Chapter 1
The Two Cultures of Cities

1.1 The Two Cultures

One of the most famous observations in the history of science is Snow's thesis about *The Two Cultures* – the culture of the sciences and scientists and the culture of the arts, humanities and the "literary intellectuals" as Snow referred to the proponents of this second culture. According to Snow the breakdown of communication between the "two cultures" is a major hindrance to solving the world's problems. C. P. Snow – a British scientist and novelist – delivered this thesis on May 7, 1959, as the Rade Lecture in the Senate House, at the University of Cambridge, England. The thesis was reformulated and extended by him a few years later in his *The Two Cultures and a Second Look* (Snow 1964). "It is hard to see", writes Yee in a review to a 1993 new addition of Snow's *The Two Cultures*, "why quite such a fuss was made over Snow's lecture at the time; as he himself was the first to admit ... [that] nothing he said was particularly original" (Yee 1993).

But there is something original, I think, in Snow's thesis: the interpretation and perception of scientific differences not in terms of differences of logic, method or opinion, but in terms of cultural differences – a view that will later appear in studies about the history, philosophy and sociology of science. For example, in *The Structure of Scientific Revolutions* Kuhn (1962) develops the notion of 'normal science' – a period during which scientists conform to the dominant paradigm partly because they are convinced by it and partly because conservative tendencies make it much safer and convenient to conform to the group, that is, to the dominant scientific culture.

Cultures come into existence by emphasizing common values, norms and material goods shared by their members and by emphasizing and often exaggerating the differences between their common elements and those of other groups. Cultures survive by the process of *cultural reproduction* – the process that routinely and daily produces and reproduces the common (often exaggerated) elements that unite the group's members as well as the differences between them and other groups (Bourdieu 1993; Giddens 1997).

Snow's usage of the term 'culture' to refer to a certain grouping among the scientific community implies that scientists are no exception in this respect – they

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are first and foremost human beings and as such tend to form cultural groups by emphasizing and often exaggerating the common elements that unite them and those that separate them from other groups, by forming stereotypes of themselves and of the others and so on.

The above-noted similarity between Snow and Kuhn is not accidental: Historians of science indicate that Kuhn "was deeply impressed by Snow's thesis" (Andresen 1999, p 55) and that "Kuhn constitutes his theory about scientific revolutions as a version of the 'two cultures'" (Westman 1994, p 81).

Kuhn added to the notion of science as a culture his famous *The Structure of Scientific Revolution* (Kuhn 1962) – the view that science evolves not linearly and gradually, but by means of revolutions – a view that reminds one of Eldredge and Gould's (1972) "punctuated equilibrium" and of course of complexity theory's central notions such as bifurcation, phase transition and self-organization.

In what follows, I describe the study of cities in the last 60 years in terms of a conjunction between Snow's and Kuhn's theses, that is, as a pendulum that is moving between two poles that roughly correspond to Snow's two cultures when the moves from one pole to the other take the form of what Kuhn has termed "paradigm shifts" and what students of complexity call *phase transition*. At one pole, we see scholars that approach the city from the perspective of the sciences with their scientific methods, attempting to develop *a science of cities*, while at the other, studies that approach cities from the perspective of the humanities and social philosophy with hermeneutics as their major methodological tool.

1.2 The Two Cultures of Cities

The movement of this pendulum starts to be strongly felt in the 1950s with the so-called *quantitative revolution* (Burton 1963). Before that event, during the first half of the 20th century, the two streams developed in parallel: On the one hand, we see "soft" humanistic studies such as Mumford's (1961) *The City in History*, or Wirth's (1938) "Urbanism as a way of life" or the notion of *regional geography* as developed in urban geography (MacLeod and Jones 2001), while on the other, quantitative studies such as Auerbach's (1913) inductive study of the size distribution of cities, Christaller's (1933/1966) and Lösch's (1954) central place theories, Reilly's (1931) "Law of Retail Gravitation", gravity/spatial interaction models and the like (see further details below in Chap. 2)

In the 1950s, we see a split – a *quantitative revolution*. It was a revolution not because the proponents of this move invented the scientific approach to cities but because as part of their effort to convey their quantitative message they have strongly criticized and even de-legitimized the scientific validity of what they have referred to as descriptive approaches. This criticism entailed an almost unbridgeable gap between the quantitative vs. the descriptive studies – very much in line with Snow's two cultures.

The quantitative paradigm dominated the field of urban research during most of the 1950s and 1960s just to be replaced, in the early 1970s, by social theory oriented urban studies. As in the days of the quantitative revolution here too, this move took the form of a "revolution" when proponents of the new paradigm started to strongly criticize the positivistic-quantitative approach. They did so from two main points of view: from a Structuralist Marxist perspective and from a phenomenological idealistic perspective (Chap. 3 below). The result of this second revolution was that the gap between the two cultures of urban studies further widened.

The field was now divided into two distinct cultures – Structuralist, Marxist and Humanistic (SMH) approaches versus Positivist/Quantitative approaches to cities – with all the ingredients indicated by Snow and by cultures in general: a breakdown of communication, emphasis and exaggeration of differences between the cultures, stereotypic images of the other and a process of cultural reproduction that reinforces and safeguards the differences in a variety of ways, including: scientific journals that due to their specialized nature could easily exclude the views of the other – a process that was practically executed by an army of referees, "guardians of the wall", that protected the minds of the groups' members from intruding ideas; general introduction textbooks that, by their very nature, tend to stereotype complex relations; specialized conferences that naturally exclude the other side; and endless number of lectures and university courses that followed and reproduced the two cultures.

The above story about studies of cities and urbanism is well recorded (Chaps. 2–4). However, it is usually told in terms of a paradigm shift between science and humanities and social studies, or in terms of a tension between analysis and hermeneutics, but not in terms of cultures. Looking at this story from our perspective of the Snow-Kuhn conjunction adds two important components. The first component is a link to theories of complexity and self-organization. It is a twofold link in the sense, firstly, that cultures come into being spontaneously, that is to say, by means of self-organization (see Harton and Latane 1997, on this issue); and secondly, in that complexity theories of cities (CTC) have the potential to link the two cultures of cities – a point I've elaborated in the article "Complexity Theory as a Link Between Space and Place" (Portugali 2006) and will further elaborate below.

The second component is a sensitivity to cultural biases: For example, it is interesting to note that the very negation 'sciences' vs. 'humanities' is culturally biased – it is typical of the English speaking cultures. In other cultures and languages – in German, French and Hebrew, for example – there is no parallel to the term 'humanities'. Instead in German it is *Geisteswissenschaften*, in French the term is *sciences humaines*, while in Hebrew we use the term "mada'ei ha'ruach' – literally meaning the 'sciences of the human spirit'.

The events that led to, and the story of, the quantitative revolution that was then followed by the SMH qualitative revolution, were specifically dominant in the English speaking countries. In Europe as well as in other parts of the world it was much less prominent. However, due to the general prevalence in the use of the English language (and culture) in science as in other domains of life, it is not surprising that the "English narrative" became the canonical story of the field. I mention it here because as implied from what has been said above and as will be

further elaborated below my view is that the gap between the two cultures of cities is not as wide as some tend to describe it. My view is that the two cultures of cities are related to each other as the two bordering edges of an almost-closed circle: The solid line that separates them is very long but the distance between them is rather short. As just illustrated, CTC have the potential to bridge this gap.

1.3 Parallel Currents

In the last two-and-a-half decades we have seen two parallel developments: The social theory oriented SMH urban studies followed general social theory by adopting postmodern, poststructuralist and deconstruction (PPD) approaches, while the quantitative spatial regional sciences were strongly influenced by theories of complexity and self-organization. These parallel developments, discussed in some detail in Chaps. 3 and 4, are interesting and significant in several respects:

First, there are several similarities between complexity theories and PPD in their perception of reality, for instance, both emphasize change, chaos and instability: PPD approaches by claiming that these properties are typical of postindustrial globalized society, that is to say, of the age of postmodernity and the new postmodern condition, while complexity theories by claiming that change, chaos and instability are some of the properties that characterize a certain type of natural and artificial systems, namely, open, complex, self-organizing systems which are far from equilibrium. As we shall see below, these similarities have led several authors to claim that complexity theories support, or are, a version of, postmodernism. My view about these similarities is different – I think that the links between complexity theories and PPD are superficial; that the more genuine links are between complexity theories and modernist social theory and that, as a consequence, CTC has the potential to, and should, link the two cultures of cities. This is one of the main themes of this book.

Second, cities have a special position in both complexity theories and PPD. In complexity theories cities were used from the start as metaphors for complex dissipative systems – e.g., by Ilya Prigogine, one of the founding fathers of the paradigm of complexity (Chap. 4). In PPD the current state of cities and urban society is regarded as one of the signs of postmodern society. More specifically, it is common in PPD to distinguish between two interrelated notions: *Postmodernity* that refers to the state of postindustrial society and *Postmodernism* that refers to a social philosophy about art, architecture and urban design in the age of postmodernity. The properties that are often mentioned as marking the present era and the move from the modern age to postmodernity are globalization, glocalization[1], the rise of civil society, and … cities and urbanism. The new nature of cities and

[1]A term combining the words ‘globalization’ and ‘localization’. It comes to indicate that the emergence of globalization was associated with the rise of localization in culture, society and economy. See Wellman (2002) and further bibliography there.

urbanism – the rise of *global* or *world cities* and the fact that for the first time in human history more than half of the world population lives in cities – are often cited as phenomena that distinguish modernism from postmodernism. Henri Lefebvre (1970) has referred to this transition as *The Urban Revolution* – a view that I've adopted and further elaborated in connection with complexity theories of cities (Portugali 2000, 2006).

Third, there are similarities in the image of the city as it emerges out of the writings of both CTC and social theory oriented urbanists. Both describe the city as highly dynamic, hardly controlled, and unpredictable. It is therefore not surprising that proponents of both PPD and complexity theories are often using the same language: complexity, chaos, network ... However, when PPD writers use these terms they refer to the literal meaning of the words whereas when employed by practitioners of complexity theories, to a formal theory with its specific mathematics. Thus, when a proponent of PPD says 'chaos' what is meant usually is the opposite of 'order', whereas when a complexity theorist uses the term chaos, in fact it means "deterministic chaos". In a similar way, when Castells (1996) writes about *The Rise of Network Society* he refers to the impact of information technologies – to the fact that society has become highly connected; whereas when CTC authors use the term 'network', they refer to the formalism of the new science of networks as defined by people like Barabasi and Watts (see Chap. 4). Or, when Healey (2007) entitled her book *Urban Complexity and Spatial Strategy* she meant that cities have become literally complex – very complicated; while when Batty (2007) named his book *Cities and Complexity* he meant 'complex' in the sense of complexity theory and its mathematical formalism, namely, *Understanding Cities with Cellular Automata, Agent-Based Models, and Fractals* (which is the subtitle of his book).

1.4 CTC – One Medium with Two Messages

So far, there have been very few attempts by proponents of CTC and PPD to cross the boundaries of their respective cultures. One such attempt was made by Thrift (1999) who, from the perspective of social theory oriented urban studies, wrote an article on "The place of complexity". His account appears like a tango: a small step forward and then two steps backward. "First", he states (p 33), "I want to take ... complexity theory seriously. It *does* have ... important things to say." But then he retreats: "But second, I want to recognize that complexity theory is just another business opportunity. It is up for sale. ... So, third, ... my account ... is tinged with irony and is more than a little ambivalent."

On the other side of the barricade, in the CTC culture, there is very little discussion about the relation of the CTC approaches to the wider domain of urban studies, SMH and PPD included. The reason is, to my mind, again cultural: Many of the practitioners of CTC are scientists (such as mathematicians and physicists) who were attracted to cities not so much by interest in cities and urbanism as by the possibility to test and apply their models in yet another domain.

Others are quantitative geographers and urbanists who consider CTC as the second, more advanced theoretically and more sophisticated technologically, science of cities and themselves as the new generation of scientists of cities.

My view is different. I think CTC have two messages to deliver to general urban studies, planning and design of cities: The first message starts from the notion that similarly to many complex natural systems, the artifact cities are complex self-organizing systems too. Similarly to natural complex systems they come into being by the process of emergence out of the interaction between the many parts of the systems, and similarly to many natural complex systems, they are far from equilibrium systems typified by phenomena such as fractals, self-organized criticality, chaos, and nonlinearity. An important consequence of this resemblance is that many of the models developed in order to study "how nature works" [the title of Bak's (1996) book about self-organized criticality] are readily applicable and available to cities and students of cities. This is the main message delivered so far by CTC to the general study and research of cities.

The second message starts from exactly the other direction: indeed there are significant resemblances between natural complex systems and cities, but beyond the similarities there are also significant differences that cannot be ignored. Firstly, cities are *dual complex systems* in the sense that each of their elementary parts – the urban agents (individuals, households, firms, or public agencies) – is a complex system, too. Secondly, and related to the above, cities are artifacts, that is to say, the product of humans' intentions, aims, politics, learning, and hopes. The significance of this view is twofold: on the one hand, it gives CTC an opportunity to feedback and contribute to the general theory of complexity, for example, about the similarities and differences between phenomena of complexity and self-organization as they take place in the natural and artificial domains; on the other, it has the potential to develop links between the two cultures of cities.

I'll elaborate this potential in some detail below (Chap. 5); here let me emphasize its core: One of the main issues that separates the two cultures, the two cultures of cities included, concerns methodology – in order "to do science" one has to adopt the principle of parsimony that implies reductionism and thus enables quantification and mathematical formalism. Social theory and with it SMH and PPD urban theories, suggest that when applied to the human domain, the scientific method with its reductionism implies overlooking and thus loosing the essence of being human. As a consequence, in the human domain, to which cities and urban societies belong, one has to adopt hermeneutics as the preferred methodology. As I'll show below, complexity theory can be at once scientific and nonreductionist and thus link the two cultures of science and the two cultures of cities.

I've started to develop this view in *Self-Organization and the City* (Portugali 2000) and in a paper on "Complexity Theory as a Link Between Space and Place" (Portugali 2006); this is also a central theme in this book and I'll come to it again in Part II. In this first part, however, my aim is preparatory, namely, to describe in some detail what has been described in brief above and thus provide the context to the discussions in Parts II-IV that follow. Thus, Chap. 2 deals with the first culture of cities, which was the first attempt at developing a science of cities; Chap. 3 deals

with the second culture of cities that suggests a social theory-oriented urban study; while Chap. 4 introduces in some detail CTC. I close Part I with Chap. 5 that looks back at CTC with appreciation at what has been achieved but also with sober criticism and finally by indicating potentials that have yet to be realized.