

# Coastal Landscape Evaluation and Photography

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## ABSTRACT

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The rationale behind landscape evaluation techniques was examined. In particular the theory that a consensus of opinion exists on taste and value in landscape aesthetics, and the suitability of using photographs in coastal landscape evaluations. Field trials involving 47 observers were carried out along the coastline of Mid and South Glamorgan, Wales in 1988. Slide usage was proved to be feasible with respect to evaluations compared to real life situations. "Experts" were found to be representative of the population at large and a general agreement on coastal landscape tastes was found to exist between different groups of people.

**ADDITIONAL INDEX WORDS:** *Landscape aesthetics, coastal scene investigation, landscape assessment, coastal planning.*



## INTRODUCTION

Landscape is an abstract concept and many landscape evaluation researchers have attempted to define its meaning. For example, ECKBO (1967) stated that there were four forms of landscape:

- (1) Social — The local, regional, natural and world-wide relations among the people with whom one lives.
- (2) Physical— It is all pervasive, surrounds us in space and time and is the product of the interaction of people and nature.
- (3) Economic— This determines how well we live.
- (4) Cultural— Which embodies the creative contribution of our times.

ROBINSON *et al.* (1976) discussed landscape as topography, an ecosystem, a heritage, a scenery and as an artform. This abstract rhetoric is representative of the philosophical approach abounding in landscape evaluation which has played a role in undermining its scientific foundations. This paper is concerned with what ECKBO (1975) would call the physical land-

scape and ROBINSON *et al.* (1976), would call scenery, *i.e.*, the visible aspect of the presence of the landforms of the earth's surface. Landscape character is due not only to the presence of these landforms, but also to the spatial arrangement of landforms with respect to one another. This can be influenced and even dominated by weather, vegetation, the presence of vehicles *etc.* Landscape beauty is derived from the sum of these components (APPLETON, 1975a and b)—which is greater than the sum of the individual parts.

DEARDEN (1980) attributed a landscape's value to its potential as three resource types:

- (1) *Recreational Resource.* Life can be viewed as a division between work and recreation. Recently a swing toward greater emphasis on recreation has occurred and many workers have documented the strong correlation between recreational satisfaction and high scenic quality outdoor recreation. The most common denominator for public enjoyment of the countryside appears to be the appearance and perception of landscape which translates to that of the coastal zone in the British context.
- (2) *Spiritual Resource.* Outdoor recreation usually means a drive in scenic areas which is a testimony to man's needs for beautiful

surroundings (ZUBE, 1967). The world's tourist industries have mushroomed and concentrated on the most scenic of these areas, and a large proportion of these lie in the coastal zone.

- (3) *Historical Resource*. Landscape is moulded by human actions and is a living record of the past. We live in a world of accelerated lifestyle change and a need exists to preserve the past landscape so that we can experience the environment that moulded our ancestors lifestyle.

The above relates to landscapes in general. The literature abounds with examples of work carried out in this field, but a closer examination for coastal landform scenic assessment reveals a huge dearth of information. This paper looks at but one aspect of the myriad of questions that need to be addressed to coastal scenic evaluation studies.

## LANDSCAPE EVALUATION OF BEAUTY

Beauty is the aesthetic appeal of a landscape to an observer and its "units"—if they exist—are the intangible ones of preference and perception. Therefore to evaluate aesthetic beauty, numerical values should be given to landscape scenic quality and it is the methods and controversies associated with this aspect applied to the use of photography and coastal scenery, that is the gist of this paper. Landscape evaluation objectives are diverse and stem from local circumstances. These broadly outlined by PENNING-ROWSELL (1975) are:

- (1) Landscape preservation: The primary data for identifying areas designated "value to society," and it is the philosophy behind U.K. National Parks (ROBINSON *et al.*, 1976).
- (2) Landscape protection: This permits the linking of development controls with available landscape resources.
- (3) Recreational policy: Evaluation seeks to identify local/natural beauty spots to allow visitor management, for example, the "honeypot" idea on the Glamorgan Heritage Coast (WILLIAMS and HOWDEN, 1980, 1985).
- (4) Landscape improvements: This not only identifies high quality landscapes but can highlight components that detract from the views.

Most users of landscape evaluation ideas have singular objectives. For example, the COUNTRYSIDE COMMISSION for Scotland (1974) saw as its main objective the suggestion of how landscape resources of Scotland's countryside and coast could be graded so as to help provide better planning for their protection and use. LAURIE (1975) summed up these views, arguing that landscape evaluation assisted in the formulation of policies for the better protection and enjoyment of the landscape. Field workers on this aesthetic topic have usually come from three main academic disciplines: geographers, who usually investigate the practicality of the technique (*e.g.*, CROFTS, 1975; UNWIN, 1975; KANE, 1981); planners, *e.g.*, PIGRAM (1983), who study the use to which the technique is put; and psychologists, *e.g.*, ZUBE (1973) who concentrate on landscape symbolism and perception.

## TECHNIQUES

Landscape evaluation techniques fall into two broad categories: (1) Field based methods. For example, FINES (1968) where an observer (or group of observers) make an on-site subjective judgment of each defined survey unit—usually a 1 Km grid, or multiple thereof. The observer is usually an "expert" and no attempt is made to separate the components within a view. Problems with this approach relate to choosing observers, the number of observers, scoring scales, and the logistics factor. (2) Component based methods. This approach is supposed to be "more objective." However, when one deals with concepts such as preference and perception, there is no such thing as an objective judgment. These techniques break down into: (a) Arithmetic component based, *e.g.*, KANE (1981). (b) Statistical component based, *e.g.*, the much quoted Coventry/Solihull Warwickshire study (1971).

One common problem is the "outview" problem, *i.e.*, landscapes beyond the grid boundary but which are still seen, and the assumption that there is a linear relationship between the dependent and independent variables.

This lack of standardization stems from the subjects theoretical vacuum (APPLETON, 1975a), but most techniques assume that there is general agreement on landscape values and taste among the population, so that it allows a

researcher to say that as a member of this population he/she is representative of its values, *i.e.*, planners can adequately represent the views of the population at large. However, WALLACE (1974) has pointed out that such methods are unrepresentative of general public opinion and values.

### PHOTOGRAPHS IN LANDSCAPE EVALUATION

ROBINSON *et al.* (1976) highlighted the potential value of photographs in landscape evaluation, arguing that their use would expand the number of observers whose opinion could be sought, a move which would prove necessary if an "expert's" opinion should prove unrepresentative of the general population. It is much easier to show a series of slides or photographs to a group of 1,000 people than to try and organize field trips for that number. All this assumes that photographs can, and do, adequately represent the 'real' world, yet few attempts have been made to establish this.

COUGHLIN and GOLDSTEIN (1967) compared scores given to slides with scores given to the real views and found correlations of around 0.6, which were said to show a modest similarity between the two sets of scores. Unfortunately what COUGHLIN and GOLDSTEIN (1967) and several others (KANE, 1971; ZUBE, 1973; and FINES, 1968) have failed to do was to show both slide and real views to the same group. Instead, slide scores from one group of people were correlated with real scores from a separate group, and hence proof of the suitability of photographs was by no means conclusive. Others remained skeptical of the suitability of photographs for this task. For example, TURNER (1975, p. 157) stated:

"I remain unconvinced that 2-D visual stimuli are an acceptable surrogate for landscape, the perception of which, I feel sure, depends on much more than the receipt of momentary visual stimuli through a fairly narrow spectrum."

However, later on the same page he highlighted the potential that existed for photographs by commenting:

"Evaluation of landscapes on site would be

most desirable, but the problem of transporting the required sample of consumers to and through landscapes is likely to remain an insuperable one, at least for the majority of planning agencies."

With respect to the above, an experiment was devised to test photographic utilization in coastal landscape evaluation, and two hypotheses were formulated: *Hypothesis I*: There is no divergence of opinion between "expert" and untrained observer. *Hypothesis II*: The assumption of a general agreement on landscape tastes in the population is not justified.

### METHODOLOGY

Since scenic beauty assessment has become such an important factor in countryside management, it has become accompanied by a proliferation of research methods (PEARCE & WATERS, 1983). For the coastal scene investigated in this paper, groups of observers judged a series of real views in the field, and in the laboratory a number of slides of these same views. The hypotheses listed above were then tested by running statistical tests on scores given by various sub-groups to these two viewpoints. Emphasis has been placed on public preference, *i.e.*, the method and results were dependent upon the attitude and coastal landscape preferences of the general public on landscape users. In studying the potential utilization of coastal landscapes "we need to identify what people believe are the facts of landscape value rather than what the researcher, the historian, and the landscape architect and planner think they believe." (PENNING-ROWSELL, 22, 1981).

### Scoring Scale

Scoring scales leave much to be desired. ROBINSON *et al.*'s (1976) open-ended numerical scale was chosen as it avoids ambiguities of descriptive categories, the confusion of geometric scales and the psychological barrier of a closed ordinal scale. The scale is centered at zero and extends infinitely on either side. Observers were shown two photographs (Plates 1 and 2) — a positive beauty scene and a 'negative' scene (Aberthaw Cements Works, South Glamorgan). The observer compared the slide/



Plate 1. 'Heaven' + 30.

real scene with respect to these control scenes. Subjective opinion was involved in choosing the two initial scenes but the use of an open-ended scale meant that impact was cancelled once scoring commenced. At the session end the observer wrote down the highest and lowest scores to views "seen or imagined" in the U.K. Each slide/real view was standardized via the formulae:

$$\frac{\text{Score} - (\text{lower limit})}{(\text{upper limit}) - (\text{lower limit})} \times 100$$

For example: a score of 50 (given to a view when compared to the positive and negative views) where upper (positive) and lower (negative) limits were +100 and -100 respectively, would give a standard score of 75 on a 0-100 scale, *i.e.*:

$$\frac{50 - (-100)}{100 - (-100)} \times 100 = \frac{150}{200} \times 100 = 75$$

#### Score Sheets

Two separate sheets were issued (slide and field test respectively).

#### Slide Taking

Forty-five slides of coastal scenery were taken of 28 views in Mid/South Glamorgan, Wales (Figure 1).

- (a) Lens choice. The normal human field of vision is 145°. A standard 50 mm lens takes in 46°. Although a wide angled lens takes in a view of 74°, it gives more distortion and an artificial depth of field to the resulting photographs. Therefore, contrary to SHUTTLEWORTH (1980, 1984), who has argued that photographs from a wide angle lens is a surrogate environmental medium, a 50 mm lens was selected.
- (b) When/where to take the slides? In order to represent actual views, the weather must match on the two occasions the observer sees the slides and the real view. All 45 slides were taken on the same day, and observers viewed the coastline under similar weather conditions.



Plate 2. 'Hell' - 30.

### Actual View

Delineation of the field of view to the slide view is essential. This was achieved via a viewing box whose dimensions were such that the view through was identical to the view captured by a camera using the 50 mm lens. Side screens prevented distraction due to movement or objects to the observer's sides. To ensure that the observer was indeed looking at the same view as appeared on the slide, the viewing box was equipped with a sight which allowed the box to be centered on the same object upon which the slide was centered. The sight was offset to compensate for the box focal length (Figure 2). View dimensions were in fact slightly larger than that of the slide to allow for edge of view interference. This was due to the effect which occurs when an observer looks toward the view edge. For example: take the left edge. The right eye is able to see the view but the left eye's vision is obstructed by the side of the box. The image the observer sees is of the view with the side of the box superimposed (Figure 3). The

viewing box was designed to ensure that this edge effect occurred outside the view boundary when the box had been correctly aligned (Figure 2). Photographs do filter reality and appear flat, but the restricted vision argument was resolved by this use of the viewing box.

### Choice of Observer

This is crucial since one object of the experiment was to test for any discrepancy between the "expert" and the layman. Since this current work concentrated on coastal landforms, it was decided to use a group of final year maritime geographers from the Department of Maritime Studies, University of Wales College of Cardiff, as the "expert" group of observers. These people had studied coastal zone management, coastal geomorphology, hydrography and landscape evaluation. The "semi-skilled" class were final year environmental science students from The Polytechnic of Wales, who were interested in landscape from the pollution aspect and had no particular training in the coastal zone. The

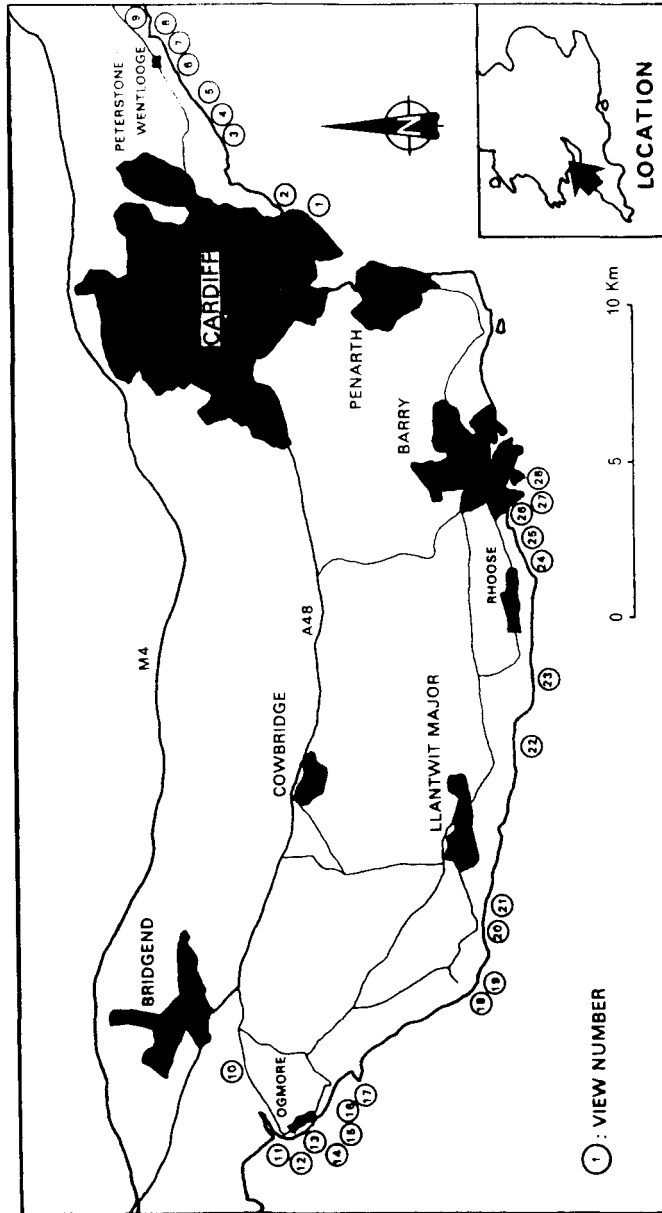


Figure 1. Location of viewpoints used in the field trial.

“layman” group was a sample taken from the general public made up of people from all walks of life, e.g., OAP’s, unemployed people, laborers, plumbers, housewives, bakers, bank managers, teachers. Numbers involved were: maritime geographers (11), environmental scientists (14), and general public (22).

All observers had little familiarity with the selected locations. KREIMER (1977) argued that familiarity could affect results. SONNENFIELD (1967) and WOHLWILL (1976) found none of it had a positive influence; PENNING-ROUSELL & HARDY (1977) a negative influence. No variation was found by SHAFER &

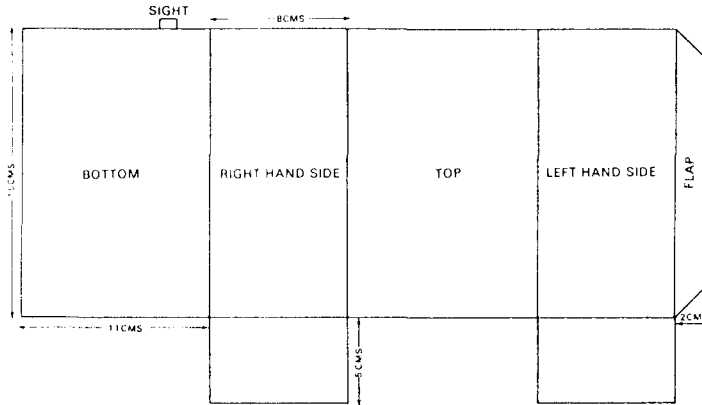


Figure 2. Plan view of the viewing box.

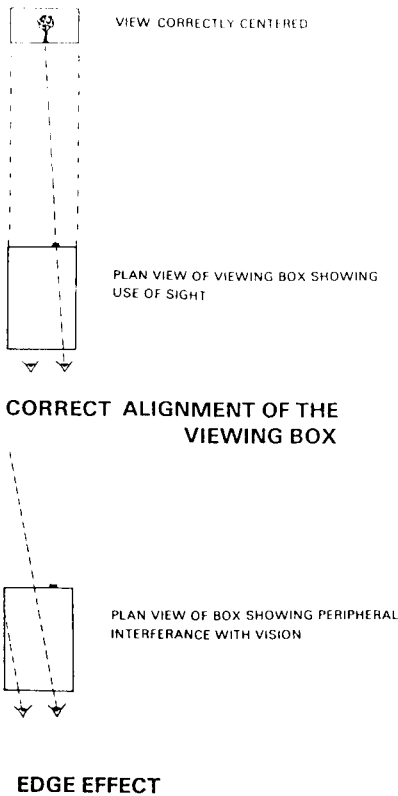


Figure 3. Correct alignment of the viewing box and edge effect.

MEITZ (1970), WELLMAN & BUHYOFF (1980), *i.e.*, no real agreement was found for this parameter.

### RESULTS/DISCUSSION

#### Preamble

The above emphasizes some of the work which has been carried out in the general field of landscape evaluation. A notable exception has been the paucity with which coastal landform evaluation has been treated. For example: LINTON (1968) developed a well-known landscape evaluation technique that is still, for tourism purposes, used in the assessment of Scottish scenery. Yet he ignored the water aspect. A day at the coast is still part and parcel of the British heritage and the furthest one can go from the sea is some 70 miles. Dense world populations invariably are situated adjacent to shorelines rather than in continental interiors, so the lack of coastal evaluations is surprising.

A recent innovation in the U.K. countryside management field has been the growth of Heritage Coasts (WILLIAMS, 1987, 1990). There are coastal areas whose objectives lie in conserving the inherent natural beauty of the areas in question, for future generations. Currently there are 43 such coasts covering two-thirds of the England/Wales coastline. They are a success story, and were initially set up during World War II when Prof. J.A. Steers of Cambridge University, went around the coastline

subjectively analyzing the area. The result of his findings (33 areas) became the basis of today's Heritage Coasts.

FINES (1968) developed a landscape assessment technique for East Sussex basing his evaluation on the use of photographs. The question not addressed then, and rarely post this period, was whether photographs were a sound surrogate for this type of analysis.

With increased concern being given to coastal problems, e.g., coastal parks, sewage discharge sites, holiday homes and caravan parks, it was deemed an apt moment for investigation. Coastal management decisions seem to be an area that the planning profession has taken over. Are they the right people to make these decisions? Further work is being carried out along the lines suggested in this paper. The aim of most planners in the coastal urban areas is for better protection and conservation of coastal scenery and enjoyment by the public at large. Public awareness and concern for the rapidly changing British coastline has given rise to an increasing demand for planning techniques that can evaluate coastal scenery—indeed all scenery, with the ultimate aim of achieving some form of protection. During the past three decades, landscape perception has responded to legislative mandates and landscape management, planning and design issues for coastal zone management in many countries. The U.K. 1968 Countryside Act stated: "... in the exercise of these functions relating to land under the enactment, every minister, government department, public body shall have regard to the desirability in conserving the natural beauty and amenity of the countryside." This led directly to the formation of the Heritage Coast concept mentioned earlier in 1975.

#### **Hypothesis I: There is no divergence of opinion between "expert" and layman.**

The three groups previously mentioned were used; skilled, semi-skilled, and laymen. If no significant difference of opinion existed between scores, the implication was that no significant difference existed between groups. Testing was via a one-way Analysis of Variance (University of Philadelphia, Minitab package) and all three groups were paired (Table 1). Table 1 indicated that no significant difference existed between groups (at the 0.05 level). This

could imply that the "expert" is therefore in a position to represent the public in some cases where landscape evaluation is required. This would be advantageous in cases where public involvement is not required as it gives the "expert" a mandate to make judgments on behalf of the population at large. This is a reaffirmation of the current policy pursued in landscape evaluations. The bald statement from these results, that the layman is on a par with the "expert" may at first appear to threaten the "experts" elevated position (FINES, 1968; UNWIN, 1975). It is suggested that they reinforce his position by proving the "expert" representation of the population which he represents.

#### **Hypothesis II: The assumption of a general level of agreement on landscape tastes in the population is not justified.**

Fundamental to most existing methods of landscape evaluation is that general agreement on landscape values and tastes exist. A comparison was made of the mean scores of all observers in terms of slides and real views. This involved two tests, one for all slide scores, and a second for the real view mean scores. Testing was via the same Minitab package (Analysis of Variance, Table 2). In addition to comparing actual scores, examination of the preferences of the three observer groups were looked at in order to identify (if any) significant differences between their choice of coastal landscapes rather than the values that were ascribed to them. This was carried out by a ranking process using 10 out of the 45 slides which represented a sub-sample of coastal views in Glamorgan. Mean scores given for each slide were calculated for the three observer groups and ranked and compared via the Spearman Rank correlation (Table 3). No overall significance in scoring values for the three observer groups (slides versus views) was shown in Table 2. However, Table 3 showed a high correlation value indicating that landscape tastes were similar throughout the observed population. Both results disproved Hypothesis II suggesting that a general agreement on taste does exist amongst the population. This again tends to support the use of "expert" observers to represent the general public in landscape evaluations, since their landscape tastes are similar.



Table 1. *One-way analysis of variance between different observer groups.*

	SLIDES		
	Crit. F	Test F	Significant Difference
Geographers versus Environmental Scientists	4.18	1.42	None
Geographers versus Public	3.25	0.98	None
Environmental Scientists versus Public	4.18	1.65	None
	VIEWS		
	Crit. F	Test F	Significant Difference
Geographers versus Environmental Scientists	4.18	0.41	None
Geographers versus Public	3.25	1.20	None
Environmental Scientists versus Public	4.18	0.81	None

Table 2. *Overall analysis of variance for various observer groups.*

	SLIDES		
	Crit. F	Test F	Significant Difference
Geographers versus Environmental Scientists versus Public	3.25	0.98	None
	VIEWS		
	Crit. F	Test F	Significant Difference
Geographers versus Environmental Scientists versus Public	3.25	1.20	None

Table 3. *Spearman rank correlation values for various groups of observers.*

	Correlating Coefficient	Crit. N (1%)	Significant Correlation
Geographers versus Environmental Scientists	0.988	0.794	Yes
Geographers versus Public	0.879	0.794	Yes
Environmental Scientists versus Public	0.903	0.794	Yes

### CONCLUSION

With regard to taste and consensus in coastal landscape evaluation, this study has served to add substance to two of the basic assumptions

on which existing methods of such landscape evaluations are based. Results suggested that the general population agrees on both landscape tastes (*re*: ranking of landscape types) and on the qualitative values they attribute to

the landscape. Therefore the "experts" present role of "landscape assessor by-appointment" is in a sense justified because tastes were homogeneous in the general population.

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