based on the necessity of the division of labour appears to sanction a deeply rooted stratification.

This functional and social segmentation and stratification finds spatial expressions in the city. Some places become associated with particular functions and social groups, and can act as a supporting mechanism or a trap for their inhabitants. In the same way that the economists promoted the division of labour in the workplace, urban planners have advocated the division of labour in the urban space (Figure 11.1).

Applying the idea of a division of labour for land and property can be traced back to the beginnings of cities. In Mesopotamian cities, for example, a citadel separated the key sites and the elites from the rest of the city, and in ancient Greece Hippodamus designed his towns on the basis of distinct land uses. In the modern era, its different manifestations have been in zoning and in the modernist thinking about functional reorganization of cities. Zoning in the United States started as an attempt to ensure compatibility in function and social status among neighbouring land users. Rather than leaving it to the market to decide through trial and error and through many small interactions, there was felt to be a need for coordination, so that undesirable land uses and undesirable neighbours do not threaten the comfort and property values of the present residents.[23] The modernist architects who set up the Charter of Athens asked for the city to be understood, and planned, on the basis of four functions of living, working, transport and recreation.[24]

However, the application of these systems of division of labour to urban space has been heavily criticized by the later generations. Strict zoning and functionalist separation of land, they argued, has led to wasteful use of space, unfriendly environments and unnecessary travel. Instead, they have asked for a mixture of uses, somewhat similar to the way in which unplanned cities had evolved. Rational planning was based on a division of labour. But was the city that it created rational? In turn, the postmodern critique asked for abandoning this model of division of labour in space. Was this irrational? One answer is that the division of labour is not criticized per se. If there was no such division, there would be no distinction between one land use and the next. The critique is directed towards that particular division of labour in space, which created a coarse grain good for cars, and offering an alternative one instead, which would create a fine-grained city good for pedestrians as well. These were two different types of rationality, rather than a rational and an irrational or post-rational one.

What differentiates one of these models from the other is the ability to envisage the city as a whole, and deal with it as such, rather than seeing it as a set of fragments and approach it from within. It becomes the problem of labyrinth and pyramid, where in the labyrinth we experience the space from inside and have no clear idea of its totality, while in the pyramid we have a clear sense of its shape both from outside and from inside.[25] Can we reject the city of labyrinths, which is what the medieval city really is, as

Figure 11.1 The division of labour in urban space has created functional and social distinctions between centres and peripheries, different neighbourhoods, and different land uses (St Petersburg, Florida, USA).

irrational? It shows clear signs of human reason at work, the only difference is that it does not reflect an ability or a desire to deal with the city in its entirety. The modern town planning systems have been devised exactly for this reason, to provide an overall conception of the city and how its constituent parts relate to one another. Totality and connectivity become the keywords in the modern notion of the rational city. As always, the problem has been how, why and by whom the city has been segmented and reconstructed.

Connected thought and connected action: competition or collaboration?

We frequently hear complaints about the wasteful duplication or even contradictory actions of different agencies involved in building and managing cities. Much is said about the need for coordination among these various actors, to make urban development and management more rational. This is at the root of urban design, town planning, 'joined up' government, strategic and comprehensive planning and similar undertakings. These are some of the manifestations of attempts to coordinate various actions into a meaningful whole, leading to a desirable goal.

We have seen how reason is defined as connected thought and the ability to provide convincing accounts for beliefs and actions. What are the implications of this definition for practice? What is the form of rationality in action? Using the same logic of connectivity, the presence of reason in city building and management may be evaluated by the following criterion: connected action that reflects connected thought, or merely '*connected action*'. The question is: what are the forms that connected action takes? Is it the same as terms such as collaboration and collective action, or does it also include other forms of organized action?

The choice between competition and collaboration forms one of the key battlegrounds of normative ideas: how do, or indeed should, two or more individuals relate to one another? Should they engage in a competition in which self-interest is the driving force, or should they try to collaborate with one another by setting up links amongst themselves and with others? Which approach is more efficient for the task at hand, more satisfying for its participants, more essential for society as a whole, more rational? Are these two alternatives mutually exclusive?

Those who argue that markets are sufficiently rational without the need for state intervention, i.e. without additional coordination, where only the invisible hand of the market leads to rational outcomes, seem to be saying that an overall coordination takes place through many small actions. These actions are interconnected through their underlying mechanism of exchange, which itself relies on an overall regulatory framework guaranteed by government, and on many cultural notions accompanying the

exchange, which may make it different in different societies and periods. In contrast, there are those who argue for coordinated action through explicit institutional arrangements, through the intervention of public organizations and others to ensure coordination, rather than opposition or duplication. What both groups are searching for, it seems, is a form of connectivity, which results in an overall rationality out of many different actions. Both seem to be looking for connected action, either implicit through small interactions or explicit through institutional intervention. Connected action, therefore, is perhaps the manifestation of rationality in city building.

Another way of defining connected action is action that shows connected thought. If action is performed by one person, then we expect it to show that it is the result of a thought process, to show that we can provide a convincing account for it. When it comes to city building, which involves many different actors, we are looking for an account that connects all these separate actions and accounts given by individual actors. The action should show connected thought coming out of a number of people and organizations, not merely out of one person. Descartes' demand for a single source of design (for cities, legal systems, etc.), was mindful of the difficulty of coordinating these diverse actions and merging these accounts into a single convincing account. His solution was narrow, as he advocated all thoughts and actions to be undertaken by a single designer, all actions and accounts to be rooted in a single source. However, the actions and thoughts of a single source can be questioned and rejected by contemporaries or by later generations, who may have a separate, and possibly valid, reasoning for a different course of action. The main challenge is to connect diverse actions and accounts without imposing a rigid framework.

Rationality in this sense may mean a single outcome out of a number of different sources of action. But this single action will never satisfy everyone, hence the historical solution of settling on the rule of the majority. The emphasis on difference, which is a hallmark of the critique of modernity, is a demand by the minorities not to be disadvantaged by the argumentation of the majority, but be given a space of their own, even if this space does not conform to the rationality of coming to a collective view. Deliberation, therefore, can lead to multiple, and even parallel, outcomes, each serving a different section of the community, rather than expecting all to conform to a common, potentially narrow, set of norms and conditions. The demand for coordinated action, therefore, may be counterproductive if it creates exceeding conformity, and so suppressing the needs of those who do not fit into this mould. This can potentially lead the way to tribalism, or be a way of expanding the scope of the majority's norms and values, making them more sensitive to the needs and aspirations of other groups and individuals.

Two forms of collaboration can be identified. One is collaboration among the members of an organic and traditional community, who have lived together for generations, whose daily routines and social symbols are well known to all members of the community, where rules of conduct are rooted in the history of the people and the place. Here, roles are almost predetermined, where the current life appears to be a variation on the theme of past lives, where the social division of labour seems unchanging. Collaboration here is framed by traditions and customs, handed down rather than thought through. Another form of collaboration is among the members of an atomized society, where all roles are, at least in theory, contractual and subject to change. This collaboration is also embedded in social and historical contexts, but in the end those who enter such collaboration do so with a higher degree of choice but with less emotional support.

However, not all connected thoughts and actions are identified as rational. The movement of mobs at the times of mass hysteria may be considered to be an example of collective and connected action, while it is not often identified as being rational. It may follow an emotional path, which means it results from intense interaction with the environment. It does not, therefore, fall within the accepted ways of a normative framework; it is highly likely that it lacks deliberation, and its conclusions may not follow its premises.

Another form of connected action is 'collective action', a notion derived from economic theory, where it is concerned with the provision of public goods by the collaboration of two or more individuals. The operating mechanism of the market, which is driven by the self-interest of firms and consumers, may apply to the provision of private goods, but it fails to meet public goods, which then need collective and collaborative action.[26] It implies a democratic element, referring to a way of arriving at an agreement by a number of different actors. Connected action, however, is a broader notion, taking into account all forms of action that involve more than one individual actor. It includes collective action, but can also include other forms of connection, through organization and through time. Therefore, if we connect to others voluntarily to achieve a particular goal, through institutional collaboration or regulated competition, or through the membership of an organization, or to others who lived in the past, we are performing a connected action. Connected action is performed by the two sides of a football match, and by those who are preserving a building that others produced two centuries ago.

Any action performed by more than one person involves interaction among them, producing negotiation, compromise, collaborative decision making or imposition of one person's will over another. Any such action will reflect a particular balance of power among them, which may appear to be just or unjust. In either case, it may result in connected action,

reflecting a connected thought process, whether or not these connections satisfied the parties involved. Does this mean that any such action was rational? Can an unjust, or merely contested, action be rational?

The examples of this ambiguity are plentiful in the history of city building. The redevelopment of Paris in the nineteenth century by Eugene Haussmann is one example. It shows a great deal of coordination on the part of the authorities, but not collaboration with the populations it affected. The Parisian boulevards were manifestations of connected thought and action performed by a powerful segment of the society (Figure 11.2). They were examples of connection in thought and action, but forced onto the slum dwellers and revolutionaries who were thrown out of their homes to pave the way for the wide boulevards. Many other urban renewal examples from the second half of the twentieth century show the same gap: while it appears rational to one group who gain from the process, it is beyond comprehension for others who lose out. A network of connections has been made, but primarily in the interests of one section at the expense of another section of society. While connections have been strong and voluntary for the former, they have been forced and weak for the latter. Asymmetrical connections characterized this type of city development. Would this be as rational as examples in which the connections

Figure 11.2 Boulevards were manifestations of connected thought and action performed by a powerful segment of the society (Paris, France).

have been more symmetrical, where the processes of connected thought and action have taken as many people as possible on an equal footing? This is why some critics of hierarchies have preferred networks as more equitable, without paying attention to the fact that inequalities will not go away even if they are imagined and interpreted in a different way.

In this sense, all cities are cities of reason, as they all show evidence of connected thought and connected action. Should our next step be a comparison among these various cities of the present time and of the past, to see which one is more rational than the others? What criteria do we use in making such a comparison? What is the ultimate aim of a city; or in other words, should there be an ultimate aim for the city? An instrumental version of reason sees the role of the city as making the production, exchange and consumption of goods and services possible. Are these the only criteria or are there any other measures?

Does connected action include conflict and hostility? It is possible to say that conflict can inject dynamism and is one way of sorting out incompatibilities. Conflict appears unavoidable in complex social interactions in the city. If we use the notion of collaboration, rather than connection, it involves promoting coordination and the search for a degree of harmony. It is, therefore, essential to distinguish the notion of connected action from collaboration. If we look at the notion of connected thought, when reason is the ability to identify and establish some relationship between things, it does not tell us whether these relationships are harmonious or conflictual. Furthermore, these can be overall positions along a spectrum. There are seeds, and actual presence, of conflict in any harmony, and vice versa. We can doubt the usefulness of the terms harmony and conflict, as in some areas the result of the battle of forces is a compromise, a temporary ceasefire, rather than the more emotive terms harmony or conflict.

Beehives and ant hills are products of coordinated action, resulting in highly organized spaces and social routines. Are these places of reason? The definitions of reason are closely linked to will, the human ability to contemplate and calculate, rather than institinctively do one thing or another, as these animals do. This may mean challenging as well as coordinating, demolishing as well as building. So connected action and connected thought merely show the presence of embodied and embedded human agents who make these connections. Rather than a decentred presence, which is the site of various social and biological influences, the intelligent agent is the one who is crucial in linking ideas and actions together, to create something new out of the meeting of existing things. These connections may include conflict as well as coordination, competition as well as collaboration.

The dichotomy between competition and collaboration is the normative side of an analytical distinction which, in its broadest sense, is the key question of social philosophy: the dichotomy between individual and

society, the choice of direction between seeing individuals as the drivers of social change, or the society as the framework that shapes these individual forms of behaviour. Yet our investigation here shows that connected action, which reflects connected thought, is not necessarily one or the other, and that social processes are the result of a constant interaction between individuals and social structures.

Shaping the city by the state and market

The application of the rational method of segmentation and reconstitution to urban development has been land use planning. The urban space is subdivided into land parcels, each allocated a separate function, so that an overall order can be achieved during a predetermined period of time. Time and space are both segmented and reorganized, so as to have a managed process and a desirable outcome. This has been an institutionalized process, initiated and managed by the public sector so as to regulate and control the behaviour of the private sector operators in the market.

The land and property market is also based on a similar principle. The urban space is subdivided into parcels, each allocated a monetary value, which can be used to exchange in the marketplace. The value of these land parcels and any development on them is determined by each unit's perceived desirability in the marketplace, and through time it establishes long-standing social and physical characteristics for parts of the urban environment. The price mechanism, therefore, segments the urban space into exchangeable parcels, and reconstitutes an urban order through perceived desirability of land parcels in an overall structure.

These are two different types of rationality applied to the urban development process: an historically evolved rationality of the market and an instrumental and framework-setting rationality of the state. One is focusing on single transactions between two agencies, and the other on the consequences and the larger picture that these transactions would generate. Though these different logics may clash in some instances, together they amount to an overall system, whereby space and time are segmented and reorganized in new ways, creating an urban order out of thousands of actions through time. These two logics may appear to be dialectically opposed to one another, but their dialogue and the possibility of their clash or coordination is what keeps the system stable, as one aims to support or correct the other.

In a democratic city, neither of the two mechanisms is meant to be forced on the city's inhabitants. Public authorities are elected by the people, and should therefore represent their views in setting the planning frameworks. The market transactions are undertaken by free individuals and agencies engaged in exchange, and so there should be no question of coercion. The result, therefore, should be the good city, managed and

developed according to reason. How is it, then, that cities do not seem to satisfy their inhabitants?

Two pressures are used to make this process more acceptable to the city dwellers. One is to open up the process of decision making and democratize it further through public participation and deliberative democracy. If more people are engaged in discussions and decisions, it is argued, the outcomes would be more widely acceptable. The other pressure is to make the market transactions fairer and more open, by putting in place legal frameworks and mechanisms to prevent monopolies and ensure fair trade.

Should such a city, then, be an example of reason? At least two factors are in the way, which prevent this from happening. The first factor is that in a market economy the quality of life of individuals is shaped largely by their access to resources. If some sections of the population do not have access to their basic needs, or can meet these needs far less than others, the result is poverty, social exclusion and unhappiness. No matter how well the city is planned, it will not be a rational achievement if its inhabitants are disadvantaged and feel isolated and unwanted.

Another factor is the complexity of life in the city. Not only access to resources, but also access to decision making and to shared experiences are needed for all citizens, so as to create a sense of a city as a whole.[27] The cities are so complex that the mechanisms of regulating and managing markets can only affect them partially. Whatever the extent of rationality superimposed on human behaviour, it is not able to extend itself to all areas of activity. Reason may be used in the operation of the markets and the state, in planning and designing for the future of the city. Nevertheless, the presence of thousands and millions of intelligent and sensual actors, and the complexity with which they make their decisions, makes it impossible, and undesirable, to plan for all eventualities and to cover all transactions and communications (Figure 11.3).

One possibility is to say that a city is rational where justice is properly administered; therefore, the rule of law is one measure of rationality. Legal judgements are mainly based on the claim to be decisions made on the basis of reason. Law, as a process of resolving disputes through applying rules created by the state, is closely related with order. In the words of a legal expert, 'Social processes including law seek to satisfy, above all, our psychological need for structure in our lives.'[28] In this, the belief in structures is considered to be more important than the structures themselves. When rules are not very precise, there is a space of freedom for the judge to make decisions, which raises the importance of reasoning.

The judgement in law is a public use of reason, a decision before an audience, which affects the fortunes of others. It involves reason, as the judges need to give an account for their decision. The test of impartiality and therefore the use of reason in law is when the process of decision making reassures the society that it can reconcile and harmonize facts,

Figure 11.3 The presence of millions of intelligent and sensual actors, and the complexity with which they make their decisions, makes it impossible, and undesirable, to plan for all eventualities and to cover all transactions and communications (Tokyo, Japan).

rules, social conditions and moral values. In other words, legal arguments are not made in isolation on the basis of cold calculation. They are part of a broader moral, economic and political discourse.

> When judges explain their results in judicial opinions they must attempt to convince us that the result does *not* depend on a fact at issue between the parties that we know is false, does *not* depend on the false assumptions about social conditions, does *not* depend on a tortured reading of rule, and does *not* depend on an ethical judgment the community would reject. The result need not please everyone, but that is not the point. Judges cannot and need not discover one right solution that everyone somehow believes best. They convince us of their impartiality as long as they convince us they have *attempted* to describe these four elements accurately and to reconcile them.[29]

The institutional and physical arrangements of a just city, therefore, need to show that facts, rules, social conditions and moral values can be reconciled.

Freedom appears to be another measure with which to identify a good city. A free city is one in which its citizens are free to live their lives without having to be subject to the will of others, unless proper legal frameworks entail otherwise. One consequence of the free city is that its citizens practise their freedoms and live where they wish, if they can. So if they are free and prosperous, they may not wish to live next to one who is poor or considered to be socially incompatible. This causes fragmentation, polarization and inequality, and therefore injustice. If distributive justice is applied, where prosperity is spread more equally among citizens, economic reasons for fragmentation will be removed but not necessarily cultural and political ones. However, in market economies, especially in the past two decades, the possibilities of distributive justice have been retreating in favour of economic freedom. There is therefore need for a fine balance between freedom and justice, which the model European cities say they are searching for, a balance between economic competitiveness and social cohesion. If a criterion of rationality is connected action, then establishing connections between these potentially opposing conditions is a major challenge of rationality.

The shaping of the city with the help of reason has been the main task of town planning, which is why the concept of rationality has been central to much of planning theory.[30] Planning has therefore been designing a purposeful process with two major characteristics: setting objectives to achieve, and connecting actions to one another to achieve those objectives. Setting objectives essentially depends on how the problem is defined, and how a sense of priority is attached to some activities, which reflects the values that are held and promoted. The process of defining problems can

be open to challenge by those who have not participated in the process. The questions then become: who sets the priorities, who defines the problems and through what sort of process. As town planning problems are relevant to large sections of the population, the way a problem is defined, therefore, finds a political significance which needs to be open to debate and challenge by the population at large and by different agencies. Problem definition is followed by formulating alternative solutions, evaluating these alternatives and selecting the optimum policy. This is a process of practical reasoning in which the best course of action is sought, a process that is essentially based on moral and political processes and decisions, rather than merely technical and scientific considerations.

Manifestations and limitations of connected action

Connected action can find different manifestations in design, development and management of cities. One key manifestation is in the aesthetics of the city, and the question of whether to build in harmony or in contrast with the past and with the other developments around them. The design movements of the past five centuries show inherent contradiction on this issue. On the one hand, the Renaissance, baroque and modernist design praised harmony and geometry, and so aimed to maximize aesthetic connectivity in the city. At the same time, they had a low opinion of the city they inherited, which they thought to be disjointed and haphazard, and so made little effort to connect to an existing reality. On the other hand, the medieval, the Victorian and the postmodern design displayed individuality and eclecticism in their aesthetics, to the extent that each building may have a different logic from the next. At the same time, they paid more attention to the context they inherited, performing a degree of connectivity. The first group dealt with the city as a totality, while the second group worked with individual sites and situations. Both performed connectivity, though in different ways and to different extents.

Another manifestation of connected action is in the development of complex organizations and their dialectic with individuals. The ability to conduct organized action is one of the simplest indications of reason. Managing a complex organization such as a city was from the very beginning only possible through setting up a complex management organization, which connected and coordinated a set of diverse actions based on a complex division of labour. As city-states were integrated into empires and territorial states, some of this complexity was transferred to the higher level governments. But the task of constructing and managing a city remained one of the most complicated tasks, and a sign of coordinated action, a sign of reason at work. The legitimacy and accountability of the agency conducting the connected action, however, is a major issue: lower level, small scale and nearer to people who can then shape the outcome, or

higher level, strategic action, which is far from people and more difficult to be influenced by them.

However, whenever the organizational complexity has led to its rigidity and therefore a misfit for purpose, there has been pressure on it to reform. One of the examples of this has been the neoliberal agenda of the 1980s and afterwards, in which the old economic and political structures were reorganized to adjust to new global conditions. The result was fragmentation and uncertainty in the market, leading to booms and busts. The Labour administration that came to power in the UK in 1997 sought to overcome this fragmentation through the promotion of 'joined-up' working, which is essentially a form of creating connections between competing or unrelated activities.

Connected action is a key feature of rational planning, which is based on the observation that phenomena in the real world are all related to one another, and therefore planning needs to take into account these connections and provide a set of connected ideas and actions. Taking all relevant matters into account in planning has led to the concept of comprehensive planning.[31] However, the complexity and extent of issues to be taken into account have often defeated the desire to connect all the relevant parties and activities. Despite heavy reliance on sophisticated information and communication technologies, the result has often been creating rigid and simplistic orders, unable to take into account the complexity and spontaneity of social life. These unfavourable results have shown the limits of comprehensive rationality (Figure 11.4).

A major point is the extent of connections and the nature of systems that these connections make. In designing a rational city, are we attempting to develop a comprehensive system in which everything is connected to everything? In a sense, such connection does exist between people and objects that form a particular society. The question is whether we seek a comprehensive system that we can account for, that becomes transparent to us, which is therefore under our control. Or are we happy with the existence, and discovery, of many, many systems of connection that coexist, but not necessarily connected to each other via an overarching account. Here we can see the objection to the notion of *grand narratives*, as accounts given by a single source, or as simplified accounts, to be the foundation of an overall, comprehensive set of connections. The tendency of the powerful is to extend the logic of their power to new areas. Establishing accounts that justify the actions of the powerful has always been a mechanism of doing this. To challenge the narrative is in a way to challenge the basis of their power.

Reasoning works on the basis of a truism: no conclusions without premises. It involves taking symbolic inputs and delivering symbolic outputs.[32] The initial inputs are axioms, which are induced from empirical observations, and the transformation of inputs to outputs take place

Figure 11.4 The desire for establishing connections at all costs has torn the fabric of cities apart (Wuppertal, Germany).

through rules of inference. This is, however, a process that is corrupted by arbitrariness. It suffers from two major shortcomings. First, it is impossible to generate unassailable general propositions from particular facts, while the facts themselves are tentative and theory-laden. Second, reason is unable to generate 'normative outputs purely from descriptive inputs'. For reason to work, then, it needs a set of facts, as well as a set of values about the goals that should be achieved. Reason is, Simon argues, 'wholly instrumental. It cannot tell us where to go; at best it can tell us how to get there.'[33]

The Age of Reason was characterized by optimism regarding the ability of reason to solve all human problems. Despite setbacks to this optimism, work has continued to find ways of rational problem-solving to our day. One model, developed in the first half of the twentieth century by statisticians and economists, was an 'Olympian model' which postulated 'a heroic man making comprehensive choices in an integrated universe'.[34] This theory, which is called subjective expected utility, loads all values into a single value, the utility function, and then tries to analyse how different courses of action can be evaluated against this value. The theory, therefore, assumes that a decision maker has a well-defined utility function, that he or she knows a well-defined set of alternatives to choose from, that he or she can assign a consistent probability distribution to these alternatives, and that he or she will choose the option that maximizes the expected value.[35] However, this theory cannot be applied in the real world, as 'human beings have neither the facts nor the consistent structure of values nor the reasoning power at their disposal', to perform this comprehensive decision-making process.[36]

Instead of this Olympian model, Simon proposes a behavioural model, a bounded rationality that draws on how human beings actually make decisions. In the real world, rationality focuses on specific issues at each instance, rather than everything at once. It then relies on working out some scenarios for the future of that specific task, which are often not comprehensive or well developed, spending most of the time on collecting facts rather than making the decision itself. The bounded rationality model, therefore, 'postulates that human rationality is very limited, very much bounded by the situation and by human computational powers'.[37] Reasoning in this model draws on emotion, the function of which is to focus attention. It also draws on intuition, which is the ability to reach solutions to problems suddenly, acquired by those who have developed the skills of recognizing familiar patterns through skill development and expertise.

This analysis is clearly drawing on Hume and the tradition of empiricism, which see reason as calculation and a means to achieve desirable ends. However, it tries to integrate emotion and intuition into calculation, and focus on situations, rather than connecting everything to everything else, although it uses a utilitarian and instrumental notion of emotion and intuition. This shows how we fragment action into functional pieces, and

try to link all these pieces together in new ways. It also shows our limited ability to make these connections, only at best capable of making localized connections.

There are many parallel systems of order in the city, each focusing on a different aspect of urban life. Each of these systems may employ complex methods of reasoning, to try to give order to their operations and the city. But they rarely come to be coordinated with each other. There are many times that people complain about the waste of energy that is the result of such lack of coordination among different systems. There are always attempts by politicians and administrators, at local as well as regional and national levels, to coordinate these systems with each other, especially if they all relate to one functional area of activity, or to one particular place or need. This is a desire for rationalization through mainstreaming and establishing connections.

There are some underlying systems that connect these localized systems of thought and action. For example, the social and cultural norms, the systems of information and communication, the public sphere, are all underlying infrastructures upon which these localized systems work. But the connection between them is not systematic; it has evolved over time, through many small adjustments and alterations, and can be unique to each culture.

The cyclical attempt to connect all systems and think about all aspects of urban life in one big scheme is one of the main rationales of planning. However, the complexity of life in modern societies has shown that it is not physically possible, or socially desirable, to have these systematic connections to a great extent. Such connections have proved to be impossible, even after the use of computers has made it possible to work with large data sets. They are also limiting civil liberties, as the scope of individual freedom can be severely limited if different areas of life in the city are all too narrowly systematized and accounted for.

The connection between different infrastructures, therefore, is an area of contention. On the one hand, there is constant pressure by both urban populations and the management class for these connections to be established and extended, so that they can have all aspects of urban life under scrutiny, either for better delivery of services or for more effective social control. On the other hand, there is pressure by people to be free from such control, as life takes new forms, moves into new directions, and is restless in exploring new territories.

Gap between accounts and actions

In his instructions to the rulers of city-states, Machiavelli referred to a main dilemma: that a ruler must be prepared to act immorally when necessary, so as to maintain his authority, at the same time as winning honour

and glory, rather than being seen as a wicked person. The solution was to learn the skills of deception and hypocrisy, of being a great simulator and dissimulator.[38] Macchiavelli's instructions in his book *The Prince* continue to be controversial 500 years after its publication. The label Machiavellian is a pejorative term and some parts of the book still sound shocking to the uninitiated and those immersed in conventional morality. Machiavelli was indeed drawing on his experience of the politics of Italian city-states, and in particular those of Florence with which he was closely involved. It is possible to see that what he articulates in his book is an insight into the nature of political power, a formulation of forms of behaviour that perhaps have always been practised by rulers, to the extent that even his critics would arrive at similar conclusions.[39] What was significant in his case was that he appeared to be justifying immoral behaviour in pursuit of power and glory, rather than condemning it and promoting moral conduct, which is what the traditional moralists such as Cicero had done since the ancient times.

From our vantage point in time, we can see that Machiavelli was drawing the attention of his readers, who he hoped would be the political leaders of his time, to a gap between conventional morality and the political reality. He was inviting the rulers to be aware of this gap and act accordingly. This is one reflection of a more general gap between discourse and conduct. Normative discourses are forever polished to present a generally acceptable appearance, while conducts are rooted in particular conditions and often follow the logic of that condition. We formulate moral codes, but rather than implementing them, we seem to be always forgetting and undermining them. An everyday example is lying, which is universally condemned while generally practised.

The gap between discourse and conduct is also applicable to the analysis of reason. Discourses of reason and rationality are used in the same positive light as the moral codes of behaviour. Indeed rationality is so ingrained in the language of morality that it is at times difficult to separate the two from each other. Our everyday practices, however, may be as far from these discourses as our moral conduct is from our moral discourses and codes. Secretly or openly, we know of the moments when mistakes happen, or spontaneous reactions that leave aside all considerations, when the grip of reason seems to be loosened, either through lack of concentration, a combination of events that are beyond our control, or just a desire to do so, challenging the social conventions that drive rationality. Being led by reason finds a moral value, while the conduct may be merely led by personal emotions or shortcomings. The myth to which modern culture aspires, the myth of being fully rational human beings, drives the accounts that we provide, even if our conduct is not compatible with such accounts.

The gap between public infrastructures and individual diversions from them can be interpreted as:

1 the inflexibility of the general and the resistance of the particular;
2 the particular's bid for adjustment to the general, which is exemplified in the case of difference; and
3 the mere existence of the particular which does not fit the general, whatever the level of adjustment.

The gap is ultimately a dynamic one and causes constant change and energy, as well as problems and instability.

We use general tools to refer to, and construct, particular meanings and objects, using general words from the public language to refer to our particular experiences. In our everyday lives, we use these general words, but we mean particular events, objects and meanings. Through using public tools, we can construct communicable meaning. But in making things, in building the city, this logic does not apply. We do not need to specify the means we use to justify the outcome. We may do so through functions, which are communicable across particularities, or symbolic references, which draw on publicly shared imagery. In any sense, objects may be more particularistic than words. Mass production of the industrial age has increased the number and diversity of objects in everyday use, extending the publicness of objects and their role in constructing public infrastructures of meaning.

The city of reason is not a final stage beyond which nothing changes (Figure 11.5). Any such finalized utopia has proved to be too rigid to meet the needs of its people: it has just frozen the vision of certain people and imposed them on others. The city of reason is a place where things can and do change through the use of collective deliberation, where many people are involved in a public sphere that facilitates thinking and acting to improve the city's conditions. There is a constant attempt to broaden the sphere of governance to include a larger number of stakeholders than before, to empower individuals and groups to take part in decision making and envisioning the future, and to create partnerships between different groups and agencies. This does not show the destination, but only shows the direction along which ideas and initiatives hope to move: towards further connectivity in action.

Conclusion

A major sign of reason is the display of connected thought and connected action. In generating connected action, practical and productive reasons are used to decide the best course of action to take. The division of labour is the hallmark of city living, and when applied to urban space, it tends to create a particular order that could be fragmented and polarized. To overcome this, attempts have been made to connect the fragments together through developing complex organizations, planning systems and aesthetic

Figure 11.5 A living city cannot reach a final stage beyond which nothing changes, as exemplified by the changes introduced to any historic area, even those built during the Age of Reason (Alexandria, Virginia, USA).

harmony. However, the ambitions of taking everything into account in making the necessary connections have proved stifling, as the complexity of urban life makes it difficult and undesirable to have everything under full control. As this control tends to be exerted by some over the others, rather than being generated through collective participation and agreement, and the aesthetic harmony may appear to reflect this, pressure for connectedness may lead to resistance and doubt. Critiques of comprehensive planning and calculative reason are different forms of reaction against the imposition of a particular instrumental reasoning onto society, especially when there is a gap between account and action. The application of reason in city design and development involves a process of segmentation and connection, analysis and synthesis, in which space is divided into parcels and units, allocated functions and monetary value, and reconstituted as blocks of social life. However, without involving those who are affected or addressing the environment in which they take place, the reconstitutions that are produced by the market or by the state planning are not the only possible accounts, nor the best courses of action.

Chapter 12

City of reason

Reason is the human capacity to provide convincing accounts for beliefs, values and actions. In other words, it is the capacity to make convincing judgements (what to believe, what to value and what to do). In theoretical reason, it means judging what constitutes justified beliefs. In practical reason, it means judging what the best course of action is to adopt. It involves three interrelated dimensions of analysis, synthesis and communication. In analysis, the issue at hand is subdivided into smaller parts; in synthesis, these parts are put together in a causal, and therefore hierarchical, relationship; and in communication, this relationship is expressed through symbols, such as words, numbers or images.

In the post-medieval world, the rise of reason has been parallel with a declaration of independence for humans from the forces of tradition and nature, with the rise of individual human self as the centre of universe. Since Aristotle, practical reason has been seen as calculation, deliberating on choosing the best course of action. What has changed essentially in the modern period is the shift of gravity in values, from observing outside forces as the source of value to the individual self as such. In other words, individuals have been freed from the bonds of nature and society, to choose only in the self-interest. It is this shift to an instrumental interpretation, from society to the individual interest, which characterizes reason in the modern period. Its sense of calculation has not essentially changed. Before the modern period, this calculation was meant to show how scriptures should be followed or how to adapt to the norms of the society, which were considered to be superior to the individual. The modern society is where these bonds are broken and calculation to satisfy self-interest finds the central place in determining what counts as rational.

Knowledge, values and skills are different, but often integrated, aspects that make a process such as city building rational. Problems emerge when these different aspects of reason are separated completely from each other. In the modern scientific age, city dwellers have been tempted to use only the theoretical reason and apply it directly to social processes such as city building. Without deliberating about the best course of action, and

without the employment of necessary skills, the result may be the mere destruction of what exists. An example is the modernist approach to city building, which used an abstract form of reason to argue for its solutions for the city, disregarding the skills that already existed and the deliberations that were needed to be undertaken. On the other hand, if practical reason is used to deliberate about the best course of action, without the necessary knowledge that the theoretical reason provides or the necessary tools that productive reason puts forward, the result may be far less satisfactory. The example is the problem of using pre-industrial city building knowledge and skills in the modern age, which can at best remain less than effective, even if the best deliberations are made. In the third case of productive reason, if tools and skills are used without knowledge and deliberation, the result may be merely mechanical, unable to cater for the needs of people or failing to achieve the best possible results within the means available.

Reason is the human capacity to make connections in thought and action and to give an account for doing so. In thought, this means first identifying the component parts of the phenomenon concerned and then establishing how these parts relate to each other. In practice, it means generating alternatives (through analytical subdivision with the help of intuition and imagination), judging the alternatives against some criteria (values, principles, available resources), and choosing the best course of action (through synthetic construction). In thought and practice, the important task is to establish and show connections between two or more concepts, objects or events.

This process of reasoning is not separate from the process of accounting for it, which shows the integration of cognition and communication, and their linguistic nature. What is at stake is that this account should establish that it is accurate in its facts, that the account is capable of capturing the complexity of the phenomenon, and that the account-giver is impartial; all areas that are subject to doubt and scepticism. Representations of facts may be a mere interpretation; the account may be inadequate; there may be more than one convincing account; and the account may only reflect the particular location of the account-giver in a particular society and culture.

It is possible to see how the social critique of individualism would lead us to realize that meaning is created through communication as well as expression, and action through collaboration as well as competition. Expression and communication take place through the use of language and other systems of signs and symbols, while competition and collaboration take place through the development of institutions, legal frameworks and complex organizations that enable collective action.

There are two broad groups of approaches to reason, one that sees it as calculative and the other as intuitive. Intuitive reason has been defined as the capacity to arrive at conclusions through thinking. It is interpreted in

different ways, often with a broad remit and character, ranging from seeing it as the representative of God in the body and the source of all knowledge, to a source of creativity and innovation. The second approach, calculative reason, often narrows down the role of reason: to reach conclusions from given premises through calculation. This makes reason instrumental, without the holistic character of the intuitive reason. Each group claims that the other definition is either not referring to reason (e.g. creativity has nothing to do with reason), or that it is a part of their own definition (e.g. intuition is a kind of highly developed calculation; or calculation is only one element of judgement in reasoning).

Dealing with uncertainty

The significance of reason is undoubtedly linked to our search for certainty in what we think and do. From early on in human civilization, precarious conditions of life on earth, dominated by powerful forces of nature that are beyond human control, have constantly reminded human beings of their mortality and vulnerability. Furthermore, the fragility of the human body and the volatility of bodily desires are other causes of anxiety. Humans have difficulty controlling their inner feelings and states of mind, as their bodies have a logic of their own, which is not necessarily in line with the requirements of mental certainty. While the body needs to be looked after, it is psychological certainty that we also seek, as it helps us feel secure in an uncertain world.

In search of this certainty and support, we live together in human societies. The first person narrative often has a limited reliability, as it may become subject to these forces from within and without. The first step towards certainty, therefore, is to get the support of others, to persuade others of the value of a narrative. In doing so, we help build a number of public infrastructures, through which we can communicate and assure one another of our support. Perhaps the most important of these infrastructures is language, with which we think our thoughts and express our feelings. There are, however, many more such public infrastructures, from notions of time and space, to frameworks for interpretation and action.

These frameworks emerge as a result of an abstraction of practical everyday concerns. They are developed into abstract systems that now can shape the conditions of these everyday concerns. The application of these frameworks for certainty to city building are manifest in spatial and temporal orders. These are recurring spatial arrangements and temporal routines, which are developed to create certainty and predictability in what can easily become chaotic and amorphous.

Rationality of a social action, such as design and development of a city, is embedded in a context: an action makes sense in a specific spatial and temporal context and its meaning is not the same in other contexts. This

means that it is often space-bound and time-bound, making sense in one place and one historical period and not necessarily in others. When applied in other contexts, it may lose its rationale, only perceived in an aesthetic capacity. The reason we are so fond of the medieval cities now is not that they worked well or brought enjoyment to their inhabitants. We have read many accounts of the horrors of life in these cities. But as we have only an aesthetic experience of these spaces, and not the full range of experiences possible from an urban environment, we tend to romanticize them. This does not mean that rational actions are not potentially rational in other contexts. It only means that such out-of-context rationality cannot be taken for granted and requires careful evaluation and critical investigation before being adopted for a new context.

It is at the intersection of the society and individual that the dynamics of cities lie. Individual action is essential, but it is often only possible through collaboration with others. Coordinated action, where individuals and institutions collaborate to achieve certain ends, is often the only way that things can be done in complex societies. Even when individuals are engaged in creative but apparently disconnected action, they are working within a social framework. At the city level, connected action is often the main form of rational conduct, but within this framework there should always be space for individual exploration and innovation. Rejection of social tyranny and controlling of individual expansionism go hand in hand.

The dynamics of urban living are also situated at the intersection of reason and emotion, of cognitive and linguistic accounts embedded in social conventions and public infrastructures, and personal embodied impulses and spontaneous biological processes. These dynamics create the energy for change, improvement and adjustment. Without them, either the biological forces dictate the human behaviour, without paying any attention to the elaborate layers of convention and social agreements that make life in urban societies possible. Or the social forces disregard individual needs and desires, which can potentially be stifled through the imposition of increasingly complex codes and limitations.

A city of reason is not where a single designer or a single system rules. As life is constantly changing, such a system would become too rigid very soon, unable to respond to the new needs as they emerge. A city of reason is one which can deal with constant change; it is where change can be introduced, evaluated and adopted or rejected, through engaging the wide range of perspectives that have an interest in the outcome. However, this is not only a process that responds to change, it also initiates change, and puts in place strategies to implement it. Change is not entirely resulting from outside factors, it is also a result of internal dynamics of the city, of the changing needs of citizens, of changing means of making cities, and of changing perspectives into what would be better for current and future generations.

The process of using reason in building and managing cities is that we engage with the world around us to develop a narrative to which we collectively subscribe. The process of this collective acceptance is always a power struggle, is never complete, and will always have its critics and victims. Once a concept has been widely accepted, members of the collective use it as a basis to justify their beliefs and actions, to construct social institutions and shape the physical environment. These concepts may shape the life of the city in profound ways: shaping beliefs through influencing people's mentality, and shaping actions through developing new ways of doing things, through new habits and routines or through new skills and technologies. The emergence and acceptance of these narratives, however, does not replace the life processes of a city, whereby people live their everyday lives with or without resorting to these overall concepts. It may be in the dynamism of this life process that these public infrastructures of meaning and action may be challenged and transformed.

At each point, we need to have accounts that we find convincing. It may be at one time resorting to gods and spirits, and at other times relying on science and technology; at one point drawing on the divine rights of a person to rule over the others, at others the praise of democracy and self-rule. We are prepared to change our accounts to find one that convinces us; what matters most is to have an account at hand which can provide us with a believable story about the world around us and with a reliable basis for what we think and do. At each point, we have to believe that our current story is better than what we used to have or what the others who do not share this account with us have. The reliability of the proofs we have for our account will vary, and inevitably some proofs are better at explaining the reality of the world than the others. That we need these accounts does not mean they are not true; they are often true to the best of our ability, if we are sincere enough. The best accounts will have integrated a wide range of concerns into a balanced judgement and representation.

Changing foundations, transforming cities

Ever since the rise of urban civilization in Mesopotamia, we can trace human efforts in search of some underlying order, some recurring patterns and regularities in the world, a constant search for clarity, safety and certainty. This was first done through studying natural rhythms and social events, analysing, comparing, classifying and searching for causal relations between phenomena. Although many of these causal relations were merely mythological, they heralded the birth of reasoning, whereby humans were able to understand and explain the world around them in some way. However, there were many unknown and unknowable factors, many irregularities and hidden causes, which could not be explained through observation. Therefore, they looked for supernatural references, which included

stars and planets, spirits of the natural world, ancestors and kings, invisible or embodied gods, all with such powers that could determine the course of events on earth. Their extraordinary powers meant they could be used as a foundation, upon which reliable beliefs and actions could be developed. They were the sources of a cosmology, a social and political order, which would be reflected in urban space.

Closely linked with the rising division of labour and the patriarchal, hierarchical social order, these cosmologies would determine the role of individuals and institutions in the city, and therefore suggest how the city should be built. The city was a model of the cosmos, and at its centre, in a walled citadel on a raised platform, the humans and the supernatural met via the medium of god-kings and priests. The order of the universe was expressed in a hierarchical order of concentric rings of social classes, and in the rectilinear geometry of the urban infrastructure, regulated through walls and gates, all elements of a publicly understandable meaning. Gods were present everywhere, inside houses and in various temples, as the cornerstones of a temporal and spiritual order that was embodied in the city.

With the arrival of monotheistic religions, this cosmology changed dramatically; now a more reliable and universal foundation for beliefs was available. But the separation of body and soul, and its parallels with good and evil, meant that a city of supreme reason could only be other-worldly, not possible to be built on earth. The church mediated an institutional and physical link between the two worlds, occupying the centre of the medieval towns. But the medieval towns, which were located at crossroads, were also a marketplace, and cosmological orders had to come to terms with the worldly demands of trade and competition for space, which gradually shaped these walled towns. Even when some fled Europe to start their godly communities in the new world, their cities soon turned into secular places. Creating embodied cities at the service of disembodied gods proved to be beyond their reach, as St Augustine had predicted. The church gradually lost its political and economic importance, but kept its cultural significance and physical presence, its buildings becoming urban landmarks for navigation, objects for aesthetic contemplation, and a connection with the memory of the past.

By the end of the medieval period, temporal power, civic institutions and human laws were taking over from the church, paving the way for the secular notions of state and individual. The Renaissance marked the rise of human reason, in its intuitive and calculative forms, as a new foundation for belief and action. The centre of gravity for providing convincing accounts about the world moved to the human mind, as famously formulated by Descartes. The universe was like a mechanical clock, an opera stage, in which the appearances hid an underlying order, which needed to be discovered by science. For rationalists, this was an order that could be expressed in geometry. Mathematics was a general model for knowledge,

the language of science, and it was in this language that the city of reason could be articulated. A single source of authority for laws, scientific knowledge and city design was asked for, to be able to create a coherent integrated whole, rather than the disconnected pieces that made up the medieval city. This was, however, a source of authority and action that prevented others from having a voice, creating tensions that have marked the modern world.

The Renaissance designers revived the Roman notion of a central plan, the design of buildings and cities with a central focus, which was emphasized by the newly discovered rules of perspective, to put humans at the centre of the world. They used basic geometrical forms and applied mathematical rules to arrive at ideal harmonious proportions, drawing on the human body which was becoming the measure of all things in this age of humanism. The calm harmony of the Renaissance, however, gave way to the baroque sense of direction: closed vistas and modest scales were turned into open vistas and grand designs, reflecting the rising power of the absolute monarchs. The harmony of connected action that marked humanist design started by arcades connecting adjacent buildings to one another, and was extended to treat entire streets, districts and towns as single compositions. The geometrical elements of points, lines and grids enabled city designers to create a series of nodes, axes and networks to impose a sense of coordination and order on the development of urban space. Boulevards ran across the city and wide streets entered at the midpoints of spacious squares with unified façades. Monumental use of sculpture and other elements such as fountains, obelisks or buildings managed the vistas and provided fixed reference points for integrating the street networks. Ancient Rome always remained a source of inspiration and imitation. The abstract rules of geometry provided the tools with which to build new towns, expand existing cities and radically to transform the urban spaces of Europe. From one century to another, justifications changed from glory of the king to economics of land, aesthetics and hygiene for people, but the result was a process of renovation that too often dismantled the living quarters of the poor with a top-down imposition of a modern physical landscape.

The rational foundation of theoretical reason was intertwined with technological foundations of productive reason. The ability to discover the secrets of the universe was combined with the ability to transform it. Mechanical clocks gave the post-Renaissance world a mechanical outlook about the universe; they were soon transformed into more advanced and complicated technologies that made fast movement and large-scale production possible. Being able to uncover some of the complexities of the world paralleled the ability to develop complex political and administrative organizations and mobilizing substantial productive capacities to change the face of cities and societies. The Industrial Revolution provided new

tools and conditions for urban transformation, making concrete, steel and glass available to a mass-production machine-age, characterized by movement and speed. In the nineteenth century, cities swelled with industrial workers, while in the following century new construction and transportation technologies allowed the cities to grow vertically and horizontally. The urban skyline became dominated first by factory chimneys and then by tall buildings for working and housing; the urban fabric was cut open to let access first to trains and then to cars. As the Cubists shattered the rules of perspective, multiple and disengaged geometries emerged which, despite the best efforts of modernists to master space through interconnection, were far too large and complex to be coherent. Centrifugal powers of modern productive reason would disconnect buildings from other buildings and roads, and functions and social groups from one another. By the end of the twentieth century, information and communication technologies were providing new tools to manage space and time. The ability to make becomes the mirror of the society: it produces its space in its own image. This ability has generated huge optimism for some, such as modernists, while pessimists have worried about its destructive powers, which have been witnessed all too frequently. It has, nevertheless, become the cornerstone for dealing with the world, to the extent that other considerations have paled in comparison, bringing about a degree of technological determinism. The result of drawing heavily on productive reason has been intensified global connections from within internally disconnected localities: a global city formed of spread-out and fragmented urban spaces, driven by its muscles rather than its mind or heart.

Challenges to reductive foundations

The rational foundations, however, proved to be limited on their own. The modern science and technology wished to conquer the natural world. But humans, their bodies and their surrounding environments, are themselves part of this natural world. There was a contradiction between seeing the natural world as so orderly and mechanical that its rules and relationships could be expressed in mathematical formulae, and yet assuming nature to be so wild and irrational that it needed to be tamed. The Romantics and empiricists challenged intuitive reason as a foundation for knowledge on the basis that senses and feeling were the driving forces of humans. Reason was considered to be a calculative power, at the service of passions and emotions. A new natural foundation for belief and action was, therefore, put forward. The notion of the world as a machine was rejected in favour of the image of a natural organism. Mind and body were no longer separated but interconnected, emotion and reason were different but interrelated forms of consciousness, and consciousness was not a fully understood territory.

The implications of the natural foundation for cities have included expressive freedom in appearances and styles. In different stages (Romanticism and postmodernism, and to some extent baroque), the critique of rational foundations has promoted expressive diversity, eclectic styles, curved lines, decoration and colour, rejecting mathematical simplicity and outward harmony that went before them. The result has been a picturesque, re-enchanted city of sights and sounds rather than order and discipline, but increasingly one in which enchantment can be personal and temporary, rather than collective and long term. Naturalism and liberalism signalled a transition of authority from monarchy and aristocracy to the bourgeoisie; it did not impose the wishes of an absolute ruler, but it also resulted in absence of coordination and a decline in the quality of urban environment, as reflected in the nineteenth-century or late twentieth-century laissez-faire cities. There were attempts to combine reason and feeling, formal and informal, symmetry and diversity, order and fantasy, integrating nature into urban development in the form of squares, parks, boulevards and winding streets.

The critique of here and now produced two types of escape: to the future and to the past. The utopian revolutionaries escaped to the future, imagining a perfect city through a radical transformation of status quo, and the Romantics escaped to a past space and time, which they imagined to look like the countryside. Both escapes, however, had unintended consequences. The revolutionaries paved the way for a new wave of rationalism that would tear the cities apart through top-down redevelopment, while the ideas of Romantics eventually led to abandoning the city for the countryside, generating an anti-urban tendency that culminated in suburban sprawl. Paradoxically, this appreciation of nature had a negative impact on the nature itself, contributing to the degradation of the global environment. To confront the damaging impact of cities on the natural environment two main trends have emerged: more intense development of cities to make them high density and compact, and management of suburbs in the form of new settlements, each rooted in one of the two great escapes of the nineteenth century. The concerns for the global environment and for personal freedom and well-being have reinvigorated the bid by nature to be the foundation for human beliefs and action.

Since its emergence, the city had always had to adjust to its natural settings if its inhabitants wished to have a chance of survival. Mountains, seas, water resources and climatic conditions all had to be taken into account in the design of the city. But with new technologies, it appeared no longer necessary to follow the natural context. As their footprints have spread to larger areas, the link seems to have been completely cut, resulting in environmental degradation, not only at the local level, but also at the global scale.

Nature was one challenge to the rational foundations, society was another. The underlying assumption for the rational foundation was an

autonomous individual who did not rely on society with its traditions and customs, but could judge everything in the light of reason. By moving the centre of gravity to human subjectivity, the supernatural and social foundations had become sidelined. This assumption, however, was challenged from different directions: how scientific methods preferred the third-person view of the world; how human individuals do not have control over some of the dark corners of their mind; how their use of language, and therefore their thoughts, depends on the existence of a public language; how they need to be part of an interdependent political community, rather than risking being atomized and isolated individuals. Individualism continued to be radicalized, but also faced different waves of holism trying to curb its spread and influence. The challenges of nature and society have shown a human agency who is embodied and embedded, located at the intersection of biological and social forces, enjoying a unity of consciousness and a relative autonomy in interdependent and intersubjective interactions. By embracing society as the foundation for reason, the notion of foundationalism itself has been questioned, so that coherence between parts or relation to practice are argued to be more significant.

The implications of this challenge have been pressure for turning cities into democratic places. Rather than being organized around gods and kings, the city was now to be designed and developed for people, where the need for justice was paramount. The stark polarization of the city and the fear of revolution led to utopianism and reform, manifested in two major scenarios: Garden Cities and the modern movement, which shaped the cities in the twentieth century. One advocated building the future growth of cities as small towns, each with a limited physical size and population, separate neighbourhoods, and a cluster of services at its core. This, however, could not be enough to cover all the future needs. The other promoted the overall transformation of cities through industrial production methods. Integration of movement and quantity of built units created vertical landscapes enveloped in wide roads and open spaces, which aimed at solving social problems through innovative urban design, even though its top-down redevelopment schemes generated new social problems of its own. The underlying assumptions of these solutions were providing a basic level of service for simple lifestyles. Urban life, however, was much more complex and diverse. The task of urban design and development was now to combine the fairness of universal provision with flexibility of responding to the needs of different income, age, gender, ethnicity, nationality and lifestyle groups. Its challenge was to make places that were both purposeful and meaningful within the context of globalization that threatened to erode local distinctions. The solution seemed to lie in emphasizing the process, enabling people from these different groups to participate in shaping their environments. A transparent and effective urban governance, therefore, is crucial in securing a democratic and inclusive process of change, drawing

on the range of local stakeholders and integrating economic, political and cultural needs. Effective participation, however, is easier said than done, always having to wrestle with economic and political imperatives and powerful stakeholders that drive the urban development process. Furthermore, a tribal fragmentary localism may emerge, manifested in envisaging the city as a collection of neighbourhoods, rather than an integrated, democratic and pluralist city, which would allow for flexibility and change.

Many of these processes have tended to be reductive, searching for a single cause that can explain everything, as the whole purpose of searching for foundations has been turning ambiguity and complexity into clarity and simplicity. These foundations have ruled out one another, created new centres of gravity and new power balances, which privileged a few and undermined many; and yet they represented the human efforts at finding clarity, safety and certainty. They became cornerstones of providing commonly held accounts for human beliefs and justifying human actions. Foundations are not necessarily created prior to practice. They emerge through practical concerns, then turned into abstract ideas, which in turn are applied in practice. So it is a time-bound process; at the beginning the ideas of a foundation are just emerging; it is more flexible and its power of shaping things is limited. But when turned into abstraction, its power becomes more established, integrating into commonly held norms and values. City building is perhaps the largest and one of the most continuous human undertakings that can mirror this endeavour, and show its changing foundations through the ages. Whatever the foundation, however, city building has only been able to implement ideas that are possible to implement, locked in a practical frame of mind. The foundations for knowledge and action have linked theoretical and practical, descriptive and normative concepts, creating a normative framework for city building. However, as we know, foundations are not enough for building a city.

Segmentation and reconstruction: inventing orders we can understand

Based on these foundations, Descartes suggested, we need to engage in a process of analysis and synthesis: breaking phenomena down into their constituent parts, and then reconstructing them so that they make sense to us, both embedded in the linguistic process of providing an account for our beliefs and actions. This was a process of making distinctions among phenomena and then establishing meaningful connections between them, often in a systematic and hierarchical order, reflecting a particular balance of power, and expressed in words, numbers or images.

From early on, space and time were subdivided into units, i.e. assigned with numerical value, as well as functional and monetary value, symbolic and social meaning, becoming the building blocks of social life and urban

space. Social complexity, division of labour and new technologies have accelerated the segmentation of time and space, whether conceived as abstract or relational, intensifying their use in ever more sophisticated ways. This, however, has created segregated cities and rushed societies. The complex process of segmentation in the city has produced atomized individuals, small time-slots and space parcels. While individual decisions may have made sense at the time, their cumulative effect has been a fragmented urban environment along the axes of space and time. The reconstruction of these axes has often been through the abstract mediums of representation, detached institutions of professionals, and impersonal mechanisms of market and bureaucracy, reflecting stratified societies with differences in power and wealth, privileging some and undermining others.

Furthermore, space and time can no longer be investigated as separate entities, as it generates a static understanding of space, or a disembodied understanding of time. What is needed for investigating a city is *dynamic multiplicity* in which, through time, different perspectives of embedded and embodied agencies are interacting with each other and with their physical environment.

Geometry, as the science of measuring space, originated in Mesopotamia but was also present in other ancient cultures as applied arithmetic, closely connected with land measurement, architecture and other activities. The Greek geometers turned this practical geometry into an abstract method of thinking, which formed a cornerstone of modern science. Deductive reasoning used some principles as true (axioms) and drew on them to arrive at other statements (theorems) through a system of logical proofs; but these were challenged by non-Euclidean geometries and by those who saw them as mere conventions.

The need for some organizational frameworks that would order increasingly complex societies started in the towns that lived by the rhythm of agricultural production, and later by mercantile and industrial routines and flexible patterns of the global economy. Timekeeping was first based on biorhythms and natural cycles, such as days, months and years, before conventional measures were invented, including weeks, hours, minutes and seconds. Astronomical, mechanical and then atomic clocks were used to calculate these units and their subdivisions ever more accurately. The duration of time has been segmented into a series of units, which are related to one another and to recurring natural events, fixing a system that captures and imposes an abstract order onto what is out of reach and invisible.

Analysis, in the form of segmenting tasks and phenomena into smaller pieces, is a key part of reasoning. This is manifest in the way language makes distinctions between objects and names them. With the specialization of tasks between agriculture and other activities, there was a division of labour which made urban living possible, and was extended to social classes, use of land and even gods, who each had their own function

in the universe. In abstract thinking, analysis was used from Plato onwards, and was based on a reverse process of reasoning: starting with the desired end and trying to reason in reverse to ways and means of bringing it about, a backward solution that connects one thing to another, consequences to causes. In contrast, synthesis goes forward, starting by what is known or admitted to be true, through constructive, progressive reasoning, to arrive at what is required.

This process of analysis and synthesis generate scales of abstraction. It is a socially constructed process; the way we subdivide a phenomenon, particularly in humanities and social sciences, depends on our perspective and our purpose. Different people may generate different ontologies. Furthermore, even if we all agree with the way a phenomenon has been analysed, we may disagree on how to reconstruct its pieces. For us to agree, or understand each other's efforts, and to go up and down the ladder of abstraction, we need public infrastructures of meaning.

Public infrastructures and private experiences

Based on these foundations, and intertwined with their development, an institutional and physical public infrastructure developed at each stage. Language is the primary framework for meaning, which makes connected thought and communication possible. It is a part of a larger set of conventions, practices, routines and rituals as well as buildings and spaces, altogether constructing a public infrastructure of meaning, around which a social order evolved. From sermons to parades and festivals, from temples to timetables, the elements of this public infrastructure were tightly related to a display and exertion of power which lay at the heart of this social order. This of course did not happen in a neat, step-by-step designed process; thoughts, actions and constructions were intertwined in a long process to generate the city's physical and institutional landscape, which could be identified and then be roughly repeated elsewhere.

Measuring time in hours and minutes was standardized long ago, but local times were different, and the task of coordinating between towns and between countries led to the establishment of universal time conventions that spread across the world by powerful empires. In social life, public time was on display in the skyline, in the form of sundials, minarets, church bells and towers, to generate a collective temporal order with which to frame individual behaviour.

The systems of measurement of space, which measure length, were first based on the human body, but becoming increasingly more sophisticated, from the length of a metal bar to atomic radiation and eventually the speed of light, to achieve maximum possible accuracy. Within the last century, the gradual adoption of common standards, through colonization or voluntary participation of different countries, has led to the current

international standards, even though parallel standards are still in use. As global interactions have intensified, the international standards for space generated a public infrastructure that affects human activities at all scales.

Time and space can both be seen as intrinsic features of the natural environment, as socially produced conventions, or as aspects of individually felt experiences. Conceptualizing space and time provided a set of abstract ideas. Space was conceptualized first as a pre-Euclidean commonsense, then through Euclidean abstraction, and finally post-Euclidean relativity. From a commonsense notion of finite places, space became conceptualized by Euclid, and following him Descartes and Newton, as infinite and real. According to Descartes, space was 'a continuous body, or a space extended indefinitely in length, width and height or depth, divisible into various parts, which could have various figures and sizes and be moved or transposed in all sorts of ways'.[1] Newton saw time as an independent entity flowing at a uniform rate: 'Absolute, true and mathematical time, of itself and from its own nature, flows equably without relation to anything external.'[2] The relative notions of space and time, as advocated by Leibniz and later by non-Euclidean geometers and Einstein, however, saw space and time as merely the relationships between objects and events. For Leibniz, space was an order of coexistences and time was an order of successions, while for Kant they were merely representations of appearances and did not exist in themselves.

In physics and mechanics, and following them engineering and architecture, however, it was the notion of abstract space that prevailed. It was a third-person, external view by science and technology that looked at it, conceptualizing it in the form of Euclidean ideal shapes or Cartesian coordinates, even if it was not possible to be grasped by senses. The reality, however, failed to live up to the perfection of these ideal abstractions. This metaphysical abstract notion was, therefore, imposed on the real world to correct it, transforming cities and societies, as manifest in post-Renaissance, and particularly modernist, architecture and urban design. While these notions can both have metaphysical elements, the relative notions of space and time entail paying attention to the relationships between people, events and physical objects, rather than imposing abstract notions on complex realities. In both accounts, the relations of distance and duration are given social significance with the aid of conventions, contributing to the construction of public infrastructures that order societies and their spaces.

Social and historical time was primarily conceptualized as cyclical, whereby patterns keep repeating. In contrast, the modern world has embraced the linear concept of time, in which time flows in one direction, associated with progress and development, looking optimistically towards the future and looking down on the past. The notion of designing a city of reason is in line with utopian traditions and the concept of linear time, in

which better future conditions are desired and designed for, although the challenge is to generate alternative paths rather than subscribing to the tyranny of a single future.

Timekeeping is an external, abstract and commonly shared framework that may be at odds with the individual's internal sense of time, but orders individual experiences and behaviour, and makes communication and coordination possible. The travelling day still appears to shape individual experiences as well as the urban form. However, the limited availability of time, the link between two abstract systems of time and money, and the support of new technologies, have resulted in the age of speed. This pressures individuals for a more intensive use of time, through multi-tasking and breakneck speed, and leads to a further development of a global infrastructure of time, upholding the new global economy. It is in reaction to the external pressure that resistance movements have emerged, from Rousseau who threw away his watch to the pressures to regulate the hours of work, and to the Slow Food movement of our time. The gap between the public and private senses of time, between measured time and felt time, between frameworks of meaning and individual expressions, between universal and particular, between abstraction and multiplicity, causes tensions as well as energies and corrective measures.

These binary conceptualizations are always simplifications of continuums, characterizing two points on a spectrum for clarity of communication. The problem will always be how to draw the line, how to characterize these points and how to move from one stage to another. The move along the scales of abstraction, and between different perspectives and timescales, will always be contested and potentially problematic, as it is not a linear progression. But design and planning are among the efforts to manage this movement in a desired direction. The role of reason is to facilitate this: theoretical reason helps moving up the continuum towards abstraction, while practical reason helps moving down towards multiplication and concretization.

By going through a recurring process of abstraction and application, we have sought to impose order onto the complexity of life. The processes of abstraction, segmentation and reconstruction are all conducted from a third-person viewpoint, which can be detached from the phenomena in order to make sense and transform them. In contrast, and often with a critical reaction, there is a first-person viewpoint that does not appear to segment phenomena, seeing them in a holistic light, preferring the emotive notion of place to the calculative concept of space. But the separation of scientific from commonsense approaches may be false. Unconsciously, we may tend to segment and reconstruct in our everyday engagements, as everyday life employs theoretical and practical reason with the same vigour. Furthermore, while we use a first-person viewpoint to understand our own thoughts and feelings, we look at other people from a third-

person viewpoint, which can be detached and cold. Subjectively, a place may have deep meanings, but intersubjectively it may lose all its significance. Rather than romanticizing the notion of place as warm and emotionally charged, we may see that place can be as cold as space, depending on where we stand.

The key point of the lived experience, therefore, becomes freedom from the will of others. If there are processes of transformation that change our life without our participation and consent, we may suffer degradation in our material conditions as well as in our mental well-being. It is against this forced transformation, which is associated with abstract reason, that people react. At a deeper level, it is the freedom of organic life from the constructions of society that finds expression in this resistance. At individual and social levels, the tension between social and biological aspects of our constitution is constantly present, working to different rhythms and routines, and thereby generating energies and obstacles, gains and losses.

Within the rational structures of time and space, there are always elements that cannot be accounted for, as time that is 'wasted' and space that is not 'properly' used. It is in these corners that the weakness or limits of our temporal and spatial orders become clear. Historically, we always try to extend these orders, and at the same time we wish to save places in which we can take refuge from the rigidities of these orders.

Accounts and actions

Reason has both substantive and procedural meanings: the faculty of intellect, and a process of reasoning through which we search for and provide accounts for our beliefs and actions. The distinction between theoretical and practical reason has been longstanding: scientific-theoretical reason which seeks truth, understood as justified belief, and deliberative-practical reason which searches for the best course of action. Overall, reason can be defined as the ability and process of making judgements about what to believe and what to do, through making distinctions and connections, producing connected thoughts and connected deeds, and being reflected in an account to convince ourselves and others. These accounts are made and expressed through collective symbolization, i.e. generation of symbols in the form of words, objects and images, or behaviour, imbued with meaning through social conventions and public infrastructures. We search for a string of words that is the evidence of connected thought, to justify a particular belief or action, in a way that others agree with us. It is always a narrative, told from one perspective, based on a set of judgements, which include some words and sentences, facts and events, values and interests, and not others. It is always an exercise of power, able to define things in a particular way. This is why many perspectives are needed to arrive at more

convincing accounts. To bridge the credibility gap, which the sceptics point at, trust in the hearer's judgement and in the speaker's accuracy and sincerity are essential, as well as the coherence of the argument and the openness of the conversation to questioning and debate, in a constant process of striving for better arguments. The gap between account and action, between general and particular, however, remains an area of tension and innovation.

A practical concern of counting goods led to fixing meaning through writing, which helped, like space and time, segment the sounds of speech into units, and then produce a public infrastructure for communication and meaning. It could transmit meaning through time and space, eliminating historical and geographical distance. Signs first stood for objects, and then for groups of objects, as well as ideas, and for words, syllables, which are how the brain deals with the flow of sound and speech by subdividing it into units, and eventually sounds, which paved the way for an alphabet. Based on a process of collective symbolization, writing changed from being pictographic and ideographic to phonetic and pronounceable, recording almost everything that language could express.

Verbal accounts can be given in many different ways, which is why science has preferred mathematics as its language, which uses numbers thought to be free from the emotional content of communication. When presented visually, the language of numbers becomes the language of shapes: geometry, which nevertheless does generate an emotional meaning in its audience. By using geometry, it was thought that a reliable system of connections has been employed to express, and to regulate, the relationship among objects and people. Producing a map becomes providing a visual account of the world. Producing a design, then, becomes producing a visual account of how the world should become; drawing is both a medium of analysis and communication. When this account uses regular geometrical shapes, it appears to be making connections between the distinct objects that make up the city, which is why geometrical regularity of urban form has been taken as an expression of rationality. It is expected to have the same effect as producing rational accounts for beliefs and actions. It is the evidence of making connections, in a manner that is widely understood by its producers and users. The absence of regular geometry of urban form, as in the Middle Ages or the laissez-faire cities, has been interpreted as the absence of connected thought and connected action.

Communication takes place at the interface of individual actions and public infrastructures. In language, four dimensions are involved: linguistic conventions, speaker's intentions, conversation's context and hearer's reaction. Linguistic communication, therefore, requires general constructs of language (words and rules that govern using them) to be employed by a particular agent in a particular context in collaboration with the audience. In face-to-face communication, performance becomes an added dimension,

which provides new tools for persuading the audience. Social conventions are internalized as character, or adopted as changeable masks, stabilizing the interface between social and biological, through suppression of impulses and showing a balanced and stable façade. Communication also takes places at a visual and spatial level, where objects and places may be designed or used to help the construction of an account. Each social field may develop its own conventions and semi-public infrastructure. However, this may or may not be shared by others, generating gaps in frames of reference that may make communication difficult, or even impossible, as evident from the gap between designers and clients, between experts and laypersons. There will also be ambiguity and gaps in communication, through differences in interpretation of buildings and objects from different places and periods by different observers with different personal and cultural frameworks. Every person and group may have a new interpretation, recreating new meaning within their own evolving conventions and frameworks. This generates gaps between accounts, space and society; gaps that create limitations and imposition of unwanted circumstances, as well as opportunity and energy for change.

Action was also subdivided and assigned functional and monetary value. The combination of division of labour with exchange made urban living possible, but also generated new forms of inequality among social classes and genders. After the Industrial Revolution, it led to dramatic levels of productivity, but also to separation of work from home and socio-spatial stratification. Division of labour was so hated by the nineteenth-century Romantics and revolutionaries that they wished it abolished, in favour of a holist integration of activities. When applied to the use of land, it generated a functionally differentiated and socially stratified urban landscape, a new urban form that eventually led to a segregated sprawl. The cornerstone of land use planning was the application of a functionalist division of labour to the urban space, in an attempt to control and coordinate land uses next to one another and across the city. Modernist town planning worked at the scale of urban region; it segmented land uses through zoning and hence creating a coarse-grain city good for cars. Post-modernist town planning, in contrast, worked at a local level, but offering a holist land use alternative, in which mixed-use would offer a finer-grain city that also was good for pedestrians. Both were examples of rational methods at work; they both used the method of segmentation, but differed in the scale of their focus, and in their method of establishing connections between the parts.

The rationale of modern planning systems has been developing an overall conception of the city and how its constituent parts relate to one another. Connectivity has been the keyword in the modern notion of the rational city. The problem, as always, lies in the process of analysis and synthesis: where boundaries for the city are drawn, how the city is

subdivided into its elements and how these elements are related to one another. Connectivity in space has been reflected both in harmony and contrast: internal harmony but contrast with the rest, as in modernism, or external harmony but contrast with one another, as in postmodernism. Connectivity may be implicit in small-scale interactions of exchange in the market, or explicit in the organized institutional intervention. While these forms of connectivity may appear to clash in some instances, they are the twin parts of an overall system, only possible via some common legal and cultural frameworks that make connections across time, space and context possible. Rather than reflecting the connected thought process of one agent, connectivity, particularly in city building, means reflecting many parallel, sequential or conflicting accounts and experiences. There is, however, an inherent tension between attempts to connect all aspects of life within an overall scheme, which can be oppressive, and the freedom of people as social and biological organisms. Comprehensive but reductive connectivity has been shown to be physically impossible and socially undesirable; connected action is therefore forced to be flexible, open and aware of its limitations.

Conclusion

The city of reason is one that reflects connected thought and connected action, as signs of embedded and embodied intelligent humans who are making these connections. These connections are developed and defined with reference to social and spatial contexts, revealing the normative aspect of rationality, which is why disconnection from these contexts has been called irrational. At the same time, there is a tension between context and action, between public infrastructures and individual experiences. In the city of reason, therefore, forms of connectivity are not rigid, closed and final, but open to challenge and adaptive to changing circumstances, to become more accurate, coherent, expressive and inclusive.

Confusion and failure have resulted from attempts at employing one form of reason where a combination of forms was needed: applying theoretical reason to action, as Descartes and modernists did, or applying practical reason to scientific knowledge, as postmodernists and relativists did. Even those who have tried to combine different forms of rationality, have tended to give priority to one form of reasoning: as its title suggests, Jürgen Habermas' communicative rationality subordinates different types of rationality to practical reasoning.[3] Another source of shortcoming has been putting all the emphasis on productive reason, i.e. the ability to make has taken the lead and issues have been interpreted as a matter for technical experts, without input from practical reason, which would harness the power of technology and expertise within a democratic deliberative process.

We cannot doubt the human ability to contemplate and to calculate, so as to develop thoughts and deeds that are coherent and purposeful. What we can question, however, are the components of this process of contemplation and calculation; the foundations and frameworks that are used; social conventions and public infrastructures on which it draws. It is here that limited interests or rigid assumptions may frame the process, laden with power games and clash of perspectives. We can question the necessity of foundations, probe the mythologies that are associated with them, and investigate how analysis and synthesis may lead to segmentation and simplification. We can also question the way these components are related to one another to generate a coherent account. It is in these relations that inconsistencies and gaps may be found. In other words, it is not the reason as a human faculty that is being questioned; it is the accounts we give that are, and should always be, open to question.

The claim to rational instrumental thought and action is based on segmentation and reconstruction. This is constantly challenged by resorting to nature, society and metaphysics. The nature's challenge says that rational purposeful action would undermine the biological dynamics within us and beyond. The society's challenge says that the purposeful action can only be described and justified within a social context. The metaphysical challenge says that breaking the totality of thought and action would lose its core meaning.

The analytical tendency to create distinctions has created fragmented urban spaces. The synthetic process of creating complex cities has ensured that these fragments are related to one another in a way that represents the social conventions and power hierarchies. Urban design, rather than contributing further to fragmentation, or to support hierarchies and rigid conventions, needs to create spaces of flexibility and overlap; places where the fragmented socio-spatial fabric can be mended, and where co-presence of difference can bring about new democratic possibilities. It needs to question the accounts that are given, and help generate alternative accounts that also address the concerns of society and nature, rather than a narrow set of interests. Rather than reflecting the theoretical or productive reason alone, it needs to combine them with practical reasoning, so that design can employ all of its technical, social and expressive capacities. Its contribution to the development of new public infrastructures of meaning should be based on such an inclusive framework of understanding and action.

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1 Introduction

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2 City of temples: supernatural foundations

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4 City of machines: technological foundations

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7 Keeping time

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