

**REVIEW OF RESEARCH IN LANDSCAPE AND
WOODLAND PERCEPTIONS, AESTHETICS AND
EXPERIENCE**

for

**Forestry Commission
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The Brief

The brief from the Forestry Commission asked for a review of research in the following areas:

- a) landscape perceptions, especially those of forests and woodlands;
- b) landscape aesthetics, especially those of forests and woodlands and the experience of being in them.

The review was to avoid the areas of landscape preference unless these were linked specifically to perception.

In addition, the consultants were asked to “recommend potentially fruitful areas of research for the Forestry Commission to pursue and areas to be avoided because there is little further to be gained”.

The results of the review were presented at a Landscape Research Seminar of Forestry Commission personnel and invited attendees on 25th March 1998 in The Salvason Room, Members House, Edinburgh Zoo.

Methodology

In further discussion with the client, it was agreed that the aim of the literature search was to try and gain a better understanding of the following:

- a) the processes and deeper aspects of perception that underlie landscape preferences (the "whys" of user preference, not the "whats");
- b) landscape perception by all the senses, not just sight;
- c) theories and models which provide a philosophical basis for preferences and aesthetic responses;
- d) what is distinctive about the forest/woodland aesthetic experience compared with that of other landscapes;
- e) aspects of landscape perception and preference which are universal and those which appear to be mediated by age, culture, gender, etc.;
- e) the gaps in research and techniques, methodologies or principles, associated with the foregoing issues, which might fruitfully be pursued in future.

The literature search and review was conducted using a combination of techniques. It drew on the prior knowledge and experience of the Landscape Design and Research Unit (which includes expertise in landscape architecture, landscape science and environmental psychology), recommendations of the Forestry Commission's Chief Landscape Architect, Simon Bell, references cited in key published works, conventional and computerised databases and internet websites.

Keywords and Search Tools used include:

- landscape + aesthetics
- environment + aesthetics
- perception (+ visual) (+ sensory)
- synesthesia
- forest + preference
- landscape + preference
- cognition (+ emotion) (+ spatial)
- mental maps
- key authors

Databases searched include:

- Art Index
- Arts Abstract
- Avery
- BIDS
- Edinburgh College of Art
- Edinburgh University
- Environmental Abstracts (Heriot-Watt University)
- National Library for Scotland
- On-line British University Libraries
- Psychology Extracts
- Thesis and Dissertation Titles
- Ubadisc

The Internet search used key words and sites, including:

- ASLA: <http://www.asla.org/asla/nonmembers/bookstore.html>
- Environmental Design and Research Association: <http://www.acs.ohio-state.edu/edra26/leadin/html>
- Imaging Systems Laboratory, Dept of Landscape Architecture, University of Illinois at Urbana Champaign:
<http://imlab9.landarch.uiuc.edu/projects/compleximages/complexity.html>
- MLURI: <http://bamboo.mluri.sari.ac.uk/~jo/litrev/chap2.html>
- Virtual Reality sites various

Post-1990 editions of Periodicals searched include:

- Environment and Behavior
- Journal of Environmental Management
- Journal of Environmental Psychology
- Landscape and Urban Planning
- Landscape Journal
- Landscape Research
- Places
- Progress in Human Geography

Limitations of the Methodology

The above approach has a number of limitations:

- no search can be wholly comprehensive and it is likely that articles in the non-academic press, work currently in progress, or work recently completed may not be included here;
- within the time available for the project, it was not always possible to locate or retrieve items, particularly from the Thesis and Dissertation Titles database;
- the potential range of disciplines whose interests overlap with those of this project is enormous and some discretion was necessary to limit and focus the search in directions predicted to be most useful.

Despite these limitations, the scope of the review is considered adequate for the purposes identified by the Forestry Commission

Presentation of Results

The results have been presented in three sections:

- a) an overview of the search and its findings;
- b) reviews of individual papers or publications which are significant, either as landmark works or as summaries of an important body of prior work, or because they point to new understandings or opportunities and techniques for further research;
- c) a bibliography of relevant work identified in the literature search and surveyed as part of this project.

Where reviewed work under (b) lists other relevant references, not all of which may have been located and read as part of this survey, these are listed at the back of the review. All relevant published work located and surveyed as part of this project is listed in the bibliography.

OVERVIEW OF RESEARCH FINDINGS

Theories and Principles

As other reviews of some of these issues before have found, some lines of enquiry have been followed up in depth and extensively, while others have barely been touched upon.

There are a number of different theoretical stances which lie behind approaches to research in landscape perception and aesthetics. Foster (1991) has explored aesthetics and the natural environment from a philosopher's viewpoint, following Berleant (1992) and others. Bruce, Green and Georgeson (1996) take a view of visual perception based primarily on physiological psychology. The Kaplans (e.g. Kaplan, Kaplan and Brown, 1989) take a view dominated by environmental psychology, and Nasar's (1988) edited papers on environmental research include the view of psychologists such as the Kaplans as well as planners, landscape architects, architects and geographers, important among them Appleton. Research by foresters has predominantly followed a psychophysical line, based on techniques developed by Daniel and Boster (1976) and others, emphasising the objective properties of landscape as the basis for aesthetic preference. Each discipline tends to have its own favoured methods.

Foster (1991) starts with a reinterpretation of Kant and Schopenhauer and discusses the influence of the (misguided as she sees it) art/nature divide in aesthetic theories on perceiving the natural environment. Foster claims that aesthetic judgments are about clarification not adjudication, and they are non-logical, non-scientific and singular. She questions whether aesthetic appreciation is necessarily aesthetically satisfying and asks what function pleasure and ethics play in aesthetics. She draws attention to the role in environmental perception of non-objects such as seasonal change, weather change, etc., and the neglected senses such as smell and taste. She usefully points out that the changeability of a given natural environment makes judgments of it of limited temporal applicability. She claims abstract ideas or cultural context are not necessary for an aesthetic response and promotes appreciation and judgement which is neither bound to art nor to science.

Bruce, Green and Georgeson (1994) take a fresh look at Gibson's theories of perception and affordance. Gibson says the world, not the retinal image, is the starting point for vision and claims that perception is direct and unmediated by inference and problem-solving. Traditional perceptual theory, by contrast, holds that perception is indirect and mediated by higher cognitive processes. Bruce *et al.* take a middle view - it is likely that cognitive activities are intimately involved in at least some aspects of human perception. Their physiological study of visual perception points to some useful ways of understanding landscape perception. The optic flow field is seen as vital (Gibson claims movement is essential for seeing) and it is likely that optic flow over-specifies the world - we are presented with a wealth of information and need active or "directed" perception in order to select between

multiple sources of information. We may combine different sources or transfer from one to another according to circumstances. Marr's development of Gibson's ideas (see Bruce *et al.*, 1996) suggest that early visual processing involves a 'primal sketch', a viewer-centred representation of what is seen, which is subsequently developed into a '3-D model' which allows object recognition when the image viewed matches a representation stored in the brain which is already known.

Bruce *et al.* suggest that different perceptual tasks may tap different visual processes - there may be, for example, a "motor" visual system we use to hit a ball and a separate "cognitive" visual system we use to steer a car. There is some empirical evidence for this, e.g. in the phenomenon of "blindsight", whereby a person with a damaged visual cortex can point to the location of an element in a region of the visual field in which they are convinced that they are blind.

This starts to point to some other theories, more bound to empirical work than Foster's philosophical stance. Seamon, Marsh and Brody (1984) have produced evidence (based on looking at simple polygons, not complex landscapes) that there is a difference in physiological process between judgments of 'affect' (do I like it?) and 'recognition' (do I recognise it?), where the first happens a great deal faster (4 times faster) than recognition. This raises the whole issue of affect and cognition in landscape perception and preference. Zajonc (see Seamon *et al.*, 1984, Parsons, 1991) has suggested that preference is all about affect. Ulrich (Parsons, 1991) similarly proposes that the initial response to an environment is one of generalised affect, which can be independent of and primary to cognition. The Kaplans (in Nasar, 1988) assert that there is an intimate relationship between cognition and affect and that there is more to cognition than conscious thought. They consider facets of 'affect' as pleasure/pain/interest and divide cognition into 'constant' (good, bad and interesting) and 'process' (managing uncertainty or risk, recognising, predicting and evaluating).

Bruce *et al.* (1996) similarly talk about the importance of human cognition in enabling us to plan, reflect and reminisce. The question is, how does perception and preference draw on affect and cognition, and how does this relate to aesthetics? There is no universally accepted definition of aesthetic response, although psychologists in general tend to the view that it is related to preference. Berleant (1992) asserts that aesthetics involve content and meaning along with form, in contrast with Foster's view. Bourassa (1991), similarly, sees ethics and aesthetics as linked. Yet the work of neurophysiologists as well as environmental psychologists suggests that the emotional or affective response may be as vital to preference (and therefore to aesthetics, if we see these two as linked) as any cognitive or rational process, and may even be a vital part of early (possibly instinctive) response. Ulrich defines an aesthetic response as like-dislike affect associated with other pleasurable feelings and physiological responding (Parsons, 1991).

Evidently there is no single philosophical or theoretical approach to landscape aesthetics and perception, but several possible approaches which might be useful models. The role of affect and cognition is important, as is the engagement with the

real world, not just the visual. The latter points to issues of multisensory and phenomenological investigations which explore how perception influences decision-making and action. The following explores some of the key empirical work on landscape preference which has attempted to investigate and elucidate these issues.

Coverage and Gaps in Empirical Studies

There has been a huge amount of work, much of it by foresters, on psychophysical preference by non-experts, as well as aesthetic and value judgments by experts. Ribe (1989) has made a useful summary of many of the former, and in particular those that use variations on and developments of the Scenic Beauty Estimation Method (SBE). Zube, in 1982, summarised a large body of work from the mid 1960s onwards and showed that there is a lack of a unifying theory to inform the way humans and landscape interact and how this relates to preference and behaviour outcomes. He underlines the gap between theory and empirical work focused on application and practice.

It would seem that there is little that is new to be learnt from using SBE variants on the psychophysical approach to preference. Similarly, it is possible that the Kaplans have exhaustively explored their framework of mystery, complexity, legibility and coherence, although it appears that there may be more to be learnt by building on this than on the SBE.

Both of the above approaches, however, rely heavily on photographs and are thus not dealing with perceptions from engagement with the real world. It is interesting to read Zube, quoting Ittleson's 1973 list of properties which relate to the real landscape (as opposed to a photograph or video) and to be reminded how much they mirror Humphry Repton's 18th century riposte (set out in his Red Book for Holme Park of 1793) to the picturesque school of Uvedale Price and Richard Payne Knight (Malins, 1966), pointing out the difference between landscape painting and landscape gardening. Ittleson identified the following properties.

- 1 landscapes surround - they permit movement and exploration and force the observer to become a participant
- 2 landscapes are multimodal - information is received through multiple senses and processed (broadly speaking) simultaneously
- 3 landscapes provide peripheral vision as well as central, from behind and in front, in and out of focus
- 4 landscapes provide more information than can be used - they can simultaneously provide redundant, inadequate, ambiguous, conflicting and contradictory information
- 5 landscape perception always involves action - landscapes cannot be passively observed, they provide opportunity for action, control, manipulation
- 6 landscapes always have an ambience - they are mostly encountered as part of a social activity, they have a definite aesthetic quality and have a systemic quality (various components and elements are related)

Repton would add the quality of continuing change, whether measured hourly, daily, or annually, as an essential landscape quality - weather (especially in Britain), sun angle, humidity, etc., are constantly changing influences on any landscape experience, and Foster (1991) has recognised this in underlining the limited temporal applicability of environmental judgments.

Russell and Snodgrass (1987) state that what we plan to do in a landscape, and whether that plan is frustrated, assisted or modified, will affect our perception of the landscape (this is not the same as Gibson's concept of "affordance", although it may be affected by it). We cannot divorce what we see from what we might do. In this context, photographs are only valid as representations of views of landscapes from a fixed seat, or out of a window, but into which we will never go, and even then they are a flawed, because surrogate, representation of reality.

The Kaplans, in work with photographs, (1989) attempt to address some of these issues when exploring "smoothness" and "ease of locomotion" in views, although these constructs are part of an expert judgement and not made directly by the subjects of the landscape preference study. Preference studies based simply on asking for a preferred photograph view can overlook the importance of the way landscapes call forth action and involvement, for example campers, when asked which photograph of a landscape within a forest they preferred, chose an image with screening and ground cover vegetation but, when the landscape close to them offered the opportunity, they chose to camp in a clear place with little ground cover vegetation (Arthur, Daniel and Boster, 1977). Similarly, Hull and Stewart (1995) have shown that a distant view will call forth a different response from that to a close view. In real life engagement with the landscape, the view within 15m of the viewer is the most important and most often focused upon.

The sequence of experience of landscape is important in how we perceive it and will influence preference. A few studies have explored this in different ways (including Hull and Stewart, 1995), but many aspects remain largely unexplored. It is clear that what a person has seen in the landscape immediately before influences the response to what is seen next. It is also evident that familiarity and habituation influence visual preference, so views of the same scene at the start and end of a journey may evoke different responses. The influences of familiarity, habituation and acculturation mean that tourists are likely to exhibit different responses to locals (Wohlwill, 1974, Russell and Lanius, 1984)

Multisensory and multimodal engagement with the landscape has been touched on by only a handful of researchers. Some work has been done on blind/visually impaired perception and sound perception in the landscape (Anderson *et al.*, 1983, Porteous and Mastin, 1985b), but most work in these domains has been carried out using artificial surrogates for the real environment. Porteous (1985a) says that 90% of our perceptual intake is believed to be visual and much of the rest is auditory and tactile. He has looked (via literature) at perceptions of smell. Children before puberty are much more sensitive to smell than after and less negatively affected by

smells in general. It is evident that preferences after adolescence are culturally conditioned and habituation is very important - we get used to smells quickly. But memory of odour does not decay over time (unlike visual memory), perhaps because smell is primitively linked directly to the brain. Smell also involves affect strongly and cognition only a little (the opposite of visual stimuli, according to Porteous). This raises some fascinating issues with regard to smell: the importance of what pre-adolescent children experience and the strength of that memory if re-encountered later in life.

The involvement of affect and emotional response in landscape also seems worth exploring further, and again, not just related to vision. Ulrich (1981) suggests that investigations using physiological or medical measures (cf. intuitive/subjective procedures) have been very much more successful in motivating government action and public concern regarding environmental quality. It is possible, for example, to measure arousal (as Ulrich has) using an electrocardiograph and measures of alpha-amplitude in brain electrical activity. This might be a fruitful way forward, especially if there are techniques that can be carried out in the field. It is possible also to use saliva samples to measure stress levels or subjective responses to mood scales such as PANAF (Positive Affect, Negative Affect) or ZIPERS (Zuckerman Inventory of Personal Reactions) (see Ulrich, 1981).

The exploration of 'smellscapes' by Porteous (1985a) also highlighted the desirability of looking at different age responses to landscape. Some work has already shown (e.g. Lyons, 1983) that preference is influenced by age. Pre-adolescents are more extreme in their views, and the variance in extremes of like/dislike declines with old age. The question of consensus vs. individual or categories of group response is important and perhaps preference studies should look more closely at this variation (and that of gender, ethnicity, etc.) rather than simply seeking the predominant or apparently consensual response.

The work of Purcell (see Purcell, Lamb *et al.*, 1994) is important here too, in exploring how we learn about landscapes and store and categorise that information. Purcell's work suggests that experience of landscape is structured around categories or more complex mental representations such as schemata, which are the result of long term exposure to regularities in the environment. He suggests landscape perception is prototypically based and the prototype is stored in the memory more strongly than other category members. He has explored the relationship between typicality of a scene and affective experience. Judgement of landscape typicality is based on relatively abstract attributes of the landscape and the concept 'landscape' may mask a diversity of types of environments and mixtures of types.

Despite Ulrich's urging towards physiological/medical measures for political expediency, phenomenological methods also seem to hold out a useful way forward, dealing as they do with full engagement with the landscape. The challenge in landscape analysis techniques is that they should stand up well under criteria of reliability, sensitivity, validity and utility (Daniel and Vining, 1983). Some phenomenological approaches may produce reliable and sensitive data on an

individual basis only (e.g. Brook, 1998) whose interpretation, by its very nature, may not be generaliseable across large groups, and thus of limited utility.

Developments of Personal Construct Theory techniques, some of which have now moved away from the overly rigid repertory grid methods used by Harrison and Sarre (1975) (like the SBE, too reliant on sophisticated statistical manipulation of measurements of dubious numerical comparability) offer ways forward. These explore the meaning perceived in the landscape through bipolar mental constructs which are personal to each individual. Furthermore, through laddering techniques, they tap into core values held by an individual. Such methods can handle multidimensional responses and have been used successfully with pre-adolescent children as well as adults (Aspinall and Ujam, 1992, Ward Thompson, 1995). They might assist a move from over-simplistic consensus-based measures of landscape preference towards information-gathering which is sensitive to age difference, gender, experience and socio-cultural background, for example, and whether experienced in groups or individually.

One aspect of landscape preference that has barely been touched on in the literature is microclimate. The sensual information received through skin temperature and touch is the least well served by perception studies, yet such sensations as warmth, coolness, humidity or windiness are, in practice, a very strong determinant in how people use and interact with the landscape and, therefore, what type of landscapes are preferred. The microclimate of a location in the landscape is an element over which landscape architects and foresters can have a strong and direct effect, yet the landscape preference literature almost completely ignores it. There would seem to be a clear case for further exploration of this aspect and several techniques, both phenomenological and physiological, which might readily assist in empirical studies.

The experience of taste in the landscape, although not immediately promising as a research focus, might also be explored. There is the element of direct taste of elements found in the landscape - e.g. blackberries or spring water - which may not be regularly part of the landscape experience but an important and vivid sub-set of experience. There is also the issue of how food/drink tastes in the landscape, which might well turn out to be an important aspect of landscape preference relating to how people plan to use and interact with their environment to make an everyday experience more pleasurable.

It is clear that passive visual perception alone does not determine our preferences and actions in the landscape. Harvey (1995) has shown that, when people were asked about how well a particular landscape would tolerate change, information about the landscape was a more important influence than what it looked like, in determining people's responses. Other work at Edinburgh College of Art/Heriot-Watt University (Hope, work in progress) has been trying to develop a profile for aspects of place that encompasses affect, cognition and the role of critical assessment, which in turn influences decision-making. As many have said before, decision-making is ultimately the key to perception and preference that is of most

vital concern to landscape architects and foresters, since decision-making will determine how people interact with the landscape and the results (both intentional and otherwise) which derive from this interaction.

Finally, a summary of those areas of research which might usefully be pursued, either because they would fill gaps in present coverage in the literature, or because they would take further promising techniques and methods that have not yet fully been explored, is listed below.

Summary of Potentially Fruitful Areas for Further Research

- 1 Recording the live visual experience of being in and moving through a real woodland landscape (see Hull and Stewart, 1995).
- 2 Recording the live experience of sound while in and moving through the landscape (Anderson *et al*, 1983, Porteous and Mastin, 1985b).
- 3 Recording the live experience of smell while in and moving the landscape (Porteous, 1985a).
- 4 Recording the live experience of taste while in and moving through the landscape.
- 5 Recording the live experience of wind, precipitation, temperature, humidity and touch while in and moving through the landscape.
- 6 Giving participants in studies a video camcorder to record visual, aural and other information on their own perceptions and responses.
- 7 Non-intrusive physiological monitoring, as a measure of affect and emotional response, might include measures of skin temperature, heart rate, and other biophysiological electrical activity, if appropriate techniques are available. These will be especially useful if they can be applied in situations of live landscape experience.
- 8 Use of mood-scales and other measures of subjective influence and response in the context of landscape perception and preference.
- 9 Exploration of the way prior lifetime experience influences decision-making and engagement (through all the senses) with the landscape. This might be related to investigating what people notice, whether the landscape experience is one that has been encountered before or is something new, whether it seems familiar or not, what associations and memories are evoked (this is particularly important in the case of smell) and how these influence human behaviour as a result.

- 10 Exploration of different categories of people's response to the landscape - by age group, by gender, by socio-economic category, by ethnic group, etc..
- 11 Use of Personal Construct Theory (PCT) methods to explore the cognitive constructs and schemata which people use in understanding and responding to the landscape.

The list presented here is not mutually exclusive and clearly a number of aspects of perception could be explored using the same technique, or a single aspect could be explored in a range of different ways using different techniques and approaches. Similarly, it is likely that development of some of the items on the list may engender a number of further fruitful avenues to explore.

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