

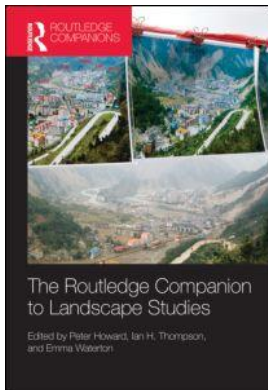
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Marc Antrop

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A brief history of landscape research

Marc Antrop

UNIVERSITY OF GENT

The history of what we now call landscape research followed many different paths and several important conceptual changes occurred. To understand this we must consider the multiple meanings the word 'landscape' has, as well as the context of society and technology. As the roots of the word 'landscape' are found in Western Europe, the perspective of this review will start there.

First, I will discuss the etymology and meanings of the word 'landscape' related to the differentiation of activities of studying and forming the landscape. Second, I shall consider the consecutive phases of the history in more detail. Third, I shall discuss briefly some of the changes in landscape research since the introduction of formal definitions of landscape, by the World Heritage Convention and European Landscape Convention.

The multiple meanings of landscape

The origin of the word 'landscape' comes from the Germanic languages. One of the oldest references in the Dutch language dates from the early thirteenth century when '*lantscap*' ('*lantscep*', '*landschap*') referred to a land region or environment. It is related to the word 'land', meaning a bordered territory, but its suffix *-scep* refers to land reclamation and creation, as is also found in the German '*Landschaft*' – '*schaffen*' = to make. Its meaning as 'scenery' is younger and comes with Dutch painting from the seventeenth century, international renown of which introduced the word into English but with an emphasis on 'scenery' instead of territory. When 'land' refers to soil and territory, 'landscape' as 'organized land' is also characteristic of the people who made it. Landscape expresses the (visual) manifestation of the territorial identity. The earliest realistic representations of landscape date from the fifteenth century, in particular in Renaissance painting (Vos, 2000) and emphasize visual character and symbolic meanings. Landscape became also an expression of human ideas, thoughts, beliefs and feelings.

Consequently, in common language, the word 'landscape' has multiple meanings and, according to the focus one makes, different perspectives of research and actions are possible. Also, different linguistic interpretations and translations resulted in a lot of confusion. Researching the exact meaning of the word and its scientific definition dominated the early start of landscape research (Zonneveld 1995; Olwig 1996; Claval 2004; Antrop 2005). To clarify

the meaning one is using, adjectives were added to the word 'landscape', such as natural or cultural landscape, rural or urban landscape or designed landscape. Landscape does not only refer to a complex phenomenon that can be described and analyzed using objective scientific methods, it also refers to subjective observation and experience and thus has a perceptive, aesthetic, artistic and existential meaning (Lowenthal 1975; Cosgrove and Daniels 1988). The term 'landscape' became also a metaphor, as in media landscape or political landscape. Unsurprisingly, the approaches to landscape are very broad and not always clearly defined. Most interest groups dealing with the same territory of land see different landscapes. The meaning of 'landscape' shifts by the context and by the background of the users.

Chronology

Figure 1.1 gives a graphic overview of the history of landscape research from the perspective of Western culture where it originated. It places ideas, concepts, disciplines, methods and technology and exemplary key persons and networks on a time line. No geographical differentiation is attempted to show regional differences. These different aspects are represented by different typographies explained at the bottom of the figure. The different phases that are recognized are indicated by bold numbers on the left and are discussed more in detail.

The early beginnings

Dealing with the landscape as an object of study started in Europe during the Renaissance and the Age of Discovery. In the fifteenth century appeared the first pictorial representations of landscapes, emphasizing its visual character and scenery and using the landscape as an expression

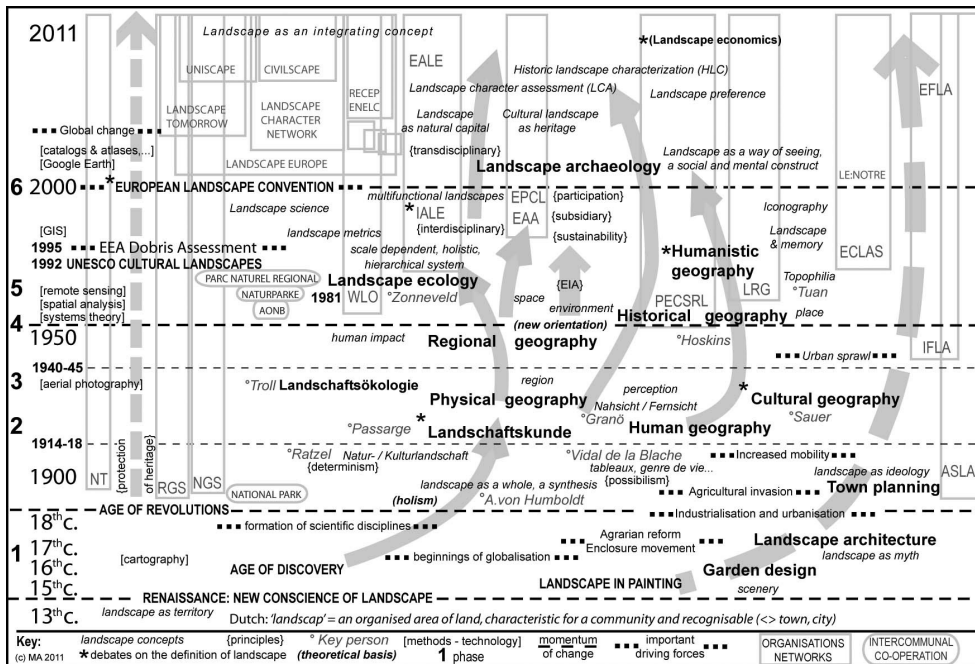


Figure 1.1 Development of landscape research

of human ideas, thoughts, beliefs and feelings. The creation of imaginary landscapes appeared almost simultaneously with a new style of garden design and urban lifestyle. Garden architecture and urban planning made a branch of practitioners from which contemporary (landscape) architecture and town planning developed.

Simultaneously, the discovery of new worlds demanded new methods for describing and depicting in a systematic 'scientific' way exotic landscapes and people. New techniques were developed such as cartography.

Emerging scientific research: landscape as an object of study of geography

The scientific research of landscape started with the systematic descriptions during naturalistic explorations, such as the ones made by Alexander von Humboldt (1769–1859) and Charles Darwin (1809–1882). A short and very concise definition of landscape was attributed, but not proven, to von Humboldt: '*Landschaft ist der Totalcharakter einer Erdgegend*' (Zonneveld 1995). This definition implies that regional diversity is expressed by landscapes and that landscape is a holistic phenomenon which is perceived by humans. Although von Humboldt was a pioneer in biogeography, physical geography and climatology, he always stressed in his writings the human and cultural aspects in the landscape and above all the aesthetic qualities, which he even considered to be mentally healing (Nicholson 1995).

Alwin Oppel, a German geographer, introduced the term '*Landschaftskunde*' ('landscape science') in 1884 (Troll 1950). Theoretical concepts and mainly descriptive methods of this '*Landschaftskunde*' were developed mainly in Central Europe and Scandinavia. Siegfried Passarge wrote extensive manuals (Passarge 1919–21, 1921–30). The Finnish geographer Johannes Granö made the distinction (Granö 1929) between the '*Nahsicht*' and the '*Fernsicht*' or '*Landschaft*'. The '*Nahsicht*' ('proximity') is the surroundings that can be experienced by all senses, while the '*Landschaft*' is the part that is mainly perceived visually. He developed descriptive methods for the study of both. He was also a pioneer in photography and introduced this technique of recording in natural sciences, mastering it as an artist (Jones 2003). Most of his work remained unknown until the English translation of his book *Reine Geographie* as 'Pure Geography' in 1997 (Granö and Paasi 1997).

Paul Vidal de la Blache (1845–1918), a French geographer, had a more literary and historical approach to landscape, although he used similar techniques of annotated sketches and his prose was not so different from von Humboldt's. The main difference was the recognition of the importance of the local society and its life style ('*genre de vie*') in organizing the landscape, which resulted in a regional differentiation not only based upon natural conditions but also upon culture, settlement patterns and social territories. He also considered the landscape as a holistic unity, which was expressed in characteristic '*pays*' (Claval 2004). The description of regions became synthetic '*tableaux*' of idealistic landscapes. Both von Humboldt and Vidal de la Blache implicitly included the perception of landscape and its aesthetic qualities in their work.

Carl Sauer introduced (the German concept of) landscape in the USA and made it the corner stone of cultural geography (Sauer 1925). However, Richard Hartshorne (1939) considered landscape as a territorial concept to be confusing, and redundant, with concepts of region and space being preferable alternatives (Muir 1999). However, Sauer's vision resulted later in the first important symposium on Man's Role in the Changing Face of the Earth (Thomas 1956).

The landscape thus became a core topic in geography and was seen as a unique synthesis between the natural and cultural characteristics of a region. To study landscape, information was gathered from field surveys, maps, literature, sketches and terrain photographs. Methods were

developed for detailed description of landscape elements and for making typologies. Theoretical debates about the nature of landscape became important in the first half of the twentieth century, in particular in Germany. Different national schools developed, with different emphases on natural or cultural landscape, on history and region.

These explorations also raised the interest of the broader public for nature, landscape and geography. In 1830 the Royal Geographical Society (RGS) was founded in the UK and in 1888 the National Geographical Society (NGS) in the USA. Colonization and industrial revolution, and many associated processes such as urban sprawl, the enclosure movement and the 'agricultural invasion' of new products, created new landscapes that erased existing ones. Landscape became popular also in the arts, in particular in painting and gardening. The American Society of Landscape Architects (ASLA) was founded as early as 1899. Scenic and symbolic meanings became more important (Schama 1995; Olwig 2002). Around the beginning of the twentieth century, the loss of nature and traditional rural landscapes initiated movements of protection of monuments, sites, nature and landscapes in most Western countries. Landscape became accepted as common heritage and laws for protecting it were enacted. Exemplary is the foundation of the National Trust (NT) in 1895 in the UK.

Landscape from the air: aerial photography and historical geography

After the First World War, aerial photography gave a completely new approach to the study of landscape. The bird's-eye perspective revealed clearly its holistic character. Complex patterns became visible reflecting hierarchies of spatial scales, suggesting that multiple processes were involved. This made Carl Troll (1939) say that '*Luftbildforschung ist zu einem sehr hohen Grade Landschaftsökologie*' ('air photo interpretation is to a large extent landscape ecology'), thus introducing 'landscape ecology', which he also called an '*Anschauungsweise*' ('a way of seeing'). Aerial photography also opened a new view on our past as many unknown archaeological and historical features were detected, giving a boost to historical geography and initiating landscape archaeology.

After the Second World War, landscape research was still mainly descriptive, resulting in regional monographs, mainly the result of doctoral theses. The emphasis was on landscape classification (chorology and typology) and landscape genesis, both natural and historical, and landscape as the basis for regional identity. In this context, the Permanent European Conference for the Study of the Rural Landscape (PECSRL) was created in 1957 and is the oldest organized group of landscape researchers in Europe (Helmfrid 2004). In the same period, landscape architects organized themselves in an international, professional federation (IFLA).

In the UK and Ireland the focus was more on the archaeology and history in the landscape. The interest in landscape grew faster and became more important for the general public than for academic scholars (Taylor 2006). A milestone was W.G. Hoskins (1955) *The Making of the English Landscape*.

Nature protectionists also developed an interest in landscape, and its protection became their mission. Soon protected natural areas were embedded in larger environments, such as the Areas of Outstanding Natural Beauty (AONB) in Britain (1956), the *Naturparke* in Germany (1957) and the *Parcs Naturels Régionaux* in France (1967).

The loss of synthesis

Continual specialization in science and the introduction of quantitative techniques changed research profoundly in the 1960s and 1970s. Most important was the 'new orientation' in

geography, aiming at more explanation based on theory and modelling. New techniques of spatial analysis laid the foundation of geostatistics. Regional geography and landscape studies became old-fashioned and Jan Zonneveld (1980) called it the 'gap in geography'.

In West Germany, this led to a crisis in the '*Landschaftskunde*' with endless theoretical discussions about definitions, losing all societal significance (Paffen 1973). Meanwhile, the theoretical basis for landscape science continued to develop in Eastern Europe (Neef 1967).

Soon the 'gap in geography' was filled and landscape research took off again from different sources. In 1972 the Working Community Landscape Ecological Research (WLO) was founded in the Netherlands in an attempt to restore landscape as a concept of synthesis and to promote interdisciplinary research. It launched the journal *Landschap* (Zonneveld 2000). Another approach to landscape research came from historical geographers and archaeologists. English work was important here, such as the series of *The Domesday Geography* edited by Darby since 1962 (Darby and Campbell 1962). In 1967 the Landscape Research Group (LRG) was founded, publishing the journal *Landscape Research*. In the framework of the PECSRL, the first important syntheses at a European scale were realized, such as a common terminology and an overview of field systems and settlement forms (Lebeau 1979). Simultaneously, a philosophical approach to landscape emerged from the Berkeley school in the USA and from several British geographers. They emphasized the importance of landscape perception, and landscape as a social construct with narratives and symbolic meanings (Tuan 1974; Lowenthal 1975).

The general settings of the chorology, typology and genesis of traditional rural landscapes were already in place before the 1970s when scientific interest shifted. From the 1970s on, satellite remote sensing offered another new perspective which was – forced by the low resolution of the first generation satellites – a small scale and more global view. Towards the end of the 1970s, the rapid development of computers made applications of statistical modelling possible and pattern recognition and image classification remapped the landscapes mainly based upon land cover.

The economic recession, consecutive energy crises and increasing environmental problems made it clear that the problems became too complex to be handled by non-concerted actions of different specialized disciplines (Moss 1999). Environmental impact assessment, first enacted in the USA in 1969, stimulated the development of new methods for studying the landscape, such as the Leopold matrix for qualitative expert assessment (Leopold et al. 1971). It lasted until 1985 before the EU introduced an Environmental Impact Assessment Directive, which included 'landscape and the (visual) surroundings' as one aspect to be studied.

The humanistic approach and the revival of landscape ecology

The impacts on the decline and efficiency of landscape research were multiple. In 1982, the Dutch WLO organized an international 'brainstorming', revitalising landscape ecology as conceived by Troll giving landscape research a new input coming from the East-European countries (Tsjallingii and de Veer 1982). This new approach was rapidly accepted by North American ecologists (Forman 1990). In 1988, the International Association of Landscape Ecology (IALE) was founded, promoting interdisciplinary landscape research, with a renewed interest in holism, systems theory and dynamics (Forman and Godron 1986; Naveh and Liebermann 1994). The journal *Landscape Research* became international and two new international ones were published: *Landscape and Urban Planning* in 1986 and *Landscape Ecology* in 1987. Simultaneously, the humanistic and historical approach to landscape continued to develop (Cosgrove and Daniels 1988; Groth and Bressi 1997; Rackham 1986).

Meanwhile, landscape architects and garden designers attempted to make their profession more scientifically based. In 1991, different schools of landscape architecture in Europe jointly created ECLAS, the European Conference of Landscape Architecture Schools, meeting annually, followed by a thematic web-based network LE:NOTRE in 1996.

Summarizing, at the end of the twentieth century, different approaches in landscape research could be recognized. Landscape ecologists focused on the relations between spatial patterns of land use and ecological processes. Historical geographers and archaeologists focused on the genesis of the landscape and its meaning as heritage. Humanistic and cultural geographers focused upon the landscape as a mental and social construct with important symbolic meanings. Separately, landscape architects and design practitioners focused on scenery. Each of these approaches used their proper definitions, concepts and methods, but a full interdisciplinary integration was still lacking.

The 'landscape crisis' and the shift towards applied and trans-disciplinary landscape studies

The term 'landscape crisis' is used to denote the feeling of discomfort many people have because they cannot cope with the increasingly rapid changes they experience in landscape (Antrop 2005). Interest in the landscape grew again, in Europe particularly focussed on the cultural landscape. The first call for a landscape convention was made at the conference 'Landscapes in a New Europe: Unity in Diversity' in Blois, October 1992, sponsored jointly by LRG and Paysage +Amenagement (Phillips, 1992). Also, the Council of Europe launched campaigns resulting in new networks in which archaeologists took a particular interest (Clark et al. 2003). Concepts such as 'landscape archaeology' and 'geo-archaeology' emerged.

An important momentum to put the landscape on the political agenda was the First Assessment of Europe's Environment (EEA 1995). The report manifestly links the diversity of the landscapes to the characterisation of European culture and identity, making it a political issue. No explicit definition of landscape is given, but the report directly inspired the Council of Europe to elaborate the European Landscape Convention, as shown in the preamble (Council of Europe 2000).

Although the main driving forces of landscape transformation were identified as urbanisation and industrialization, increased mobility, mechanization, extensification of agriculture, all in a global context, little was known how these really transformed the landscape at the local scale (Swaffield and Primdahl 2006; Antrop and Van Eetvelde 2008). It gradually became clear that a sole academic interdisciplinary approach was insufficient to cope with all issues related to landscape in society. More stakeholders were involved. Insiders and lay-people needed to be included in participatory processes for managing and planning landscapes (Opdam et al. 2001; Selman 2006). The need for a trans-disciplinary approach grew (Naveh 1991). Many Internet sites emerged, as well as online open access journals such as *Living Reviews in Landscape Research* in 2007. New concepts and methods were introduced: sustainable landscapes (Haines-Young 2000), multifunctional landscapes (Brandt and Vejre 2004), landscape character assessment (Swanwick 2004), historic landscape characterization (promoted by English Heritage, see Chapter 4), landscape paths and trajectories (Käyhkö and Skånes 2006) and landscape economics (Oueslati 2011).

Landscape research since the coming of formal definitions

Formal definitions

The multiple meanings of landscape complicate inter- and trans-disciplinary co-operation and make it difficult to implement the concept in legislation, in particular in a multilingual

international context. This resulted in new formal definitions, i.e. standardized definitions based upon a consensus by all signatory parties of a convention. Concerning landscape, two formal definitions are particularly important: the one by UNESCO World Heritage Convention and the one by the European Landscape Convention (ELC).

Since 1992, cultural landscapes can be listed by UNESCO as World Heritage. They are defined as the:

combined works of nature and of man [and which] are illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal.

Three categories are recognized and their definitions include the qualities and values to consider in their assessment.

(UNESCO 1996)

More important for research is the European Landscape Convention, which defines landscape as 'an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors' (Council of Europe 2000). This definition contains many important elements. First, landscape refers to an area, thus a well-defined territory that is organized and managed. People perceive landscapes and thus their scenic and aesthetic qualities for humans should be considered. Different landscapes exist because of their distinct character, which is the result of the continuous interaction between natural processes and human activities. History, economy and ecology are essential factors in the structuring and understanding of landscapes. No reference is made to 'special' landscapes such as 'spectacular' or 'ordinary' ones, to rural, industrial or urban ones; all landscapes should be considered equally. This definition is a mix of two very different perspectives, which Cosgrove (2003) describes as two different landscape discourses.

The ELC also formally defined other important concepts, such as landscape protection, which is defined as 'actions to conserve and maintain the significant or characteristic features of a landscape' and landscape planning as 'strong forward-looking action to enhance, restore or create landscapes'. The general measures the ELC proposes include 'the recognition of landscapes in law as an essential component of people's surroundings, as an expression of the diversity of their shared cultural and natural heritage and a foundation of their identity'. Landscape is seen as a human right and its integration in all kinds of policies is proposed. The specific measures include awareness-raising, training and education, identification and assessment of landscapes and defining landscape quality objectives. The ELC was opened for signature on 10 October 2000 and in October 2011 35 countries of the 45 member states of the Council of Europe ratified the convention. Although the convention has no legal power to enforce it, such as EU directives do, its impact on policy is already important and still growing.

Shifting landscape research

The growing interest in Europe for landscape since the ELC is unequivocal. Although the value of traditional, natural and rural landscapes as heritage and their meaning for quality of life was already recognized in law in many countries, the application was restricted to rather small classified areas considered highly valuable. There was no comprehensive policy for all landscapes. One of the first effects of the ELC on landscape research resulted from Article 6. 'Special measures/Identification and assessment'. This led to the making of new landscape inventories and characterization, often resulting in 'landscape atlases' or 'landscape catalogues'. Two types

can be recognized: (i) the GIS-based atlases giving a searchable collection of thematic map layers and often web-based, and (ii) more monographic descriptions, well illustrated with maps and iconographic material, also referred to as 'landscape biographies'. Most of the atlases refer to the regional and national scales, although some small scale pan-European classifications were made as well.

A second important shift in landscape research comes from the emphasis the ELC puts on the importance of landscape for the public ('as perceived by people', 'the public's aspirations', etc.). This stimulated research in landscape perception and preference as well as processes of participation. This research showed the difficulty and complexity in defining 'the public' and its aspirations. Also, the information needed in participatory planning processes involving many stakeholders with different interests, demands a more appropriate translation of scientific knowledge allowing easy and clear communication, something many researchers find difficult (Jones and Stenseke 2011).

Another effect of the ELC is the emergence of new networks dealing with the landscape; Landscape Europe, Landscape Tomorrow, UNISCAPE, CIVILSCAPE, RECEP-ENELC and many others exist. Most of them started between 2003 and 2006. In older associations, a new European focus can be noticed as well: such as in the LRG and the French CEMAGREF, and EFLA emerged within IFLA, EALE within IALE. Most of these networks aim to pool interdisciplinary expertise and to develop partnerships. They focus on specific problems and situations in Europe and offer applied research for planning and managing landscapes in a more holistic and sustainable way. In addition, they often add education and training both at international and local scale.

Today, many policy levels, interest groups and scientific disciplines are involved in the landscape, making it a complex multi-layered business, with inter- and trans-disciplinary processes that sometimes interact, sometimes compete and still too rarely give consistent results. In this complex 'policy landscape' the real landscape is often the only integrating concept. In general, landscape research became more applied, more society oriented and less theoretical and academic. Landscape studies diversified with varying depth and quality, ranging from rigorous scientific analysis to almost pseudoscientific papers aimed at a broad public. Many gaps in knowledge still exist. More and more scientific disciplines borrow methods and techniques from others, especially when they offer 'innovation' in their domain, even when applied in a more amateurish way.

However, the unmistakable shifts that occurred in landscape research after 2000, cannot all be related to the ELC. Other reasons are found in the landscape changes, which became unprecedentedly devastating and happen at a still accelerating pace. Methods to study and monitor these changes need to be fast and reliable. Solving specific, acute problems and strict deadlines dictate this kind of applied and policy-oriented research. Commissioners of landscape studies are asking for practical reports, which are often kept confidential as long as the legal procedures last and no political decisions are taken. With this shifting focus in research goals, the funding sources shift as well. Consequently, academic and applied landscape research are diverging. The academic merit system, with a focus on pure research and producing PhDs, enforces this process as well. Local and specific problem-solving is less suited to be published in international, peer-reviewed journals. As administrations are rather reluctant to fund doctoral research, more practical projects are commissioned to agencies, private companies and NGOs.

This divergence in landscape research is well illustrated by the rise and fall of landscape metrics and a changing focus between Europe and the USA. The quantitative description of landscape patterns using spatial analysis and modelling developed during the 1980s, stimulated by the development of GIS and specialized software, such as *Fragstats* (McGarigal and Marks

1995). After a spectacular growth of the use of landscape metrics, since 2004 a decline can be noticed (Uemaa et al. 2009) and is explained by the very sophisticated methods involved, too abstract and not transparent results of questionable utility for policymakers. Also the lack of critical thresholds and absolute limits was important as it made these indicators rather useless to evaluate effects of policies and impacts of decision making. Landscape metrics and modelling remained only interesting in pure academic and theoretical research. The specific problems that landscapes are facing in Europe are much more complex and a lot more stakeholders are involved. Thus, in contrast to the USA, the use of landscape metrics in applied landscape research declined in Europe. Heritage value, social and symbolic meanings demand a more holistic approach. So, landscape characterization developed, supported by all kinds of landscape representations and narratives.

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