

Chapter 2

A Semantic Introduction

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The objective here is to take a brief look at semantic questions surrounding several words that are frequently used in this book, and which relate directly to the two nouns in the title: “Landscapes and Societies”. This includes the obviously similar terms land, culture and civilization, but also three words concerned with the relationship between the two—determinism, adaptation and sustainability.

2.1 Landscape and Land

The Merriam-Webster definition of landscape is “the landforms of a region in the aggregate”, which is almost the same as the definition of topography in the Oxford English Dictionary (OED): “the features of a region or locality collectively”. For the OED landscape is: “a tract of land with its distinguishing characteristics and features, esp. considered as a product of modifying or shaping processes and agents (usually natural).” That is a better definition, and since landscape is there defined as “a tract of land”, I will take landscape and land to be synonyms. However, it’s a bare-bones definition, and the details need to be fleshed out. An examination of the phrase in parenthesis is also necessary.

The ideas of Aldo Leopold on the topic of land, his “land organism”, are germane to the discussion. According to Leopold (1993, p. 46) the complexity of the land organism is “the outstanding scientific discovery of the twentieth century”. He wrote that “the individual [human being] is a member of a community

of interdependent parts [which includes] soils, waters, plants, and animals, or collectively: the land.” The concept owes much to earlier work by geographers. Carl Sauer for example, wrote of the “phenomenology of landscape” and emphasized that “the works of man [were] an integral expression” of it (Sauer 1925, p. 21).

Notice Leopold’s introduction of the word community into the debate. As an ecologist Leopold was well aware of our Darwinian drive to compete within the land organism, but in the interests of conservation he was keen to develop a “land ethic” that would encourage human beings to cooperate as well as compete. He hoped that seeing the land organism as a community, with the strong need for cooperation that holds a community together, would provide a firm foundation for the ethic he desired.

Even without Leopold’s ethical agenda, it is still necessary to see landscape as a ‘community’ or, to use a less anthropomorphic phrase, a complex of interrelationships. Only with this perspective is it possible to appreciate how a landscape works, and how interdependent its many parts are. It also encourages us to be humble—the complexity of landscape is so great that we do not yet seem to have a sufficient grasp of it to live sustainably on it.

A final matter to clear up is the phrase “usually natural” in the OED definition. Although as good Darwinians, we insist that human beings are an integral part of the natural world, we normally distinguish our activities and effects as being artificial rather than natural, a convention I will follow.

The fact is that little if any of the Earth’s surface is free from human influence so that pristine nature if it still exists, is rare. Our mark is seen even in the inhospitable environments of the high mountains and high

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latitudes. Indeed it has been said that in the Holocene, *Homo sapiens* became a geological force on the planetary surface comparable to those such as volcanism, tectonism, glaciation and weathering that have dominated the landscape surface since Precambrian times (Chesworth 1996). We have begun a new geological epoch, the Anthropocene, says Crutzen (2002).

The Millennium Ecosystem Assessment Project (2005, p.18) in its definition of landscape clearly recognizes the human component: a landscape is “an area of land that contains a mosaic of ecosystems, including human-dominated ecosystems. The term cultural landscape is often used when referring to landscapes containing significant human populations or in which there has been significant human influence on the land”.

In light of such considerations, I will take land or landscape to be part of the macroscopic three dimensional continuum of landforms that make up the Earth's land surface. It is composed of a chaotic complex of rocks, minerals, soils, and amorphous solids, surface water, ground water, organisms and products of their decay, all of which interact and change the landscape, with much feedback, in response to the forces of weathering, tectonism and human activity. Landscapes are transient features, maintained in a state of disequilibrium on scales ranging from micro to macroscopic, by external forces powered by the energy of the sun, and internal ones driven by the decay of unstable nuclides within the Earth (Chesworth 1991). The movement of water on and in a landscape is the principal natural means by which a gravitational equilibrium may be approached, and the erosion of the loose skin of the land surface, the soil, is the chief way that landscapes are worn down towards a base level. Since the practice of agriculture requires the manipulation of both soil and water, it was inevitable that farmers would become a geomorphic force as their enterprise prospered and became more intensive. Human activities of all kinds now mark virtually all landscapes with an indelible footprint.

2.2 Landscape Quality

Until about the eighteenth century, the quality of a landscape was judged solely by how well it served the purposes of humanity. Landscapes with deep, loamy soils were considered fair and fruitful, while areas with

poor drainage were foul and waste. From the Age of Enlightenment onwards, landscapes were also considered to have an intrinsic quality of their own, regardless of their usefulness to us.

To the Romantics, beginning with Rousseau, and to the landscape gardeners of the English school, this quality was aesthetic in nature. To the scientists of the late nineteenth century, and increasingly thereafter, it was the role in the biosphere that defined the quality of the landscape and its components. The ecologist for example judges the landscape in terms of the different types of habitat that it provides, and that ensures a particular level of biodiversity. However, farmers, no matter what their artistic or aesthetic propensities, are practical people with a utilitarian perspective. Their assessment of land is based above all else on the age-old one of its ability to provide food and fibre to the human population. Opinion in society at large is also dominated by practical requirements—disposal of wastes, provision of foundations for roads and buildings, maintenance of a built environment conducive to human health, and so on (Thomas 1996).

Mention of human health brings to mind again Aldo Leopold and his concept of the “health” of land, another way of looking at landscape quality. Writing in the 1930s, he said that “the land consists of soil, water, plants, and animals, but health is more than a sufficiency of these components. It is a state of vigorous self-renewal in each of them, and in all collectively. Such collective functioning of independent parts for the maintenance of the whole is characteristic of an organism. In this sense land is an organism, and conservation deals with its functional integrity or health” (Leopold 1993). This is a clear anticipation of the idea of Gaia introduced by Lovelock (1979/2000) with notable support from Lynn Margulis (Margulis and Sagan 1997).

At its simplest the Gaia Hypothesis considers that the Earth acts as a kind of superorganism, maintaining itself as a healthy abode for life. The state of the planetary surface is constantly adjusted by biological feedback mechanisms whenever inhospitable influences make themselves felt. Rather than the Gaia Hypothesis it might be more accurate to speak of the Gaia Syndrome, since as Kirchner (1989) points out, the Gaia idea incorporates many hypotheses, which he recognizes severally as Influential, Co-evolutionary, Homeostatic, Teleological and Optimizing Gaia (Kirchner 1991). His basic criticisms are (a) that

where Lovelock's idea is right, for example the feedback mechanisms invoked, it is not original, and (b) where it is original, for example in claiming that Gaia has the teleological objective of maintaining homeostasis in the interests of life, it is wrong. Lovelock in fact, dropped the claim of teleology (that is that Gaia is specifically constituted to achieve the end-point of a planet in homeostasis) in his later publications.

The most notable discussion of Lovelock's ideas in terms of a consideration of landscape is by van Breemen (1993a). For the sake of argument he divides soil properties into "favorable" (or pro-Gaia) and "unfavorable" (or anti-Gaia). In his usage a favorable property as one that "helps to increase the net primary production on a definable part of the landscape with a more or less uniform vegetation, of a size in the order of $10\text{--}10^3\text{ m}^2$ ". Favorable properties are found for example in a soil (such as a loamy textured Luvisol) with a high inherent fertility, and a structure that includes a heterogeneous system of interconnected pores. A structure of this kind will simultaneously provide good anchoring for roots, good water-holding capacity and good aeration. Unfavorable properties occur in soils with little rooting-depth (Regosols and Leptosols), a texture conducive to excessive drainage and droughtiness (Arenosols), heavy soils subject to waterlogging (Vertisols), and soils developed in extremely cold (Cryosols) or dry (Solonchaks, Solonchets) environments.

There is no conclusive evidence that natural soil-forming processes are Gaia-directed in any way to lead towards favorable properties and thus to a soil particularly comfortable and hospitable towards life on Earth. The fact is that the land surface is constantly modified by weathering, soil-forming and soilwasting processes to produce a kind of dump of natural wastes that is in a state of continuous recycling. Life on Earth has found this to be collaterally useful, and has evolved into a "best fit" to the properties of the resulting soils. Volk (2002) convincingly develops this Darwinian explanation for the comfortable look that life has in a landscape, and as van Breemen (1993b) says, natural selection explains everything without recourse to teleology.

Consequently, the state of a landscape, whether it is considered its quality, to use a neutral term, or its health, to use a metaphorically loaded one, is perfectly well explained without the invocation of a mystical Gaia. The co-evolution of biotic and abiotic compo-

nents of the Earth's surface, under the influence of natural selection, is a completely adequate explanation.

2.3 Society, Culture and Civilization

These are amongst the most difficult words in English to pin down. The difficulty arises not only because there is considerable overlap between them, but because each has an abstract meaning in addition to a concrete one. Society is the obvious place to start since it subsumes the other two.

Society is clear in two main senses says Raymond Williams (1983, p. 291) "as our most general term for the body of institutions and relationships within which a relatively large group of people live; and as our most abstract term for the condition in which such institutions and relationships are formed."

The word society has a long pedigree coming via Norman French from the Latin 'societas' with the connotation of community, companionship or fellowship. By the sixteenth century it had acquired the meaning of a group of people living together in a country or region, and sharing customs, laws or institutions. This is where there is considerable overlap with culture, again from a Latin root, 'cultura', meaning cultivation or tending of land, though including also the cultivation of the spirit (Williams 1983). In several western European languages it developed to connote the cultivation of the intellect, and the arts in particular. By the nineteenth century the word had acquired the meaning of a society in a particular place and time, characterized by a common language, distinctive ideas, customs, social behaviour, artefacts, and general way of life.

As culture is nested within society, so civilization is nested within culture. The basic characteristic of civilization is a society at a particular stage of complexity. For example the OED says that civilization is "a developed or advanced state of human society". One implication is that at a certain level of complexity a society grades into a civilization. The direction that complexity takes is most readily defined in concrete terms. For example Richard Wright defines the term as "a special kind of culture: large, complex societies based on the domestication of plants, animals, and human beings ... typically [with] towns, cities, governments, social classes, and specialized professions" (Wright 2004, p. 33).

All three may be used as singular nouns to mean society, culture or civilization in general. From the late eighteenth to early nineteenth centuries they also acquired plural meanings so that it became possible to refer to Greek, Roman, Chinese or any number of societies, cultures or civilizations—tacit recognition that human communities differed from each other on a regional basis. This raises a question central to the objectives of this book: to what degree is human society conditioned by landscape. Or, another way of asking the question: to what degree is it possible to state that human society is deterministic in a geological, geographical or geomorphologic sense.

2.4 Determinism

To many historians and pre-historians determinism is a dirty word. A typical criticism is embedded in Northrop Frye's (1957) wise-crack that determinism is a fallacy in which "a scholar with a special interest in geography or economics expresses that interest by the rhetorical device of putting his favorite subject into a causal relationship with whatever interests him less". Jared Diamond's "Guns Germs and Steel", in which the broad patterns of human history and prehistory are determined by "biogeography, crop cytogenetics, microbial evolution, animal behaviour, and other fields remote from historians' training" (Diamond 1997), has recently reignited discussion of the topic. The book was received well by the general public and the author received a Pulitzer Prize for it but many scholars were highly critical of what they considered to be its deterministic approach. Judkins et al. (2008) is a typical critique and references earlier ones. William H. McNeill (1997) considers Diamond's book "a clever caricature rather than a serious effort to understand what happened across the centuries and millennia of world history", a "sort of geographical reductionism" that simplifies "the tangled web of recorded history to four natural processes". Three of the four are specifically landscape or physiographic attributes in the strict sense, while one (the first) is concerned with the Leopoldian extension of land to include the biospheric aspects:

- a. availability of domesticable plant and animal species, since food production and the agricultural surplus is necessary for the support of non-farming

specialists and large populations that might give a military advantage;

- b. mountains, deserts and day lengths, varying with latitude and "affecting rates of diffusion and migration, which differed greatly among continents";
- c. distances across open water, "influencing diffusion between continents";
- d. continental differences in area or total population size.

Distilled to its essence McNeill's objection to Diamond's thesis is that it tends to rule out, or greatly diminish the role of what he calls 'cultural autonomy', that is, the "personal and collective behaviour shaped by shared meanings [that] distinguishes us from other species. It is the hallmark of humanity." McNeill says that Diamond ignores freedom of choice in favor of "the tyranny of natural environments".

McNeill is willing to grant that Diamond's type of determinism is indeed applicable to the early phases of the history of human society "when technical skills and organizational coordination were still undeveloped" and we were "closely constrained by the local availability of food". Now, however, "the vast differences in the wealth and power that different human societies have at their command today reflect what long chains of ancestors did, and did not, do by way of accepting and rejecting new ways of thought and action, most of which were in no way dictated by, or directly dependent on, environmental factors."

2.5 Adaptation

There are two meanings to adaptation that are applicable to the subject matter of this book: a general meaning and a specialist, biological meaning.

The more general one of the two is exemplified by a definition taken from the OED: the process of modifying a thing so as to suit new conditions. The "thing" here is the Earth's land surface, and the "new conditions" are those that result from human activities, requirements and desires. Interpreted this way, it is the reverse of determinism—the opposite direction of the road from landscape to humanity implied by the latter word.

The specialist meaning in modern biology comes from the Darwinian theory of evolution. Thus in ecology adaptation is the way that an organism, includ-

ing *Homo sapiens*, adjusts to its environment in order to improve its chances of survival. The adjustments may include behavioural, physiological or structural changes to the organism, either singly or together.

In the case of human adaptation, physiological and structural change does not appear to have been particularly active since at least the appearance of the Cro-Magnons. Consequently any adaptations since the beginning of agriculture, and the origin of urban and industrial civilization, have been essentially behavioural. We have adjusted our behaviour to fit us for life on virtually every type of landscape, in all terrestrial biomes.

A specific form of adaptation (sometimes referred to as exadaptation) amongst human beings is the development of tools and technologies that act like prosthetic devices in enabling us to deal with our environment in ways that our physiology would otherwise not allow (Catton 1980). This is manifestly obvious in the tools we have devised to modify landscape to our needs, from the digging stick of the early farmer to the massive excavator of the modern civil engineer.

2.6 Sustainability

Sustainability is the property of being able to continue to support the existence of an entity such as society (Brown 1981). The basic concept is simple: a sustainable system is one that lasts.

Simple though the concept is, problems begin when we try to define how long a system must last in order for it to be labelled sustainable. Forever is not an option on a finite planet governed by the laws of thermodynamics, so we must set a pragmatic limit. The fact is that no human society has persisted in unbroken succession for longer than about a thousand years, so current attempts to devise systems of managing the terrestrial landscape in a way sustainable to the interests of *Homo sapiens* are probably doomed to failure. However, it is possible to speak of a society as living sustainability within its environment for a specified length of time—meaning that resources and wastes were managed adequately enough to allow the society to persist for that period. The point is that the term sustainability only makes sense in the real world when a time limit is imposed.

Our current power to modify the environment has now become problematic and the question of the sustainability of human society is of growing concern. We have more or less taken over a third of “human friendly” landscapes, and have notably modified another third. The temperate grasslands and the Mediterranean biome have been completely wrested from their original inhabitants, and the temperate forests are moving along the same path of human makeover. In commandeering the habitats of other species we threaten the integrity of the biosphere, our life-support system, and many voices in the ecological community consider that industrial civilization in particular, amongst human societies, is unsustainable (Rees 2008). Indeed, it has been said that the human species has been adapted to the needs of short term interests and is itself inherently unsustainable.

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