

Space I

S. Elden, Durham University, Durham, UK

© 2009 Elsevier Ltd. All rights reserved.

Introduction

Space is, in many ways, the key topic of geography. It is probably the most-often cited term that gives geography its identity and unifying focus. While biology studies life, and sociology society, geography lacks this specificity, as the etymology of the term would suppose a focus on the world (*geo*) rather than space. Yet, attempts to redefine geography as spatial science privileged this term, and though criticisms of this position offered alternative approaches, they did not fundamentally shift the emphasis from space. Thus both human and physical geographers use the word regularly, but it is frustrating to define and to many appears so diverse as to lack any useful specificity.

One of the reasons that space is so difficult to define is that it has many uses and a complicated history. Indeed, it seems incontestable that space is a historical concept, determined by advances in science and debates in philosophy. Many of the initial disciplinary histories of geography tended to obscure differences in how space was thought in order to lend a degree of coherence to the imagined trajectory of the subject. Where space is defined, or perhaps better, assumed, it tends to be unproblematically done so as a container for things to exist in, a place where events happen. Others are content to leave these big questions to one side as they pursue more narrowly defined questions within their own specialism. Yet some awareness of these debates is invaluable to a geographer, however concrete the focus of their work.

Key philosophical questions that geographers have engaged with include:

- Do we experience in space or experience space?
- What is the distinction between space and place?
- What is the relation between space and time?
- Is the world in space or is space in the world?

Space in the Philosophical Tradition

The word 'space' is derived from *spatium*, which in classical Latin meant a distance or a stretch. It could also mean a fixed distance such as the course in a race – a *spatium* or a *curriculum* was a lap in a chariot race. In the late Middle Ages some writers started to use the term as more akin to a container, as a synonym of a particular sense of *locus*, or place.

For later writers such as Descartes, what defined space, *spatium*, was its extension – or stretch – in three dimensions: length, breadth, and depth. For Descartes this gave rise to a particular determination of the material world as what he called *res extensa* – an extended thing – and because of this fundamental determination the world becomes accessible to us through the science that best allows us to comprehend it. This, for Descartes, is geometry, which he reconfigures in such a way to enable each point in space to be mathematically determined, and therefore effectively the same as any other. The notion of Cartesian coordinates (*x*, *y*, and *z*) derives from this understanding. Space in these terms becomes more understandable, and therefore controllable, through being understood in such a way.

Philosophers since have written about space in a number of ways, though it is interesting that it is much less the focus in itself but rather as one of a pair of terms. This is either because space is paired with 'time', or opposed to 'place'.

Space and Time

It is tempting to suggest that space is like time in at least one respect. This is St. Augustine's famous remark in his *Confessions*, Chapter XIV, that if nobody asks us what it is, we know; yet if we are asked, we do not know. In the philosophical tradition, time has generally been accorded a priority over questions of space. Whether this is because of a belief that while all events happen in time some happen solely at the level of thought and are therefore unplaced, or whether the priority is accorded to temporality and thinking spatially is derived from it depends on the particular thinkers. Some suggest that space measurements are ultimately reducible to ones of time, and that therefore time is prior, logically, to space. Often time is looked at as progress, change, and development; space as static, fixed, and merely a container. Kant argued that the senses of space and time were effectively hard-wired into our brains that we could not perceive except in space and time. Kant however thought that time was prior to space. For some writers, ideas of the three dimensions of space – *x*, *y*, and *z* – are partnered by a similarly calculated dimension of time, *t*. Temporal change has long been known to change the dynamics of space – Heraclitus famously declared that you cannot step into the same river twice, since other waters are continually flowing in. In Einstein's work the relation between time and space is not merely coexistent, but co-dependent.

Space and Place

Many writers see a distinction between space and place, in that place is the more experienced, lived form of our encounter with our environment, and space is the more mathematical, abstract imposed view of this. Place in these terms is understood in large part through the body, and our perception of what it moves through and interacts within. Yet it is worth remembering that many of our units of measure are derived from our body – foot, inch, fathom, and cubit, for instance, and an acre was the amount of land one man and an ox team could plow in a day. Others see that place is to be understood as a more localized way, whereas space is larger and less personal. On that basis place is ‘in here’ and space ‘out there’. Other approaches see that place is more open and dispersed, whereas space is bounded and exclusive. While two things can be in the same place, this is not the case with space, as things take up space, they occupy it. This view, which was certainly held by Descartes, is founded on the claim that the calculative measurement of space is the same both for the volume of objects and the ‘container’ they are within. As the remainder of this article notes, many of the ways in which space is understood within contemporary human geography are closer to some of the traditional understandings of place, and some closer to the more mathematical. Other ways of seeing this are attempts to mediate between the two positions.

Spatial Science

The quantitative revolution in geography was often characterized as seeking to reconceive geography as a ‘spatial science’. This was part of a wider development within the social sciences, but saw space as a fundamental variable which conditioned both the social context and the actions of individuals within it. Space is thus the focus, and scientific method the means to explore and analyze it. Within this approach to space, issues of distance and arrangement take on a particular priority, alongside direction and connection. The goal of accurate general rules and prediction led to an increase in the objects of study and the development of tools to make this possible.

The pursuit of the spatial order that conditioned spatial relations thus becomes important, which requires more than a straightforward view of space as a static box. Objects and events take on an importance in terms of their spatial proximity and relationships. While this was often unquestioning of what space actually was, the use of mathematical methods and quantification tends to lend support to the idea of space as a calculative, measured construct. In these terms, this is strongly influenced by positivism as a scientific approach. Advances in geography more recently, including geographic information

systems, work on a similar understanding of space. Critiques tended to suggest that this either saw space as a separate domain or it had causal properties – separation or fetishism. In these terms, geographers suggested that other disciplines from within the humanities were more useful in grounding geography rather than the social sciences, or at least the latter with the stress more on the social than the scientific.

Structuralist thought approached space from a related perspective. Many structuralist writers, including the anthropologist Claude Lévi-Strauss and the Marxist theoretician Louis Althusser, made great play of spatial language and metaphors in their work. These included terms such as field, terrain, site, and position. Yet they also stressed the question of space, often at the expense of time. Structuralists sometimes claimed that their work was interested in the freezing of time in order to look at things in terms of their relations and structures. This was known as concentrating on the synchronic rather than the diachronic, which examined change through time. The argument was that this was a way of containing temporal change in order to examine the deeper structures of human thought and society. Spatial rather than temporal relations became important in the framing of these structures. It was a way of avoiding the idea that different societies in the world were simply at different stages of development, where they were situated as further along a simple temporal succession. The problem, as many of the structuralists themselves came to recognize, was that this tended to occlude the possibilities of change through time, even within these societies. Later thinkers recognized that though structures or frameworks exist, these are dependent on knowledge, power, and truth, all things that are historically constructed. In this way, they began the process of thinking questions of temporality and spatiality together.

Ways of Thinking Space

Contemporary human geography tends to use the word space in a wide range of ways. While their methodological approaches differ in numerous ways from spatial science, the object of inquiry remains. Indeed, the advent of social/spatial (or sociospatial) theory has tended to emphasize the interrelated nature of social and spatial phenomena, suggesting that to think one without the other is to miss an indispensable part of the picture. This stresses the way in which space functions as a constituent element in social processes – not in a purely determinist way, but rather as continually intertwined, made, remade, and making. This is not the spatial fetishism that some geographers have been accused of in the past, where landscape makes people, and spatial variation is unproblematically assumed. Social relations are not merely

spatial relations, but neither is there any way to separate them. These claims suggest that for too long social theory has neglected the spatial aspects of human interaction, while it has generally recognized the historical elements. Many geographers have seized upon Michel Foucault's suggestion that while the obsession of the nineteenth century was history, the present epoch will be the one of space. Yet, as with Foucault's work, this development has not been simply to reintroduce an unproblematic sense of space, but rather to recognize the plurality and fecundity of this term.

This gives rise to the relation between space and property, with an emphasis placed on the difference between privately owned land and public space. Politically, much of the debate about space is related to the notion of territory, from that which belongs to individual states to smaller-scale territories of groups, gangs, or individuals. In some of this work there is a link between human and nonhuman geographies. Territory in its modern sense of the land controlled by a state is closely related to the development of techniques of measuring land and controlling terrain. In this respect, territory can be understood as a particularly political way of rendering space, and territoriality as a strategy of humans to control and dominate it.

In these terms the question is not so much what space 'is', but how ways in which space have been understood have conditioned particular types of human interaction and understanding. These issues are not confined to geography, of course, since space clearly exceeds that disciplinary focus. Physics, philosophy, and art all have a sense of space which is important in understanding the changing senses of space. The space of Renaissance art – of linear perspective and representation – for example, was shattered by the fragmented geometries of Cubism or abstract expressionism. Art in this sense was a challenge to form as well as content. Categorizing these different understandings of space can be done in many ways, yet three ways have proved to be particularly influential. These are absolute versus relative space, and the later introduction of a notion of relational space; Henri Lefebvre's distinction between kinds of space; and the work of Deleuze and Guattari on smooth and striated space.

Absolute, Relative, and Relational Space

When space emerged as an explicit category of Western thought, it tended to be thought in a way that has come to be characterized as 'absolute'. This is space as fixed, as a container, as something in which all things happen. This is the space of classical physics, in the writings of Newton, Galileo, and Descartes. Space can therefore be represented as a two- or three-dimensional grid, imposed over a landscape in surveying or cartography. Each point is

effectively the same in a homogenous expanse, amenable to scientific procedures based on coordinate geometry. Space, as understood in this, is directly understandable through measurement and calculation. This is the view of space that underpins modern science generally, with an emphasis on the arrangement of things or phenomena within space and less on the things or phenomena themselves. Thus, space is built up from points to lines, to planes to volumes.

Space, in this absolute sense, fits with the axioms of Euclid's *Elements*, giving rise to the term 'Euclidean space'. This is somewhat misleading, since Euclid's Greek does not contain a word that is the equivalent of 'space', but the term can be understood to mean a view of space that accords with his axioms and postulates.

In opposition to this view of space, yet sharing many of its essential elements, is 'relative' space. One way to understand this is to recognize that space is not an empty container, but filled with objects and relations. Space is, on this argument, in part dependent on that relation to objects, as it is a positional quality of a world of material things. Relative space can also be based on challenging the fixed geometries of absolute space. This would include the development of multiple geometries that rejects some of the key postulates of Euclid, while retaining a coherency and consistency, and recognizing that the perspective of the observer plays a key role. Spherical geometry, for instance, shows that two parallel lines will meet if laid on a spherical surface, such as the curved space of the globe. Two parallel lines laid north to south do meet at the poles. This has important implications for triangulation as a means of measuring the Earth's surface and helps to explain the reason for the distortion of two-dimensional maps, such as the Mercator projection, which sacrifice shape and area for the ability to plot straight-line courses. Notions of latitude and longitude depend both on this, and also on a clear sense of how absolute space allows division and abstract models.

When looking at speeds close to the speed of light, Einstein realized that space was related to time, and that space-time is the most appropriate way to see this. Other writers have focused on how space appears dependent on other things. On this view, space and our experience of it is relative to other things – to time, to cost or other economic factors, to social interaction, or the way in which we cognize or perceive it. In these terms, proximity may not be the same as distance – I am closer, for instance, to the person I am speaking to on the telephone than to the neighbor next door; I have more in common with the other participants on an e-mail discussion list, dispersed across the world, than the people in the next town. This can equally be understood as the difference between pattern and process.

Leibniz's dispute with Clarke is a famous instance of a debate between absolute and relative views of space.

Clarke defended the absolute view of space of Newton against criticisms leveled by Leibniz. Leibniz had many points to make, but crucial to them was that space was not an absolute reality, devoid from any substance, or it would be more real than any substance. Kant agreed with this criticism, and Clarke is generally acknowledged to have had little response to this. Leibniz also argued that motion was not something that could be measured only through space itself, but solely understood through relation to other objects. Clarke replied that even objects moving in a void were effected by forces, which could not be related to anything else. Leibniz also suggested that direction in space is relative to the things within it – up and down, left and right, and compass directions are all dependent rather than self-evident. Space for Leibniz is thus relative, as it cannot be understood solely in relation to the single point, but only in relation to others around it. This challenges some of the assumptions of positivism or empiricism about how we can measure things. Kant attempted to reconcile these positions by suggesting that space, as part of our internal perceptive apparatus, was real enough to be amenable to scientific examination, yet not an attribute of things aside from through their perception by us.

More recently, some of these ideas have been developed further, but as relational space. In this sense, space is relational because objects exist only as a system of relationships to other objects. Space is thus seen as the product of interrelations, as constituted by them. Space is a multiplicity, heterogeneous rather than homogenous, plural rather than singular. Space is, therefore, always in the process of making, never finished or closed. Doreen Massey, in particular, has suggested that we should understand space in this way. If the differences between this and relative space are perhaps overdrawn, this is a way to understand space that exceeds the mathematical more generally, that is the space of social relations, metaphorical spaces, spaces of poetry, art and emotion, and dream and aspiration. Relative space is, for some contemporary geographers, too close to the understandings of spatial science, and the stress on the relational allows them to escape from more narrowly conceived ideas of the relative. It is through practical analyses that spatial issues are seen to be embedded in social relations. Geographies of emotions and the recent emphasis on affect link to these ideas of space in a less-confining way.

Lefebvre's Understandings of Space

Henri Lefebvre was a French Marxist philosopher and sociologist, who wrote on a wide range of topics. Although not a geographer, his work has been widely read by geographers, especially since the 1991 translation of *The Production of Space*. This was a book he came to write only in his mid-70s, after several decades of work on

urban and rural sociology, studies of everyday life, and Marxist theory. Lefebvre argued that space was poorly understood and some specificity needed to be introduced. Yet, this was not to propose a fixed, unitary definition. Like other ways of looking at space, and in partial relation to the work of David Harvey, Lefebvre proposed a dialectical way of thinking about space. Harvey and other writers – notably Edward Soja and Mark Gottdiener – had previously introduced Lefebvre's ideas into debates in English-language geography. Although Soja's appropriation of Lefebvre was criticized his stress on the essential spatial nature of social life – the argument of the sociospatial dialectic – and the argument that space needed to be reasserted in social theory had a major impact in geographical work and in related fields such as urban studies.

Although Lefebvre took many of his ideas about space from German philosophy, including Ernst Cassirer and Martin Heidegger, he read them through a deep attachment to Marxist politics and the spaces of twentieth-century France. Lefebvre argued that there was undoubtedly a way of thinking of space as physical and material – the spaces of architecture, towns, and nature. This was space as we perceived it in the world around us. He called this 'spatial practice', and some have suggested it can be understood as real space. This is the organic, physical space of the world. Lefebvre also argued that there were 'representations of space', space as we conceive of it. This was a mental construct, and would include the spaces of maps, of plans, space as geometry, and space as imagined. This tends to dominate ways in which space is thought. Lefebvre therefore suggests that the traditional ways of thinking of space have tended to be concrete or abstract.

Lefebvre's dialectical point is that these two ways of thinking about space are, in themselves, understandable, but that in our everyday lives we encounter space in a way that, while it has elements of both, exceeds their determinations. These he calls 'spaces of representation' (the English translation renders them as 'representational spaces'). This is the social space of lived interaction, the spaces of symbolism and meaning and, in Edward Soja's term, space as simultaneously 'real-and-imagined'. Lefebvre therefore challenges both a crudely materialist analysis and a politically detached idealist one. He suggests that this lived space is dominated by the tactics of abstraction, and overlays the physical space of the world, imbuing it with meaning.

As a Marxist, Lefebvre was particularly interested in introducing this analysis into his historical materialism. Some have suggested that this spatial element makes for a historical-and-geographical materialism, but this perhaps runs the risk of too much emphasis on the additionality, and not enough on the disruptive introduction. To inject this kind of spatial perspective is simultaneously to

challenge how we think about time and history, with change through space and time rather than simply historical progress being one of the results. Lefebvre also claimed that time should also be understood in a lived sense rather than a mechanized or measured way.

Lefebvre particularly emphasized the way in which spaces were produced – that is constructed, coded, recoded, and used through a range of practices. For Lefebvre, social space is a social product. These practices were not only confined to material building projects or abstract schemata of town planners, or regional developers but also the everyday interactions of people and groups. His analysis therefore not only owes much to political economy, in that space is an economic and social product, with analysis of rent, exchange and use value, and profit, but also exceeds this to develop a more general politics of space. Space and time thus are not neutral, preexisting frames for human events, or the way in which we experience other things. Space and time are produced and shaped through actions and reactions, experienced in themselves.

Lefebvre's notion of social space can also be understood as lived, embodied space, and so has links to some of the literature on 'place'. This is somewhat complicated by Lefebvre's use of the term *espace*, which, in French, arguably carries a wider range of resonances than the English 'space'. Many of those meanings would not straightforwardly be understood as 'space', and are perhaps closer to the English use of 'place'. Lefebvre rarely used the term space in isolation from some kind of qualifying adjective. Indeed *The Production of Space* is filled with a number of other spaces – concrete space, abstract space, contradictory space, and differential space. This is an important and neglected point, in that Lefebvre proposes the three-part schema only to complicate and historicize it in later chapters of *The Production of Space*. For Lefebvre the mode of production is important in terms of determining how space will be seen, and he is particularly interested in how capitalism produces space.

Smooth versus Striated

One final way to think about space is found in the work of the French thinkers Gilles Deleuze and Félix Guattari. Deleuze was a philosopher by training while Guattari was a Lacanian-trained psychoanalyst. They wrote extensively individually – especially Deleuze – and a number of books together, of which *A Thousand Plateaus* is probably the most influential in geography.

Deleuze and Guattari suggest a distinction between smooth and striated space. Smooth space is crisscrossed with lines, overlapping and jumbled points in a web of connections. This is space as immense and sprawling, space defined through movement, lines, and trajectories. Striated space is organized, hierarchical and largely

static, channeled, and divided into shapes of various sizes. Politically these can be represented as the globalized world of the third millennium, of far-flung points connected in a network society, nodes in a system; as opposed to the nation-state map of ordered Europe, which progressively eradicated the overlapping sovereignties of medievalism, redistributing land to remove almost all the enclaves and exclaves.

However, Deleuze and Guattari convincingly argue that smooth space only appears to be free of striation, and that while striated and smooth space can be theoretically disassociated, in practice they continually entwined. This has been useful for some geographers in trying to understand the way in which the smooth space of global networks is imposed over the striated spaces of modernity, with nation-states still attempting to cling to their sovereignty and territorial integrity in an age of globalizing markets and culture and emergent global modes of governance. To use two of their other terms, this is, for Deleuze and Guattari deterritorialization partnered with reterritorialization, the continual making and remaking of spatial relations.

Conclusion

In his recent work, Harvey has suggested that in many of the ways geographers operate, we think of space as absolute, relative, and relational all at the same time. While perspective is important, this does not mean that we can abandon some of the ways in which absolute understandings of space condition our daily lives. Harvey's point is that contemporary geography may be concentrating too much on the relational and forgetting the concrete and relative; just as the positivism of a previous generation was too obsessed with the absolute and relative. For Harvey, this fits with his views of space as dialectical.

Harvey has also attempted to reconcile the absolute/relative/relational schema with Lefebvre's ideas, suggesting that these can be turned into a matrix of meanings for understanding space. If this perhaps is too neatly dialectical in attempting to reconcile all differences within a confining system, it does point to the ways in which these different ways of understanding space are not mutually exclusive, and it is possible to recognize geographers working with a number of these ideas and frames of understanding today.

Many of these ways of conceiving, perceiving, and living space illustrate the unequal dynamics of human society. Space can be understood economically as a form of property, particularly through the notion of land; as a military-strategic issue of terrain; and as the political notion of territory. Certain spatial frames are imposed, made to seem obvious and unproblematic, and yet have

profound impacts on people's lives, in a variety of ways. If we think about power as creative, and not just repressive, and therefore about the making and remaking of social relations, it is clear that thinking about power requires a thinking of questions of space. Similarly, thinking about space requires an understanding of questions of power, since it is about interaction, determination, and control. In that sense 'space' really is at the heart of what geographers – both within and beyond the discipline of 'geography' – do.

See also: Mapping, Philosophy; Marxism/Marxist Geography II; Military Geographies; Phenomenology/Phenomenological Geography; Philosophy and Human Geography; Place; Positivism/Positivist Geography; Quantitative Revolution; Scale; Territory and Territoriality.

Further Reading

Benko, G. and Stohmeyer, U. (eds.) (1997). *Space and Social Theory: Interpreting Modernity and Postmodernity*. Oxford: Blackwell.
Bonta, M. and Protevi, J. (2004). *Deleuze and Geophilosophy: A Guide and Glossary*. Edinburgh: Edinburgh University Press.
Casey, E. S. (1997). *The Fate of Place: A Philosophical History*. Berkeley: University of California Press.
Clove, P. and Johnston, R. (eds.) (2005). *Spaces of Geographical Thought*. London: Sage.
Crang, M. and Thrift, N. (eds.) (2000). *Thinking Space*. London: Routledge.

Deleuze, G. and Guattari, F. (1987). *A Thousand Plateaus: Capitalism and Schizophrenia*, vol. II. Minneapolis, MN: University of Minnesota Press.
Elden, S. (2004). *Understanding Henri Lefebvre: Theory and the Possible*. London: Continuum.
Gottdiener, M. (1985). *The Social Production of Urban Space*. Austin, TX: University of Texas Press.
Gregory, D. and Urry, J. (eds.) (1985). *Social Relations and Spatial Structures*. London: Macmillan.
Harvey, D. (2006). Space as a keyword. In Gregory, D. & Castree, N. (eds.) *David Harvey: A Critical Reader*, pp 270–293. Malden: Blackwell.
Jammer, M. (1958). *Concepts of Space: The History of Theories of Space in Physics*. New York: Dover.
Kern, S. (1983). *The Culture of Time and Space 1880–1918*. Cambridge, MA: Harvard University Press.
Lefebvre, H. (1991). *The Production of Space* (translated by D. Nicolson-Smith). Oxford: Blackwell.
Lefebvre, H. (2009). State, space, world. In Brenner, N. & Elden, S. (eds.) *Terror and the State of Territory*. Minneapolis: University of Minnesota Press.
Massey, D. (2005). *For Space*. London: Sage.
Ray, C. (1991). *Time, Space and Philosophy*. London: Routledge.
Sack, R. (1980). *Conceptions of Space in Social Thought*. London: Macmillan.
Soja, E. W. (1989). *Postmodern Geographies*. London: Verso.
Soja, E. W. (1996). *Thirdspace*. Oxford: Blackwell.
Thrift, N. (2003). Space the fundamental stuff of human geography. In Holloway, S. L., Rice, S. P. & Valentine, G. (eds.) *Key Concepts in Geography*, pp 95–107. London: Sage.
Tuan, Y.-F. (1977). *Space and Place: The Perspective of Experience*. Minneapolis, MN: University of Minnesota Press.
van Fraassen, B. C. (1970). *An Introduction to the Philosophy of Time and Space*. New York: Random House, 1970.